SPIE. PHOTONICS WEST

INTERNATIONAL YEAR OF LIGHT 2015

2015

2015 TECHNICAL PROGRAM.

PHOTONICS WEST EXHIBITION

BIOS EXPO

WWW.SPIE.ORG/PW15

The Moscone Center
San Francisco, California, USA

Conferences & Courses
7–12 February 2015

BiOS EXPO
7–8 February 2015

Photonics West Exhibition
10–12 February 2015

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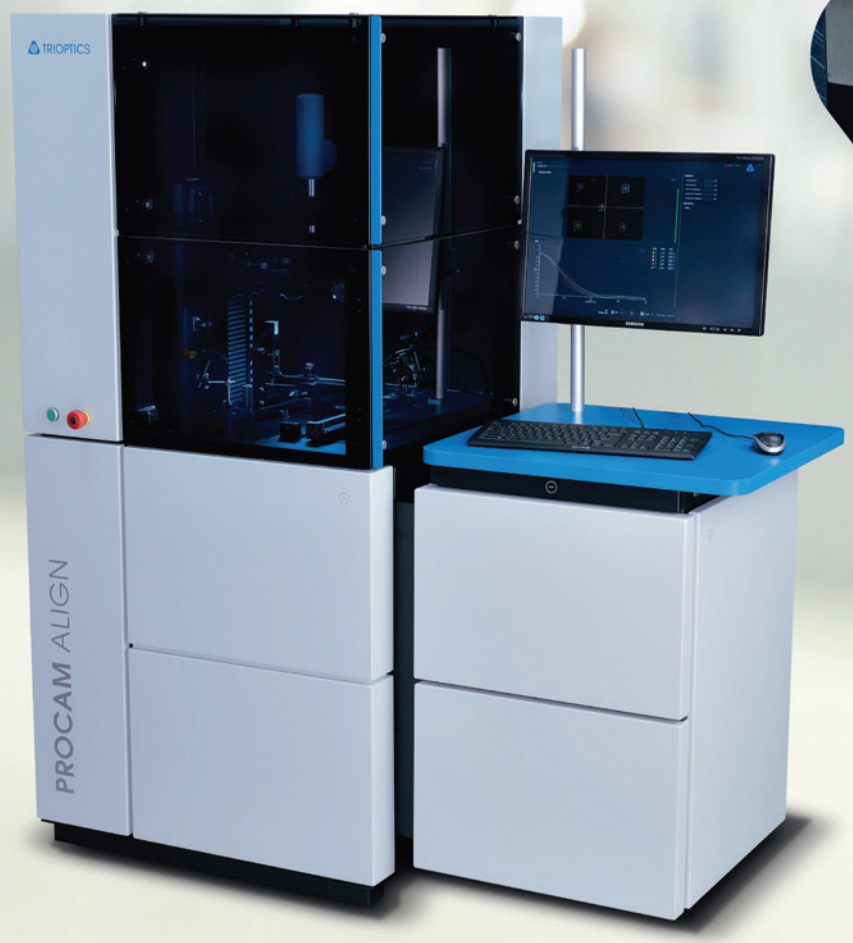

See us at
Photonics West
Hall B
Booth #1833

www.trioptics.com

SPIE. PHOTONICS WEST

The Moscone Center
San Francisco, California, USA

DATES
Conferences & Courses:
7–12 February 2015

TWO EXHIBITIONS
BiOS EXPO: 7–8 February 2015
Photonics West: 10–12 February 2015

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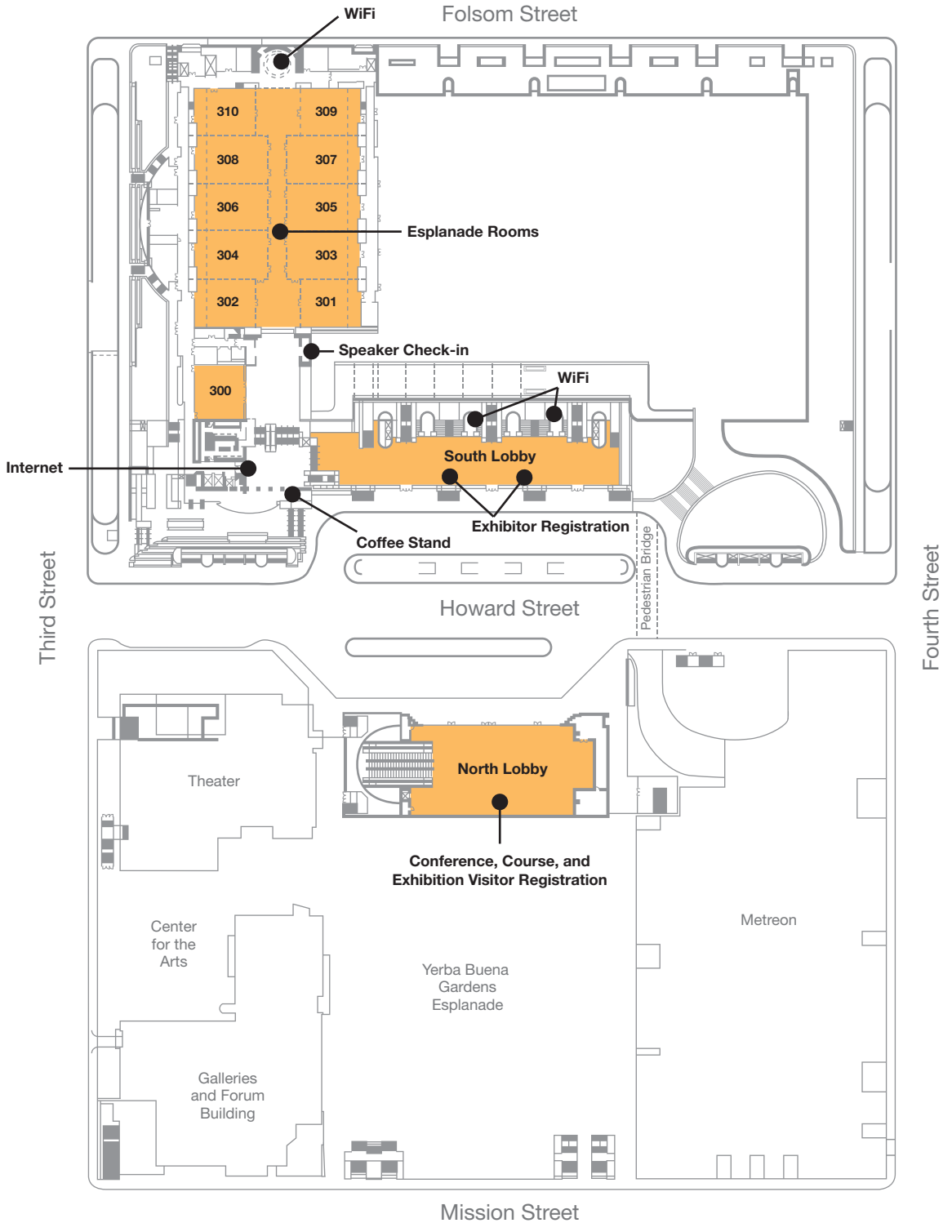
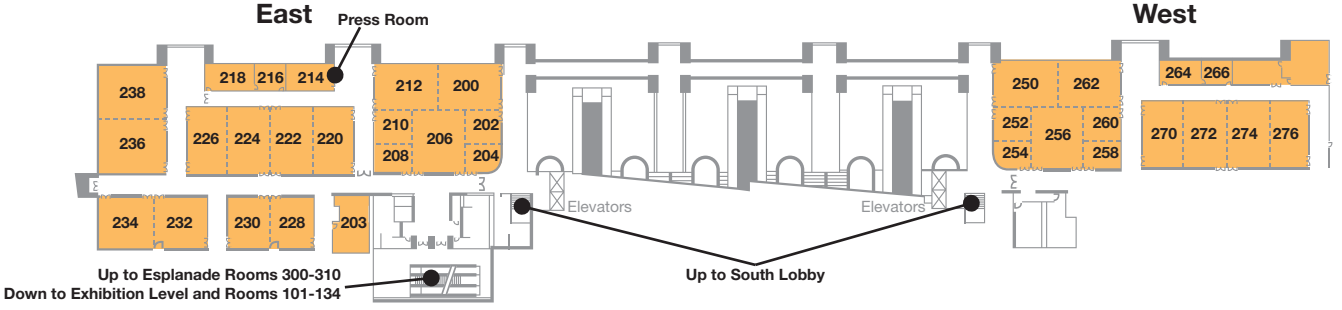
SPIE is the international society for optics and photonics, a not-for-profit organization founded in 1955 to advanced light-based technologies. The Society serves nearly 225,000 constituents from approximately 150 countries, offering conferences, continuing education, books, journals, and a digital library in support of interdisciplinary information exchange, professional growth, and patent precedent. SPIE provided $3.4 million in support of education and outreach programs in 2014.

THE MOSCONE CENTER

Esplanade/Lobby Levels



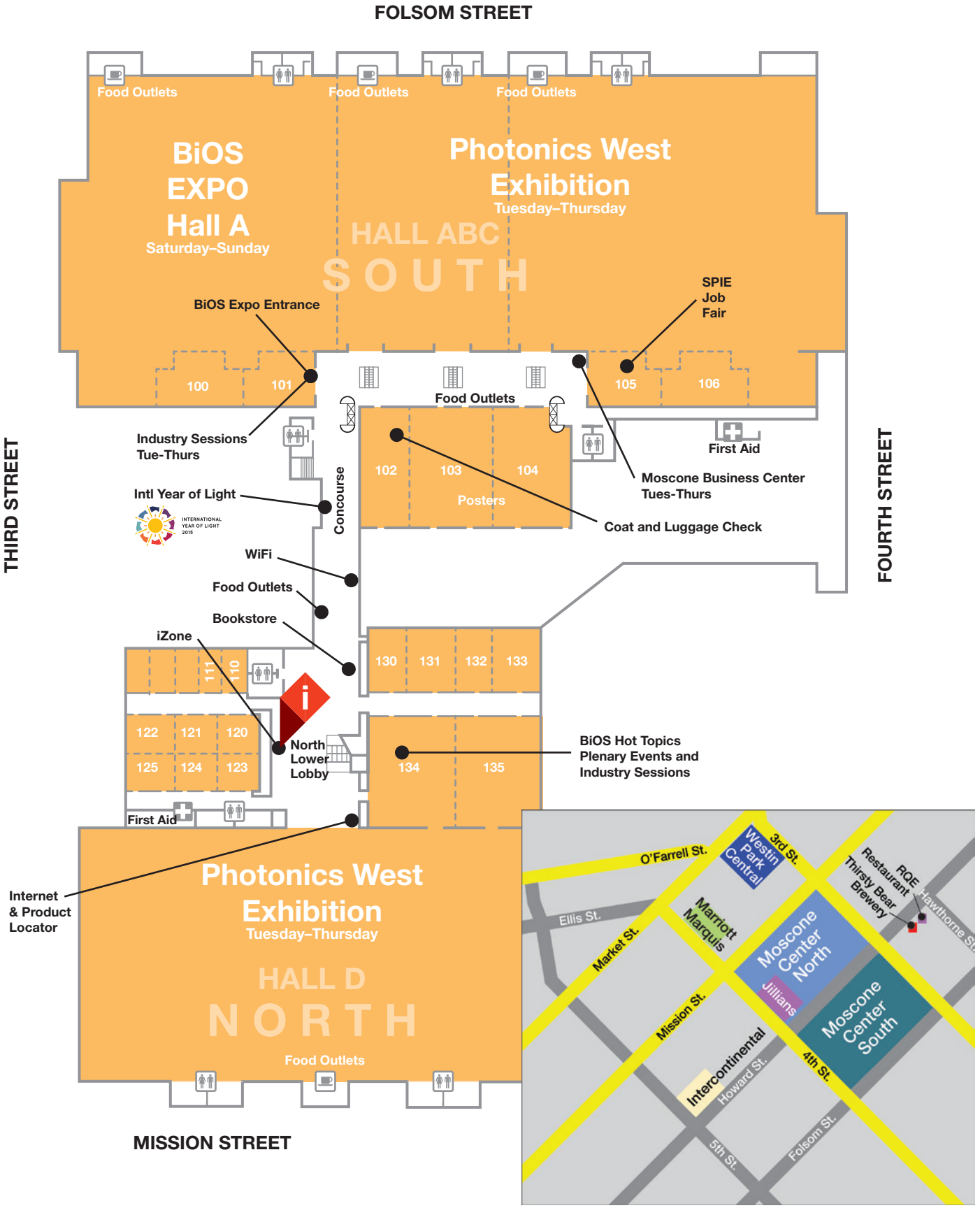
Mezzanine Level



SPIE THANKS THE FOLLOWING CONFERENCE SPONSORS

THE MOSCONE CENTER

EXHIBIT LEVEL



Join us in celebrating the International Year of Light

The International Year of Light is a global initiative highlighting to the citizens of the world the importance of light and light-based technologies in their lives, for their futures, and for the development of society.

We hope that the International Year of Light will increase global awareness of the central role of light in human activities and that the brightest young minds continue to be attracted to careers in this field.

INTERNATIONAL
YEAR OF LIGHT
2015

UNESCO | SPIE.

For more information on how you and your organization can participate, visit **www.spie.org/IYL**

BIOS TECHNICAL CONFERENCE INDEX

SPIE. PHOTONICS WEST BIOS

THE WORLD'S LARGEST INTERNATIONAL BIOMEDICAL OPTICS AND BIOPHOTONICS CONFERENCE

SYMPOSIUM CHAIRS:

James Fujimoto
Massachusetts Institute of Technology (USA)

R. Rox Anderson
Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA), and Harvard School of Medicine (USA)

PHOTONIC THERAPEUTICS AND DIAGNOSTICS

Program Chair: **Brian Jet-Fei Wong,** Beckman Laser Institute and Medical Clinic, Univ. of California, Irvine (USA)

CLINICAL TECHNOLOGIES AND SYSTEMS

Program Chairs: **Tuan Vo-Dinh,** Fitzpatrick Institute for Photonics, Duke Univ. (USA) and **Anita Mahadevan-Jansen,** Vanderbilt Univ. (USA)

TISSUE OPTICS, LASER-TISSUE INTERACTION, AND TISSUE ENGINEERING

Program Chairs: **Steven L. Jacques,** Oregon Health & Science Univ. (USA)

BIOMEDICAL SPECTROSCOPY, MICROSCOPY, AND IMAGING

Program Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA); **Daniel L. Farkas,** Univ. of Southern California (USA)

NANO/BIOPHOTONICS

Program Chairs: **Paras Prasad,** SUNY/Univ. Buffalo (USA); **Dan V. Nicolau,** McGill Univ. (Canada)

SPIE. PHOTONICS WEST TRANSLATIONAL RESEARCH

SYMPOSIUM CHAIRS:

Bruce J. Tromberg
Beckman Laser Institute,
Univ. of California, Irvine (USA)

Gabriela Apiou
Harvard Medical School, Wellman Ctr.
for Photomedicine, Massachusetts
General Hospital (USA)

SPIE Translational Research 2015 highlights papers from BiOS that showcase the latest photonics technologies, tools, and techniques with high potential to impact healthcare.

TOPIC AREAS

Translational Research Lunchtime Forum
Sunday 8 February · 12:30 to 2:00 pm
Location: Room 300 (Esplanade)

Discussion Facilitators: **Bruce J. Tromberg** and **Gabriela Apiou**

A discussion of outcomes-based studies that can change the lives of patients. Select participants from the Translational Research virtual symposium will have the opportunity to present their methodology and findings. These speakers will demonstrate the use of optical/light-based techniques that are innovative and clever and can change the outcome for patients in a positive and life-giving way.

Best Paper Awards in the category of evidence-based medicine will be presented.

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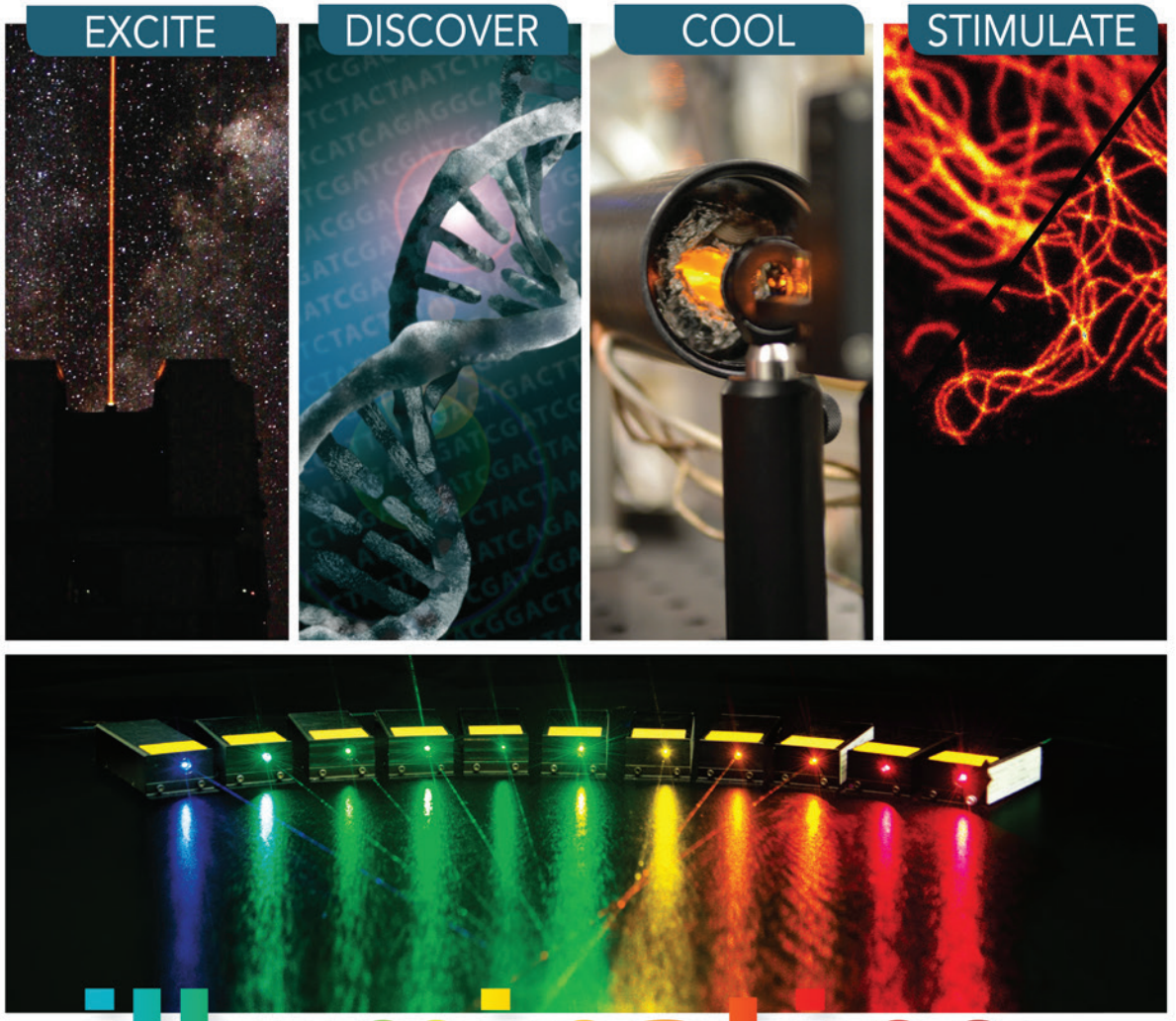

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LASE TECHNICAL CONFERENCE INDEX

SPIE. PHOTONICS WEST LASE

THE PREMIER LASER TECHNOLOGY AND APPLICATIONS CONFERENCE

SYMPOSIUM CHAIRS:

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Yongfeng Lu, Univ. of Nebraska-Lincoln (USA)

SYMPOSIUM CO-CHAIRS:

Bo Gu, Bos Photonics (USA)

Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

LASER SOURCE ENGINEERING

Program Chair: **Gregory J. Quarles,** Optoelectronics Management Network (USA)

NONLINEAR OPTICS

SEMICONDUCTOR LASERS AND LEDS

Program Chair: **Klaus P. Streubel,** OSRAM AG (Germany)

LASER MICRO-/NANOENGINEERING

Program Chairs: **Henry Helvajian,** The Aerospace Corp. (USA) and **Alberto Piqué,** U.S. Naval Research Lab. (USA)

LASER APPLICATIONS

OPTO TECHNICAL CONFERENCE INDEX

SPIE. PHOTONICS WEST OPTO

ADVANCEMENTS IN INTEGRATED OPTOELECTRONIC DEVICES, SEMICONDUCTOR LASERS, LEDS, AND MOEMS-MEMS.

SYMPOSIUM CHAIRS:

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Univ. of East Anglia (United Kingdom)

Alexei L. Glebov
OptiGrate Corp. (USA)

SYMPOSIUM CO-CHAIRS:

Jean Emmanuel Broquin
IMEP-LAHC (France)

Shibin Jiang
AdValue Photonics, Inc. (USA)

OPTOELECTRONIC MATERIALS AND DEVICES

Program Chair: **James G. Grote,** Air Force Research Lab. (USA)

PHOTONIC INTEGRATION

Program Chair: **Yakov Sidorin,** Quarles & Brady LLP (USA)

NANOTECHNOLOGIES IN PHOTONICS

Program Chair: **Ali Adibi,** Georgia Institute of Technology (USA)

MOEMS-MEMS IN PHOTONICS

Program Chairs: **Holger Becker,** microfluidic ChipShop GmbH (Germany) and **Winston V. Schoenfeld,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

ADVANCED QUANTUM AND OPTOELECTRONIC APPLICATIONS

Program Chair: **Zameer U. Hasan,** Temple Univ. (USA)

SEMICONDUCTOR LASERS AND LEDS

Program Chair: **Klaus P. Streubel,** OSRAM AG (Germany)

DISPLAYS AND HOLOGRAPHY

Program Chair: **Liang-Chy Chien,** Kent State Univ. (USA)

OPTICAL COMMUNICATIONS: DEVICES TO SYSTEMS

Program Chair: **Benjamin Dingel,** Nasfine Photonics, Inc. (USA)

GREEN PHOTONICS + 3D PRINTING TECHNICAL CONFERENCE INDEX

SPIE. PHOTONICS WEST GREEN PHOTONICS

SYMPOSIUM CHAIR

Stephen J. Eglash
Stanford Data Science Initiative,
Stanford Univ. (USA)

SPIE Green Photonics 2015 highlights papers from BiOS, OPTO, and LASE that showcase the latest photonics and optoelectronic tools and materials that will reduce power consumption, enable cleaner manufacturing, and create new energy generation for a broad range of applications.

TOPIC AREAS PAGE

SPIE. PHOTONICS WEST 3D PRINTING

SYMPOSIUM CHAIR

Henry Helvajian
The Aerospace Corp. (USA)

SPIE Applications of 3D Printing 2015 highlights papers from BiOS, LASE, and OPTO that showcase innovative ways to apply this multidimensional/multidisciplinary technology.

SPECIAL EVENT DAILY SCHEDULE

Saturday · 7 February

BiOS EXPO

Saturday · 12:00 to 5:00 pm
Sunday · 10:00 am to 5:00 pm

Charting a Course in the Photonics Industry, 1:30 to 3:30 pm, p. 47

BiOS Interactive Poster Session, 3 to 4 pm, p. 19

Pascal Rol Award (Conf. 9307), 5:45 to 6 pm, p. 22

BiOS Hot Topics, 7 to 9:30 pm, p. 18

Sunday · 8 February

Translational Research Lunchtime Forum, 12:30 to 2 pm, p. 19

Lunch with the Experts - A BiOS Student Networking Event, 12:30 to 1:30 pm, p. 44

Charting a Course in the Photonics Industry, 1:30 to 3:30 pm, p. 47

PicoQuant Young Investigator Award (Conf. 9331), 3:25 to 3:35 pm, p. 22

FDA Policies and Procedures, 5 to 7 pm, p. 19

BiOS Interactive Poster Session, 5:30 to 7 pm, p. 19

Student Chapter Meeting, 6 to 9 pm, p. 44

BiOS Sunday Plenary, 7 to 8:30 pm, p. 20

HEAR TWO NOBEL LAUREATES

Monday · 9 February

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The Craft of Scientific Presentations: A Workshop on Technical Presentations, 8:30 am to 12:30 pm, p. 48

JenLab Young Investigator Award (Conf. 9329), 9:35 to 10:05 am, p. 22

The Craft of Scientific Writing: A Workshop on Technical Writing, 1:30 to 5:30 pm, p. 48

SPIE Fellows Luncheon, 2 to 1:30 pm, p. 44

HEAR A NOBEL LAUREATE

Funding your Photonics Venture, 2:30 to 4:00 pm, p. 33

Student Poster Session Competition Award Presentation (Conf. 9329), 2:50 to 3:05 pm, p. 22

Startups Need More Than Money, 4:00 to 5:30 pm, p. 33

Cluster Reception and "Photonics Industry Update" Presentation, 5 to 6:30 pm, p. 33

Women in Optics Panel Discussion and Reception, 5 to 6:30 pm, p. 45

BiOS Interactive Poster Session, 5:30 to 7:30 pm, p. 19

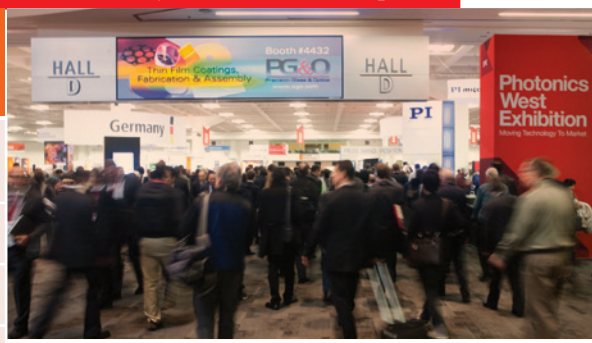
Ocean Optics Young Investigator Award (Conf. 9338), 5:50 to 6:05 pm, p. 22

Photonics West Welcome Reception, 7 to 8:30 pm, p. 45

Tuesday · 10 February	Wednesday · 11 February	Thursday · 12 February

PHOTONICS WEST EXHIBITION

Tuesday · 10:00 am to 5:00 pm
Wednesday · 10:00 am to 5:00 pm
Thursday · 10:00 am to 4:00 pm



SPIE Career Center JOB FAIR

Tuesday · 10:00 am to 5:00 pm
Wednesday · 10:00 am to 5:00 pm

SPIE Senior Member Breakfast, 8 to 9 am, p. 45

Partners in Photonics: How Technology Businesses Can Expand their Capabilities with Strategic Partnerships, 8 to 10 am, p. 33

Financing Life Sciences and Healthcare Business, 8:30 to 10 am, p. 33

Nano/Biophotonics Plenary Session, 10:30 to 11:30 am, p. 20

ITAR and Other International Trade Regulations, 10:30 am to 12:30 pm, p. 34

Best Student Presentation Award (Conf. 9349), 12:20 to 12:30 pm, p. 26

3D Printing: A Manufacturing Revolution, 12:30 to 1:30 pm, p. 34

Lunch with the Experts - A Student Networking Event, 12:30 to 1:30 pm, p. 45

Industry Keynote Presentation: Silicon Photonics for a New Era of Scalable Bandwidth, 1:30 to 2:00 pm, p. 35

Magnifying Your IP IQ: Topics for the Savvy Optics Intellectual Property Manager, 1:30 to 3:30 pm, p. 35

Resumes to Interviews: Strategies for a Successful Job Search, 1:30 to 4:30 pm, p. 47

Student Chapter Info Session, 1:45 to 2:30 pm, p. 45

Neurophotonics Plenary Session, 2 to 3 pm, p. 20 — HEAR A NOBEL LAUREATE

Silicon Photonics and Photonic Integrated Circuits: An Industry Perspective, 2 to 3 pm, p. 35

Best Student Paper Competiation (Conf. 9355), 2 to 4:30 pm, p. 26

IMEC-MOSIS Silicon Photonics Workshop, 3:30 to 5, p. 36

Speed Networking Social, 4:30 to 6 pm, p. 46

2015 Updates to the U.S. Munitions List that Will Impact ITAR—What Would You Like to See Changed, 5 to 7 pm, p. 36

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Seno Medical Best Paper Award (Conf. 9323), 5:40 to 6:10 pm, p. 22

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IBOS: International Biomedical Optics Society Session, 7:30 to 9 pm, p. 21

Laser Communication Technical Event, 7:30 to 9 pm, p. 24

The Nature of Light: What Are Photons? Workshop, 7:30 to 9 pm, p. 29

Holography Technical Event, 7:30 to 9 pm, p. 29

SPIE Member Reception, 8 to 9:30 pm, p. 46

Working Hard and Earning Big: The recipe for making good money in optics and photonics, 8 to 9:30 am, p. 37

Conflict Minerals: What You Need to Know, 8 to 10 am, p. 37

Inbound Marketing: How to Bring Customers to You, 10:30 am to 12 pm, p. 38

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Career Advancement through SPIE Involvement, 11:30 am to 12:30 pm, p. 47

Executive Perspectives on the World of Optics and Photonics, 1:30 to 2:30 pm, p. 38

Getting Hired Panel, 1:30 to 2:30 pm, p. 38

Hiring Strategies: How to Hire the Best Employees, 3 to 4:30 pm, p. 38

Best Student Paper Competition (Conf. 9361), 3:30 to 3:50 pm, p. 30

SPIE Startup Challenge, 3:30 to 6 pm, p. 38

Best Student Paper Competition (Conf. 9362), 5:20 to 5:30 pm, p. 30

OPTO Interactive Poster Session, 6 to 8 pm, p. 29

PRISM Awards Ceremony and Banquet, 6 to 10 pm, p. 40

"No Ties" Student Social, 8 to 10 pm, p. 46

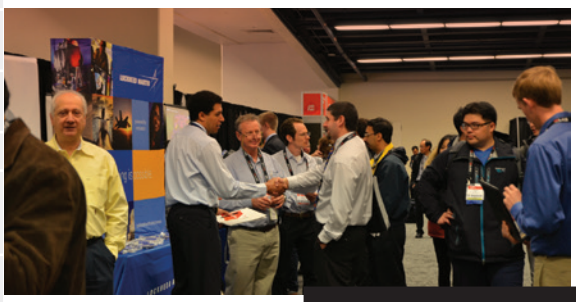
Photonics Industry Update: A Global Industry Profile, 9:15 to 9:45 am, p. 40

Startup Alley: Commercialization and Prototype Showcase, 10 am to 12 pm, p. 40

Software Tutorial on Optoelectronic Device Simulation, 1 to 5 pm, p. 40

Best Student Paper Competition (Conf. 9350), 4:40 to 4:50 pm, p. 26

Best Student Oral Paper Competition (Conf. 9344), 5:10 to 5:30 pm, p. 26



BIOS SPECIAL EVENTS

SPIE. PHOTONICS WEST BIOS

BiOS Hot Topics

Saturday 7 February · 7:00 to 9:30 pm · Location: Room 134 (Exhibit Level)

Hear the latest technical breakthroughs and directions from leading worldwide experts. Access to the BiOS Hot Topics included with your conference registration.

7:00 to 7:10 pm

Welcome and Introduction

James Fujimoto
Massachusetts Institute of Technology (USA)
BiOS 2015 Symposium Chair

R. Rox Anderson
Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard School of Medicine (USA)
BiOS 2015 Symposium Chair

7:10 to 7:15 pm

Presentation of 2015 Britton Chance Biomedical Optics Award

PRESENTED BY SPIE PRESIDENT

Toyohiko Yatagai
Utsunomiya Univ. (Japan)

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. The SPIE Awards Committee has chosen Lihong Wang of Washington Univ. in St. Louis in recognition of his pioneering technical contributions and visionary leadership in the development and application of photo-acoustic tomography, photoacoustic microscopy and photon transport modeling.

Photon-Phonon Synergy: Photoacoustic Tomography and Beyond

Lihong Wang
Washington Univ. in St. Louis (USA)
(2015 Britton Chance Biomedical Optics Award Winner)

7:35 to 7:40 pm

Hot Topics Facilitator

Sergio Fantini
Tufts Univ. (USA)

7:40 to 7:55 pm

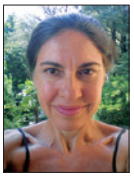
Cancer Screening and Nanoscale Cytology

Vadim Backman
Northwestern Univ. (USA)

7:55 to 8:10 pm

Endoscopic OCT

Brett Bouma
Wellman Ctr. for Photomedicine (USA)



8:10 to 8:25 pm

Optical Assessment of Collagen and Breast Cancer

Paola Taroni
Politecnico di Milano (Italy)

8:25 to 8:40 pm

Fluorescence-guided Resection of Intracranial Tumor

David Roberts
Dartmouth Hitchcock Medical Ctr. (USA)

8:40 to 8:55 pm

Adaptive Optics for the Retina

Richard Rosen
New York Eye and Ear Infirmary (USA)

8:55 to 9:10 pm

Nonlinear Microscopy

Peter So
Massachusetts Institute of Technology (USA)

9:10 to 9:55 pm

Simultaneous Imaging of Neural Activity in 3D

Rafael Yuste
Columbia Univ. (USA)

BiOS Interactive Poster Sessions

Saturday-Sunday 7–8 February
(with BiOS EXPO) . . . . . 3:00 to 4:00 pm
Location: Hall A

Sunday 8 February . . . . . 5:30 to 7:00 pm
Location: Room 103 (Exhibit Level)

Monday 9 February . . . . . 5:30 to 7:30 pm
Location: Room 103 (Exhibit Level)

Tuesday 10 February (with LASE) . . . . . 6:00 to 8:00 pm
Location: Room 103 (Exhibit Level)

Conference attendees are invited to attend the BiOS poster sessions throughout the week. Come view the posters, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Please see individual conference programs for poster session timing. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors: view poster presentation guidelines and set-up instructions at www.spie.org/PWPosterGuidelines

Translational Research Lunchtime Forum

Sunday 8 February · 12:30 to 2:00 pm
Location: Room 300 (Esplanade)

DISCUSSION FACILITATORS:

Bruce J. Tromberg
Beckman Laser Institute,
Univ. of California, Irvine (USA)

Gabriela Apiou
Harvard Medical School,
Wellman Ctr. for Photomedicine,
Massachusetts General Hospital
(USA)

A discussion of outcomes-based studies that can change the lives of patients. Select participants from the Translational Research virtual symposium will have the opportunity to present their methodology and findings. These speakers will demonstrate the use of optical/light-based techniques that are innovative and clever and can change the outcome for patients in a positive and life-giving way.

Best Paper Awards in the category of evidence-based medicine will be presented.

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Optical Coherence Tomography News

FDA Policies and Procedures: What Academic Investigators and Small Business Should Know

Sunday 8 February 2015 · 5:00 to 7:00 pm
Location: Room 300 (Esplanade)

CHAIRS:

Warren Grundfest
Univ. of California, Los Angeles (USA)

Ramesh Raghavachari
U.S. Food and Drug Administration (USA)

Come hear speakers from regulatory agencies share their perspectives and advice on incorporating regulatory requirements into product development and how to achieve successful regulatory strategies. In addition, small business owners will gain valuable business perspectives concerning 3rd party review and regulatory approval for medical devices.

SPEAKERS INCLUDE:

Roger Bagwell
Actuated Medical (USA)

Small Business Experience in Regulatory Approval and Commercialization of Medical Devices

Actuated Medical Inc. (27 employees) is developing a variety of medical devices that use an actuation component. AMI currently has 510(k) Clearance and CE Mark on its TubeClear technology in addition to several other products in development. AMI has leveraged a variety of resources to take devices to market, which can be difficult for a small business. Key to this approach was first outfitting a facility that allows rapid development of innovative products, including machining and 3D printing. Taking devices through regulatory approvals and to market requires having more sophisticated processes in place than we originally realized. For example, AMI is certified ISO 13485:2003 which represents a comprehensive quality management system for the design and manufacture of medical devices (thus FDA cGMP compliant) and ISO 14971:2007 which details the requirements for application of a risk management system for medical devices. Another key is the ability to manufacture, even in small volumes, devices that are ready for verification and validation, to be shown to investors, submitted for follow-on funding, and/or manufactured for pre-clinical or human-use studies. AMI is also set up to manufacture devices in unit volumes of 100s per month, as initial sales are developed. Initial sales and regulatory approvals, along with patent protection and many other factors, are key to attracting a partner to: a) distribute, or b) buy out your technology package.

Martin Culjat
Farus, LLC; Univ. of California, Los Angeles (USA)

FDA Submissions for Start-Up Medical Device Companies

Many academic investigators and start-up personnel have a basic understanding of the regulatory process for medical devices, but are unsure how the process applies to them and where to start. This talk will provide a unique perspective for researchers seeking to prepare a 510(k) application for a class II medical device.

A representative from FDA will also speak during this session.

BIOS SPECIAL EVENTS

BiOS Sunday Plenary

Sunday 8 February · 7:00 to 8:30 pm
Location: Room 134 (Exhibit Level)

PLENARY SESSION CHAIRS:

Ammasi Periasamy
Univ. of Virginia (USA)

Rainer Erdmann
PicoQuant GmbH (Germany)

Bruce Tromberg
Beckman Laser Institute and Medical Ctr. (USA)

All Photonics West technical attendees are invited to listen to the scientists who shared the 2014 Nobel Prize in Chemistry. They will speak about their prize-winning work in the field of super-resolution microscopy. The session includes an extended question-and-answer period, allowing broad audience participation.

Attendees may submit questions in advance at http://spie.org/nobelqa or use the QR code

Stefan W. Hell
Max Planck Institute Göttingen
(2014 Nobel Laureate in Chemistry)

Eric Betzig
Janelia Research Campus, Howard Hughes Medical Institute (USA)
(2014 Nobel Laureate in Chemistry)

W.E. Moerner
Stanford Univ. (USA)
(2014 Nobel Laureate in Chemistry)

Let's celebrate the winners and the role that photonics and imaging play in providing better insight in monitoring the interplay between individual molecules inside cells, in observing disease-related proteins aggregate, and in tracking cell division at the nanolevel.

Nano/Biophotonics Plenary Session

Tuesday 10 February · 10:30 to 11:30 am
Location: Room 134 (Exhibit Level)

Welcome and Introduction
Dan Nicolau
McGill Univ. (Canada)

Bridging Molecular and Cellular Biology with Optics
Gabriel Popescu
Univ. of Illinois at Urbana-Champaign (USA)

Understanding the structure and function of living cells from the nano to the micron scale remains a grand challenge. While X-ray diffraction and electron microscopy reveal nanoscale information from cellular structures, they operate with lifeless specimens. By contrast, optical techniques are well suitable for studying live cells. However, the resolution of the far-field "linear" microscopy is approximately 300 nm, a manifestation of Heisenberg's uncertainty relation. Thus, pushing the biophotonics investigation toward the molecular scale is faced with significant challenges but also with unique opportunities. We will describe various principles dedicated to this goal and present some recent advances in phase sensitive measurements.

Neurophotonics Plenary

Tuesday 10 February · 2:00 to 3:00 pm
Location: Room 310 (Esplanade)

Session Chair: **Qingming Luo**
Huazhong Univ. of Science and Technology (China)

2:00 to 2:45 pm

The Neurexin Enigma—from Synapse Formation to Schizophrenia

Thomas C. Südhof
Stanford Univ. School of Medicine (USA)
(2013 Nobel Laureate)

Neurexins and their ligands are trans-synaptic cell-adhesion molecules that are essential for synapse function, and that shape the properties of synapses such as short- and long-term plasticity. Neurexins are presynaptic cell-adhesion molecules that are encoded by three extraordinarily large genes, each of which generates longer ∝- and shorter β-isoforms that are in turn diversified into thousands of alternatively spliced transcripts. Neurexins bind to multiple postsynaptic ligands, including neuroligins, LRRTMs, and the complex of cerebellins with GluRσ2. The various splice variants of neurexins and the various isoforms of their ligands exhibit strikingly different functional activities and binding affinities; their interactions are likely competitive, and contribute to determining the properties and nature of synapses. Accumulating evidence demonstrates that neurexins and their ligands perform central functions in the assembly and function of neural circuits, but their precise roles and mechanisms of action are only now beginning to emerge. Moreover, many different mutations in neurexin and their ligands have been associated with autism, schizophrenia and intellectual disability, suggesting that the functions of these molecules are relevant for insight into these devastating disorders. In my talk, I will describe our recent studies on how neurexins and their ligands shape synapse properties, and how dysfunction of neurexins and their ligands might predispose to neuropsychiatric disorders.

2:45 to 3:00 pm
Questions and Discussion

IBOS: International Biomedical Optics Society

Tuesday 10 February · 7:30 to 9:00 pm
Location: InterContinental Hotel, Ballroom C

Session Chairs: **Jennifer Barton,** The Univ. of Arizona (USA),
Lihong Wang, Washington Univ. in St. Louis (United States)

Biomedical optics is a major growth area in modern medicine. The International Biomedical Optics Society is a nonprofit interdisciplinary group that provides a unique channel for communications among physicians and clinicians employing optics in medicine and the scientists and engineers who provide foundations for advancements in this field. The BiOS symposium, where IBOS meets, is the premier annual international forum for discussions and announcements of technical/clinical and educational/pedagogical developments in the use of lasers, optical fibers, spectroscopic diagnostic techniques, and related areas of optical medicine.

All registered conference participants are encouraged to attend this evening session. Attendees are required to wear their conference badges.

The 2014 program will include the following presentation:

Transforming Medicine and Surgery with Biophotonics

Stephen Boppart
Univ. of Illinois at Urbana-Champaign (USA)

Disease originates at the molecular and cellular level. Therefore, there is a clear need for biophotonics and optical imaging devices in medicine and surgery to detect and diagnose disease at these scales, and do so at the point-of-care or the point-of-procedure. This presentation will highlight some of the key elements and challenges for translational and transformational research, for moving technologies from the academic lab toward commercialization.

Seeking Light: International Opportunities for Biophotonics Funding and Collaborations

Tuesday 10 February · 5:30 to 7:00 pm
Location: InterContinental Hotel, Sutter

MODERATORS:

Mark Hutchinson
Univ. of Adelaide (Australia)

Katarina Svanberg
Lund Univ. Hospital (Sweden)

Dennis Matthews
Univ. of California,
Davis Medical Ctr. (USA)

In this the International Year of Light, we have been provided with an exciting opportunity to look outwards and communicate our excitement for light in its many forms, and the research fields that examine it. This horizon gazing is not new to SPIE Photonics West, with attendees contributing to a proud history of innovative paradigm shifting research. But have the funding mechanisms that support such research kept up?

Inherent to cutting edge research are high risk, but high reward ideas that may be ahead of their time. Funding such research can be difficult. Endeavours such as these can be supported by new trans-disciplinary funding opportunities, such as that awarded to the $38M Australian Research Council Centre of Excellence for Nanoscale BioPhotonics. Here over 100 researchers from diverse disciplines have come together to tackle grand challenges of developing nanoscale biophotonic sensors. This is the kind of work that normal funding mechanisms cannot facilitate.

This forum will provide an opportunity of networking and collaboration. You will hear from the Director of the Centre of Excellence for Nanoscale BioPhotonics about their research program and collaboration opportunities. Additionally, you will learn from NIH program officers and European Union funding agencies about ways to engage in collaborative international research with Centres such as the Centre for Nanoscale BioPhotonics, and opportunities to gain funding support to support your grand trans-disciplinary and translational research aspirations.

BiOS 2015 Best Paper Awards

PicoQuant Young Investigator Award

Part of: Single Molecule Spectroscopy and Superresolution Imaging VIII (Conf. 9331)

Sunday 8 February · Location: Room 307 (Esplanade)

AWARD CEREMONY · 3:25 to 3:35 pm

We are pleased to announce that a prize will be awarded to the best oral presentation by a presenter under the age of 32 within Conference 9331 Single Molecule Spectroscopy and Imaging VIII. Participants must be both the primary author and presenter of an accepted abstract to be eligible.

PRIZE DONATED BY:

PicoQuant

Pascal Rol Award 2015

Part of: Ophthalmic Technologies XXV (Conf. 9307)

Sunday 8 February · 5:45 to 6:00 pm
Location: Room 305 (Esplanade)

Outstanding extended abstracts submitted to the Ophthalmic Technologies conference will be nominated for the Pascal Rol Award for Best Paper in Ophthalmic Technologies. The award and prize will be presented after the last scientific session of the conference to recognize the best paper and presentation. The 2014 recipient of the Pascal Rol Award was Dr. Yosi Mandel from Stanford University (see www.pascalrolfoundation.org).

JenLab Young Investigator Award

Part of: Multiphoton Microscopy in the Biomedical Sciences XV (Conf. 9329)

Monday 9 February · 9:35 to 10:05 am
Location: Room 308 (Esplanade)

We encourage graduate students, postdocs, or scientists who are not more than 32 years old to apply for the JenLab Young Investigator Award. To receive this $2,000 cash award, (1) participants must be both the primary author and presenter of an accepted abstract in the Poster Session, and (2) the associated proceedings paper must be submitted at least 2 weeks prior to the meeting start dates for review by the selection committee.

PRIZE DONATED BY:

JenLab

Best Student Paper Award

Part of: Microfluidics, BioMEMS, and Medical Microsystems XII (Conf. 9320)

We are pleased to announce that a cash prize will be awarded to the best student paper in this conference. Qualifying papers and presentations will be evaluated by the awards committee and the winner will be notified at the end of, or after, the meeting.

AWARD SPONSORS:

microfluidic ChipShop

OCMI The Ohio Center for Microfluidic Innovation at The University of Cincinnati

Student Poster Session Competition

Part of: Multiphoton Microscopy in the Biomedical Sciences XV (Conf. 9329)

Monday 9 February · 2:50 to 3:05 pm
Location: Room 308 (Esplanade)

Graduate Students and postdoctoral fellows with accepted posters can participate in the poster session competition of the conference on Multiphoton Microscopy in the Biomedical Sciences. There is a cash award for the winner(s). The participants should mention that their submission is for the "Students Poster Session Competition (SPSCMP)." The participants should follow the rules and regulations of SPIE for submission of their abstract and manuscript.

PRIZE DONATED BY:

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Ocean Optics Young Investigator Award

Part of: Colloidal Nanocrystals for Biomedical Applications IX (Conf. 9338)

Monday 9 February · 5:50 to 6:05 pm
Location: Room 232 (Mezzanine)

Ocean Optics Young Investigator Award will be given for the best paper presented by a leading author who is either a graduate student or has graduated within less than five years of the paper submission date. The award consists of a $1,000 cash prize to the Young Investigator and $2,000 Ocean Optics equipment credit to the laboratory where the work was performed.

PRIZE DONATED BY:

Ocean Optics

Seno Medical Best Paper Awards

Part of: Photons Plus Ultrasound: Imaging and Sensing 2015 (Conf. 9323)

Tuesday 10 February · 5:40 to 6:10 pm
Location: Room 306 (Esplanade)

Seno Medical Instruments of San Antonio, Texas, will sponsor two Awards for this Conference: Best Paper and Best Poster presented. Proceedings manuscripts must be submitted by Friday, 30 January 2015 to be eligible. All manuscripts submitted by Friday, 30 Janary will be considered. Contact authors may submit their manuscript by signing into their www.spie.org accounts at http://spie.org/myaccount/.

PRIZE DONATED BY:

SENO MEDICAL INSTRUMENTS INC.

SPIE. PHOTONICS WEST LASE

LASE Plenary Session

Wednesday 11 February · 10:20 am to 12:30 pm · Location: Room 134 (Exhibit Level)

Attend the plenary session and hear the latest from worldwide experts. Access included with your conference registration.

10:20 to 10:25 am

Welcome and Opening Remarks

Guido Hennig
Daetwyler Graphics AG (Switzerland)

Yongfeng Lu
Univ. of Nebraska-Lincoln (USA)

10:25 to 10:30 am

Announcement of the Green Photonics Best Paper Award and the 3D Printing, Fabrication, and Manufacturing Best Paper Award

Stephen J. Eglash
Stanford Data Science Initiative; Energy and Environment Affiliates Program, Stanford Univ. (USA)

Henry Helvajian
The Aerospace Corp. (USA)

10:30 to 11:10 am

NASA's Optical Communications Program: 2015 and Beyond

Donald M. Cornwell, Jr.
NASA Headquarters, Space Communications and Navigation Program (USA)

NASA and MIT's Lincoln Laboratory in 2013 demonstrated the first two-way, high-rate (622 Mbps) laser communications from the Moon on the Lunar Laser Communication Demonstration. This talk will expand upon the results from that demonstration and expound upon how it has enabled an aggressive new program at NASA which now includes a laser communications relay demonstration (LCRD) from geo-synchronous orbit in 2018, a low-Earth-orbit (LEO) laser communications terminal on the International Space Station (ISS) that will relay data through LCRD in 2019, and NASA's current effort to develop the Deep-space Optical Terminal (DOT) for Mars and beyond in 2020.

Don Cornwell currently leads the Advanced Communications Division within the Space Communications and Navigation (SCaN) Program at NASA Headquarters. Dr. Cornwell received his Ph.D. in Electrical Engineering from the University of Maryland College Park and has been awarded 8 patents for his work on Raman amplifiers for fiber optic communication.

11:10 to 11:50 am

Coherent Combination of Ultrafast Laser Pulses: A Route to Joule-Class High Repetition Rate Femtosecond Lasers

Jens Limpert
Friedrich-Schiller-Univ. Jena (Germany)

The quality of any laser application crucially depends on the quality of the driving light source, i.e. the laser itself. Hence, it is not surprising that novel laser output parameters reveal new aspects of applications, or even open up novel opportunities. There are emerging applications, e.g. laser particle acceleration, asking for a laser architecture that efficiently allows for the combination of Petawatt (PW) peak powers with Megawatt (MW) average powers.

The fundamentals and the potential of coherent combination of a larger number of ultrafast fiber amplifiers, i.e. a fiber–based amplifying interferometer, will be reviewed.

Jens Limpert received his M.S in 1999 and Ph.D. in Physics from the Friedrich Schiller University of Jena in 2003. His research interests include high power fiber lasers in the pulsed and continuous-wave regime, in the near-infrared and visible spectral range. After a one-year postdoc position at the University of Bordeaux, France, where he extended his research interests to high intensity lasers and nonlinear optics, he returned to Jena and is currently leading the Laser Development Group at the Institute of Applied Physics. Together with his colleagues, he has invented novel large-mode-area fiber designs based on micro- and nanostructures. He has

also developed novel experimental strategies and, based on these strategies, demonstrated significant power scaling of high repetition rate ultrafast lasers systems, as well as new concepts of optical parametric interaction and high harmonic generation. He is author or co-author of more than 200 peer-reviewed journal papers in the field of laser physics. His research activities have been awarded with the WLT-Award in 2006, an ERC starting grant in 2009 and an ERC consolidator grant in 2013.

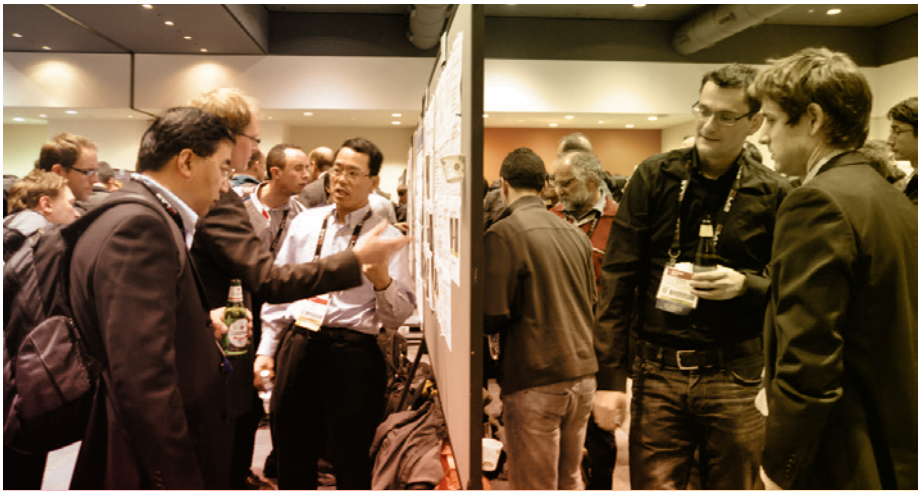
11:50 am to 12:30 am

Laser 3D Printing of Metallic Components and its Industrial Applications: Technical Breakthroughs and Opportunities

Xiaoyan Zeng
Wuhan National Lab. for Optoelectronics (China)

Laser melting deposition (LMD) with powder feeding and selective laser melting (SLM) with powder bedding are two typical methods of laser 3D printing to fabricate metallic components directly from designed 3D data with high performance, net-shape, short cycle, and almost 100% density. In this talk, the current status and main technical breakthroughs in both LMD and SLM in China will be introduced and compared from different aspects, including: compositions, microstructures, performances, and dimensional precisions of components. Laser 3D printing promises a revolutionary progress to shorten production cycles and costs, and to improve the component quality in aeronautics, astronautics, and other industrial fields in the coming years.

Prof. Xiaoyan ZENG received his Ph.D. in Materials Science and Engineering from Huazhong University of Science and Technology. Now he is the Deputy Director of Lasers and Terahertz Department, Wuhan National Laboratory for Optoelectronics (WNLO), Huazhong University of Science and Technology (HUST), China. His research interests include laser surface engineering, laser additive manufacturing, laser welding, and laser microprocessing. He has worked in laser materials processing field for 30 years, published more than 100 papers in the internationally reputable journals, and filed more than 40 Patents. Some of the processes he developed have been successfully applied in industrial applications.



LASE Interactive Poster Session

Tuesday 10 February · 6:00 to 8:00 pm
Location: Room 103 (Exhibit Level)

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines

Laser Communications

Tuesday 10 February · 7:30 to 9:00 pm
Location: InterContinental Hotel, Fremont

SESSION CHAIRS:

Hamid Hemmati
Jet Propulsion Lab. (USA)

Don Boroson
MIT Lincoln Lab. (USA)

This technical event on Laser Communications will hold its informal annual meeting in conjunction with the Free-Space Laser Communication and Atmospheric Propagation conference. All professionals involved in theory and applications of free-space laser communications, remote sensing and supporting technologies are invited to participate in an open discussion on a variety of topics related to the challenges and advancement of the field. Attendees are invited to bring suggestions for discussion topics.

SEE MAPS PP. 2–4

LASE 2015 Best Paper Awards

Best Student Presentation Award

Vertical External Cavity Surface Emitting Lasers (VECSELs) (Conf. 9349)

Tuesday 10 February · Location: Room 238 (Mezzanine)

AWARD CEREMONY · 12:20 to 12:30 pm

Throughout the conference, qualifying student oral presentations will be evaluated. Student presentations will be judged based on scientific merit, impact, and clarity of the presentation. While the award is not judged by the manuscript, a manuscript must be submitted.

AWARD SPONSOR:

COHERENT

Best Student Paper Competition

Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications (Conf. 9355)

Tuesday 10 February · Location: Room 258 (Mezzanine)

COMPETITION · 2:00 to 3:30 pm

JUDGING · 3:30 to 4:00 pm

AWARD CEREMONY · 4:00 to 4:20 pm

We are pleased to announce that **cash prizes and plaques** will be awarded to the best student presentations in this conference (1st, 2nd, and 3rd place; both poster and oral papers considered).

Papers submitted by **graduate and undergraduate** students are eligible. In order to ensure a fair evaluation, the conference chairs and the program committee will judge the students during a special student competition session held during the conference. Here the students present a brief **5-minute summary** of their original talk or poster presented at the conference. Candidates for the award need to be the presenting author, a full-time student, must have conducted the majority of the research presented in the paper, and must submit their manuscript to the conference proceedings.

Following the student competition, the judges will meet and decide on the top three students. Winners will be announced during the award ceremony. In order to claim your cash prize, a manuscript must be submitted to the conference proceedings.

AWARD SPONSORS:

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Best Student Paper Competition

Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) (Conf. 9350)

Thursday 12 February · Location: Room 133 (Exhibit Level)

AWARD CEREMONY · 4:40 to 4:50 pm

A cash prize will be awarded to the best student oral and poster presentation in this conference.

Throughout the conference, qualifying student presentations will be evaluated by the conference committee, and the results will be announced during the award ceremony on Thursday. Student presentations will be judged based on scientific merit of the work, and clarity of the presentation. While the award is not judged by the manuscript, a manuscript must be submitted.

AWARD SPONSORS:

OKAMOTO optics Plymouth Grating Laboratory

Best Student Oral Paper Competition

Fiber Lasers: Technology, Systems, and Applications (Conf. 9344)

Thursday 12 February · Location: Room 131 (Exhibit Level)

AWARD CEREMONY · 5:10 to 5:30 pm

We are pleased to announce that a **cash prize** will be awarded to the best student oral presentation in this conference.

Throughout the conference, qualifying student oral presentations will be evaluated by the conference committee, and the results will be announced in this session. Student presentations will be judged based on scientific merit of the work, and clarity of the presentation. While the award is not judged by the manuscript, a manuscript must be submitted.

To be eligible for consideration, the student must be the first author on an accepted paper, and must make the oral presentation.

AWARD SPONSORS:

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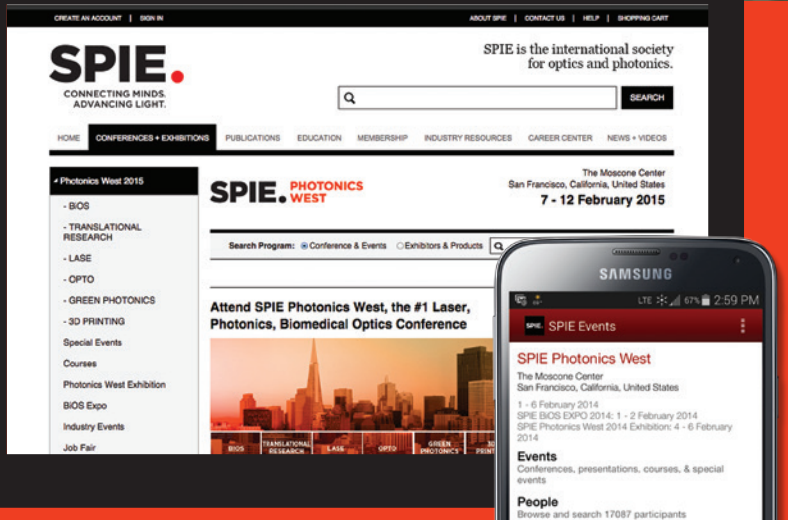

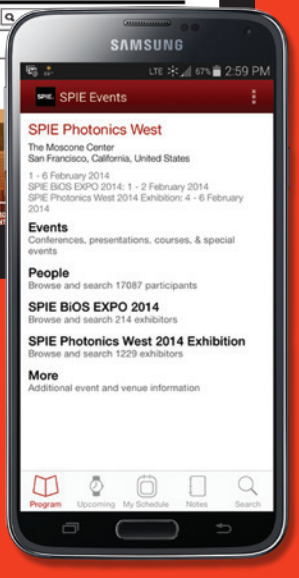

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OPTO Plenary Session

Monday 9 February · 8:00 to 10:10 am · Location: Room 134 (Exhibit Level)

Don't miss these world-class speakers discussing game-changing technology and valuable insights.

8:00 to 8:10 am

Welcome and Opening Remarks

David L. Andrews
Univ. of East Anglia Norwich (United Kingdom)

Alexei L. Glebov
OptiGrate Corp. (USA)

Announcement of the Green Photonics Awards

Stephen J. Eglash
Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 to 8:50 am

Silicon Integrated Nanophotonics: From Fundamental Science to Manufacturable Technology

Yurii A. Vlasov
IBM Thomas J. Watson Research Ctr. (USA)

The IBM Silicon Nanophotonics technology enables cost-efficient optical links that connect racks, modules, and chips together with ultra-low power single-die optical transceivers. I will give an overview of its historical development, technology differentiators, current status and a roadmap.

For over 12 years **Dr. Yurii Vlasov** led the development of Silicon Nanophotonics technology at IBM. He also served as a company-wide strategist focused on the long-term vision of nanophotonics aligned with the IBM product division roadmap. He is a Fellow of both OSA and APS, as well as a Senior Member of the IEEE.

8:50 to 9:30 am

Ultrafast Coherent Charge Transfer in Solar Cells and Artificial Light Harvesting Systems: Toward Movies of Electronic Motion

Christoph Lienau
Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Interface Science, Carl von Ossietzky Univ. Oldenburg (Germany)

The efficient conversion of (sun-)light into electrical or chemical energy is one of the most fundamental and relevant challenges in current energy research. Our ability to construct artificial molecular or nanostructured devices that can harvest and exploit sunlight inevitably relies on an in-depth understanding of the elementary microscopic principles that govern the underlying light conversion processes. Generally, these processes happen on an exceedingly short femtosecond time scale, making real time studies of the light-driven dynamics particularly important. To elucidate these dynamics, we have recently combined coherent femtosecond spectroscopy and first-principles quantum dynamics simulations and have used this approach to explore the primary photoinduced electronic charge transfer in two prototypical structures: (i) a carotene-porphyrin-fullerene triad, an elementary component for an artificial light harvesting system and (ii) a polymer:fullerene blend as a model for an organic solar cell. Surprisingly, our experimental and theoretical results provide strong evidence that in both systems, at room temperature, the driving mechanism of the primary step within the current generation cycle is a quantum-correlated wavelike motion of electrons and nuclei on a timescale of few tens of femtoseconds. Our results suggest that the strong coupling between electronic and vibrational degrees of freedom is of key importance for the dynamics and yield of the charge separation process. In my talk, I will present our most recent findings and their implications for the light-to-current conversion in solar cells. In an outlook, I will discuss new opportunities to probe such dynamics at a single nanostructure level.

Christoph Lienau is a professor in experimental physics at the University of Oldenburg. After receiving a PhD in physical chemistry in Göttingen, he worked as a postdoc with Ahmed H. Zewail at Caltech, studying femtosecond dynamics in solution. In 1995, he became a scientific staff member of of the newly founded Max Born Institute in the department of Thomas Elsässer. Here, he initiated a research activity in "ultrafast nano-optics", combining low-temperature and

ultrafast near-field spectroscopy and their applications to nano-spectroscopy. In 2006, he became a full professor in physics in Oldenburg. He has published more than 150 publications in refereed international journals and has given more than 100 invited and plenary talks at major international conferences. He holds 5 patents. He is a Fellow of the Optical Society of America and Vice-chair of the semiconductor physics division of the German Physical Society. His research interests are in ultrafast, nano and quantum optics.

9:30 to 10:10 am

Tunable and Quantum Metaphotonics

Harry A. Atwater
DOE Light-Material Interactions Energy Frontier Research Ctr. (United States),

Resnick Institute and California Institute of Technology (USA)

Progress in understanding resonant subwavelength structures has fueled an explosion of interest in fundamental processes and nanophotonic devices. The carrier density and optical properties of photonic nanostructures are typically fixed at the time of fabrication, but field effect tuning of the potential and carrier density enables the photonic dispersion to be altered, yielding new approaches to energy conversion and tunable radiative emission. Electrochemical in metals yields tunable resonances and reveals the plasmoelectric effect, a newly-discovered photoelectrochemical potential. Finally, while plasmons are usually described in a classical electromagnetic theory context, under single photon excitation quantum coherent states emerge. We demonstrate entanglement or coherent superposition states of single plasmons using two plasmon-quantum interference in chip-based plasmon waveguide directional couplers.

Harry Atwater is the Howard Hughes Professor of Applied Physics and Materials Science at the California Institute of Technology. Professor Atwater currently serves as Director of the DOE Energy Frontier Research Center on Light-Matter Interactions in Solar Energy Conversion, and is also Director of the Resnick Institute for Science, Energy and Sustainability. His scientific interests have two themes: plasmonics and optical metamaterials as well as photovoltaics and solar energy conversion. Atwater is an early pioneer in nanophotonics and plasmonics; he gave the name to the field of plasmonics in 2001.

WORKSHOP

The Nature of Light: What Are Photons?

Tuesday 10 February · 7:30 to 9:00 pm
Location: InterContinental Hotel, Ballroom A

SESSION CHAIR:

Narasimha S. Prasad
NASA Langley Research Ctr. (USA)

The purpose of this workshop is to stimulate optical engineers to become more effective innovators by paying closer attention to visualize the invisible interaction processes that go on between light and matter in instruments. Specifically one should explore the physical processes behind the emergence of superposition effect as interference fringes in our detectors. The participants will be able to appreciate the universal property of all waves: the NIW-property (or, Non-Interaction of Waves). Although, neglected for centuries, waves in the linear domain do not interact (interfere) with each other to create re-distribution of wave energy (fringes). In the real world, superposition effect becomes manifest through transformation experienced by detecting dipoles based on their (i) intrinsic quantum properties and (ii) the device time constant, after being simultaneously stimulated by multiple superposed waves. The following optical observations will help one to appreciate the significance of this workshop. In a two beam interferometer, two superposed coherent light beams help generate fringes of visibility unity only when the two amplitudes exactly are equal and polarizations are exactly parallel; but they give zero visibility when one of the beams is rotated to become orthogonal. Or, only a slow detector system can carry out Michelson's Fourier transform spectrometry; a fast detector will produce confusing oscillatory heterodyne current. Thus, detectors determine the superposition effects. Light beams do not interact or interfere by themselves. These examples will be elaborated to better appreciate the physical processes behind the emergence of superposition effects in diverse optical phenomena (instruments).

This presentation will be given by Prof. Chandrasekhar (Chandra) Roychoudhuri of the Univ. of Connecticut. Chandra will explain the basic optical phenomena (interference, diffraction, polarization, spectrometry, mode locking, and basic photon counting) in view of the hitherto neglected NIW-property. The workshop will be based upon his recent book, "Causal Physics: Photon Model by Non-Interaction of waves", CRC/Taylor & Francis, 2014.

TECHNICAL EVENT

Holography

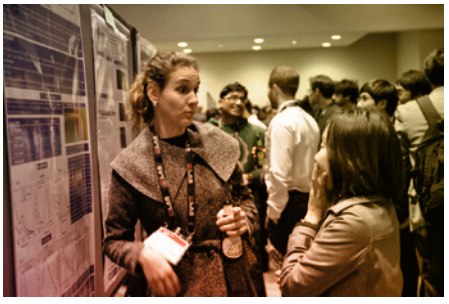
Tuesday 10 February · 7:30 to 9:00 pm
Location: InterContinental Hotel, Ballroom B

SESSION CHAIR:

V. Michael Bove
MIT Media Lab.(USA)

The Holography Technical Group is involved with the whole record of research, engineering, recording materials, and applications of holography. The main fields of interest are display holograms, commercial and artistic, holographic optical elements (HOEs), holographic interferometry and holographic non-destructive testing (HNDT), computer-generated holography (CGH), electro and digital holography, holographic microscopy, and holographic data storage (HDS).

This meeting will focus on recent developments and directions, in particular, in regard to new materials, color display holography, digital holography, CGHs and HOEs.



OPTO Interactive Poster Session

Wednesday 11 February · 6:00 to 8:00 pm
Location: Room 103 (Exhibit Level)

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions. Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

OPTO 2015 Best Paper Awards

Best Student Paper Award

Ultrafast Phenomena and Nanophotonics XIX (Conf. 9361)

Wednesday 11 February · Location: Room 270 (Mezzanine)

AWARD CEREMONY · 3:30 to 3:50 pm

For Conference 9361: A generous sponsorship of Femtolasers allows us to award one or two presentations with a Best Student Paper Award. All contributed papers of the conference 9361 given by a young scientist (PhD student or postdoc within the first two years after graduation) are eligible for the award. Note that this award is for contributed papers only. Invited papers and contributions to other symposia do not qualify.

AWARD SPONSOR:

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Best Student Paper Award

Terahertz, RF, Millimeter, and Sub-Millimeter-Wave Technology and Applications VIII (Conf. 9362)

Wednesday 11 February · Location: Room 238 (Mezzanine)

AWARD CEREMONY · 5:20 to 5:30 pm

A generous sponsorship from HÜBNER GmbH & Co. KG allows us to award one or two presentations with a Best Student Paper Award. All papers of the conference 9362 written and presented by a student (BS, MS, PhD) qualify for this award.

AWARD SPONSOR:

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Best Paper Award and Best Student Paper Award

Part of: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII (Conf. 9374)

Location: Room 228 (Mezzanine)

We are pleased to announce that a cash prize will be awarded to the best paper and best student paper in this conference.

The winner will be announced during the session in which their paper will be presented, and they will also be awarded a cash prize.

AWARD SPONSOR:

nanoscribe

Best Paper Award and Best Student Paper Award

Part of: MOEMS and Miniaturized Systems XIV (Conf. 9375)

Location: Room 310 (Esplanade)

We are pleased to announce that a cash prize will be awarded to the best paper and best student paper in this conference.

The winner will be announced during the session in which their paper will be presented, and they will also be awarded a cash prize.

AWARD SPONSOR:

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3D Printing
Industry Panels and Keynotes

The Moscone Center
San Francisco, California, USA

Conferences & Courses
13–18 February 2016

Photonics West Exhibition
16–18 February 2016

BiOS EXPO
13–14 February 2016

INDUSTRY EVENTS

FREE - Open to all conference attendees, exhibitors, and exhibition visitors.

Explore the business side of Photonics West. These sessions provide valuable information and networking opportunities needed to succeed in business.

PANELS AND PRESENTATIONS

Interactive discussions on some of the biggest challenges and most promising areas of our industry

- Funding your Photonics Venture
- Startups Need More Than Money
- Partners in Photonics: How Small Technology Businesses Can Expand their Capabilities with Strategic Partnerships
- Financing Life Sciences and Healthcare Businesses
- 3D Printing: A Manufacturing Revolution
- Industry Keynote Presentation: Silicon Photonics for a New Era of Scalable Bandwidth
- Silicon Photonics and Photonic Integrated Circuits: an Industry Perspective
- IMEC-MOSIS Silicon Photonics Panel and Workshop
- Working Hard and Earning Big: the Recipe for Making Good Money in Optics and Photonics
- Conflict Minerals: What You Need to Know
- Executive Perspectives on the World of Optics and Photonics
- Getting Hired Panel
- Hiring Strategies: How to Hire the Best Employees

SPECIAL EVENTS

Important networking events for the business community

- Cluster Reception - Leaders from regional optics and photonics clusters are welcome. Includes "Photonics Industry Update" Keynote Presentation
- Startup Challenge - Watch entrepreneurs pitch their new photonics business and compete for $18,000 cash and $5,000 in product
- Prism Award Ceremony—The "Oscars of Photonics". The Prism Awards recognize the most innovative products on the market. Winners will be announced at a gala event on Wednesday 11 February 2015
- Photonics Industry Update: A Global Industry Profile Keynote Presentation (after Exhibitor Breakfast)
- Startup Alley—Commercialization and Prototype Showcase

WORKSHOPS AND SEMINARS

Build skills and gain insight

- ITAR and Other International Trade Regulations
- 2015 Updates to the US Munitions List That Will Impact ITAR—What Would You Like to See Changed?
- Magnifying Your IP IQ: Topics for the Savvy Optics Intellectual Property Manager
- IMEC-MOSIS Silicon Photonics Workshop
- Product Demos in the Exhibition Halls

JOB FAIR

Meet over 30 recruiters on the exhibit floor

Intel, Newport, Hamamatsu, Microsoft, KLA-Tencor, and more

TWO WORLD-CLASS EXHIBITIONS

Meet the best suppliers face-to-face

- BiOS EXPO 2015
- New products at BiOS EXPO
- Photonics West Exhibition
- New products at Photonics West

MONDAY

Funding your Photonics Venture

Monday 9 February · 2:30 to 4:00 pm
Location: Room 134 (Exhibit Level)

Money - it is often what separates a good business idea from a good business implementation. Now, the landscape for funding new ventures is changing - corporate investment programs, crowd-funding, non-traditional VCs, and more are providing new options for funding. Learn about these from a series of experts involved in finding and vetting new technology ventures.

PANELISTS:

Jenny Rooke, PhD
Venture Partner at
Fidelity Biosciences

Alex Dewinter
Director, GE
Ventures

Supriya Jaiswal
Head of Business
Innovations at
Hamamatsu
Photonics

Jason Eichenholz
CEO and
Co-Founder,
Openphotonics

Startups Need More Than Money

Monday 9 February · 4:00 to 5:00 pm
Location: Room 134 (Exhibit Level)

Yes, cash is important – whether you bootstrap or have an investor. But it's only one important piece in a puzzle that includes advisors, service providers, industry experts and customers. Come and engage with a multi-disciplinary panel to learn how to efficiently navigate this incredibly valuable eco-system.

MODERATOR:

Arun Chhabra
Co-founder
8tree

PANELISTS:

Phil Hunt
IP Attorney
Rylander Lab

Ian Moss
ITAR Specialist
Goulston & Storrs

Robert Kester
Startup Co-founder
Rebellion Photonics

Linda Smith
Finance
Ceres Technology
Advisors

Photonics Cluster Reception

Monday 9 February · 5:00 to 6:30 pm
Location: InterContinental Hotel, Ballroom A

KEYNOTE SPEAKER:

Stephen G. Anderson
Industry and Market Strategist
SPIE

All leaders from regional optics and photonics clusters are invited to join this SPIE-hosted reception. Connect with your peers while enjoying drinks and appetizers, compare notes, and hear an update from Stephen Anderson on the "Photonics Industry Update: A Global Industry Profile." Dress is business attire.

TUESDAY

Partners in Photonics: How Technology Businesses Can Expand their Capabilities with Strategic Partnerships

Tuesday 10 February · 8:00 to 10:00 am
Location: Room 101 (Exhibit Level)

Millions of dollars are spent each year on research at universities, government labs, and other public entities. How can your technology business expand its capabilities and create breakthrough new products by leveraging those efforts? What are the benefits and pitfalls in partnering with these entities, licensing their technology, and surviving long enough to bring a new product to market? Experts from a variety of geographic and partnership backgrounds will discuss the options entrepreneurs have in accessing technology that is already developed.

MODERATOR:

Robert Lieberman
Lumoptix, LLC

PANELISTS:

Forest Bohrer
Univ. of
Washington

Catherine Elizondo
Lawrence Livermore
National Laboratory

Christoph Harder
Swissphotonics.net
and Harder & Partner

Chu-Hsien
Steve Hsu
Commercialization
and Industrial Service
Center, ITRI, Taiwan

TUESDAY

Financing Life Sciences and Healthcare Businesses

Tuesday 10 February · 8:30 to 10:00 am
Location: Room 134 (Exhibit Level)

MODERATOR:

Linda Smith
Ceres Technology Advisors

Life Sciences and Healthcare businesses are addressing markets with an inherently interdisciplinary mix of technologies. Today, biophotonics is a key enabling technology. Life Sciences and Healthcare markets are highly regulated, have high customer acquisition costs, and are characterized by strategic cooperation among competitors. Intellectual property landscapes are complex. Whether the venture is a start-up or an established player launching a new product, access to capital is paramount to success. Join us for a panel workshop dedicated to financing life sciences and healthcare businesses.

Join us for a panel workshop dedicated to financing life science and healthcare businesses. The panel's expertise crosses early to late stage venture capital and private equity, strategic corporate investing, licensing, venture debt, and crowd sourcing. Learn about financing and exit strategies, as well as micro and macro trends influencing competition for capital and valuations.

The panel's expertise crosses angel investing, early to late stage venture capital and private equity, strategic corporate investing, licensing of intellectual property, and debt financing. Learn about financing and exit strategies, as well as micro and macro trends influencing cost of capital and valuations.

PANELISTS:

Andrew T. Jay
Head of the Medical Solutions Fund
Siemens Venture Capital - Financial Services

Faz Bashi
Chair,
Digital Health & Sciences Committee
Life Science Angels

Jim Haack
SVP Technology Banking
Citibank, Citi Commercial Bank

Jeremy R. Salesin
VP of Acquisitions
Intellectual Ventures

ITAR and Other International Trade Regulations

Tuesday 10 February · 10:30am to 12:30 pm
LocsationRoom 101 (Exhibit Level)

INSTRUCTOR:

Ian Moss
Goulston & Storrs

If your company's sales activities, products or services come into contact with foreign jurisdictions, this is a must-attend program. The stakes have never been higher. Anyone who wants to answer questions such as, "How do U.S. export controls apply to me?" or "What are the legal pitfalls of doing business internationally?" or "What are best practices for engaging in global trade?" will benefit from attending this workshop.

INTENDED AUDIENCE: Owners, executives, product managers who wish to learn how to grow business while effectively and efficiently navigating U.S. international trade laws and regulations.

3D Printing: A Manufacturing Revolution

Tuesday 10 February · 12:30 to 1:30 pm
Location: Room 134 (Exhibit Level)

MODERATOR:

Stephen G. Anderson
Industry and Market Strategist
SPIE

Digital manufacturing has been called the third industrial revolution and is at the frontier of advanced manufacturing. Its widespread adoption could upend currently accepted production economics by allowing things to be made economically in smaller numbers, with more flexibly, and with new materials. Furthermore, end-users will eventually be able to manufacture products themselves instead of relying on large factories with global supply chains.

While there seems little doubt that the advent of 3D printing or additive manufacturing represents a potentially huge economic opportunity across multiple industries for service providers, systems manufacturers, and photonics companies, digital manufacturing has been the subject of unprecedented popular interest and excitement leading to potentially unrealistic expectations.

Join us for an industry panel that will provide a realistic assessment of how digital manufacturing technology, applications, and markets will evolve in the near future. Hear expert perspectives, including end-users, discuss the roles that photonics can play in this manufacturing revolution and what needs to happen for digital manufacturing to go mainstream and fulfill its promise.

PANELISTS:

Reinhart Poprawe
Managing Director

Fraunhofer Institute for Laser Technology. Research interests include all aspects of high-power lasers and laser manufacturing

Todd J. Rockstroh
GE Aviation Consulting Engineer

GE Aviation (GEA) Consulting Engineer for Non-Conventional Manufacturing Processes focusing on Additive, Intelligent, and Sustainable Manufacturing technologies

Jim Williams
Vice President of Aerospace and Defense

3D Systems, Advanced materials and process R&D with an emphasis on engineered composite thermoplastics for selective laser sintering (SLS).

John Dexheimer
President
LightWave Advisors and partner in First Analysis Private Equity Fund.

Industry Keynote Presentation: Silicon Photonics for a New Era of Scalable Bandwidth

Tuesday 10 February · 1:30 to 2:00 pm
Location: Room 134 (Exhibit Level)

Mario Paniccia
Intel Fellow, General Manager,
Silicon Photonics Group, Data Center Group
Intel

The ubiquitous data explosion and the growth of mega-size data centers are driving a transformation of data center architecture. The need for faster computation, longer connections between servers, increasing link speeds, and aggressive power requirements are drivers for top-to-bottom optical solutions for connectivity. The additional need for low-cost optical solutions will rely on integrated Silicon Photonics as the technology choice. In this industry keynote talk you will hear Intel's perspective and trends for fundamental changes to data centers – including server architecture, "the rack", networking, and pooled resources – enabled by silicon photonic interconnects and wafer-scale integration. Given the impact Intel has on the technology landscape, this is one session you cannot afford to miss.

Magnifying Your IP IQ: Topics for the Savvy Optics Intellectual Property Manager

Date: Tuesday 10 February 2015 · 1:30 to 3:30 pm
Location: Room 101 (Exhibit Level)

This course covers key topics for those with responsibilities for overseeing an intellectual property portfolio. The topics include the key provisions of non-disclosure and licensing agreements, what to know when dealing with venture capitalists and other prospective investors, methods of accelerating the passage of applications through the U.S. Patent and Trademark Office, selection and protection of trademarks, and how to prepare for offensive or defensive patent litigation.

INTENDED AUDIENCE: Any individual whose responsibilities include oversight and protection of their company's intellectual property. Basic familiarity with intellectual property management issues is assumed.

KNOBBE MARTENS INSTRUCTORS:

Mark Gallagher

David Jankowski

Lori Yamato

Derek Bayles

Silicon Photonics and Photonic Integrated Circuits: an Industry Perspective

Tuesday 10 February · 2:00 to 3:00 pm
Location: Room 134 (Exhibit Level)

Demand for smaller and cheaper optical interconnections inside networks and computers will create a new market of miniaturized, low-cost photonic components that can leverage the scale of CMOS manufacturing. Learn what industry leaders have developed at the frontier of the silicon photonics market.

MODERATOR:

Peter Hallett
Director of Marketing and Industry Relations
SPIE

PANELISTS:

Philippe Absil
3D and Optical Technologies Department Director
Imec

Peter De Dobbelaere
VP of Engineering
Luxtera

Douglas Gill
Research Staff
IBM T. J. Watson Research Center

Ruth Houbertz
CEO
Multiphoton Optics

Ashok Krishnamoorthy
Architect and Chief Technologist, Photonics
Oracle

TUESDAY

MOSIS SILICON PHOTONICS WORKSHOP & DEMO SESSION

Unique flow for your silicon photonics products

Tuesday 10 February to 3:30 to 5:00 pm
Location: Room 134 (Exhibit Level)

Learn more how to develop and design your silicon photonic products in a fabless environment with easy access to the latest technology and a state-of-the-art photonics fab during the imec-MOSIS Silicon Photonics Workshop & Demo Session.

Imec and MOSIS will show how you may benefit from the innovative multi-project wafer (MPW) model, giving you access to the power of silicon photonics.

Whether your company is active in photonics or electronics developing solutions for telecom, datacom, biomedical, or sensor applications, the benefits of the fabless MPW approach allow you to create products with a better performance, in a shorter time. Academic users can also benefit from the Europractice-enabled mini-Photonics concept.

In the workshop, we will explain how to leverage imec's Si Photonics platform to design silicon photonic prototypes and products from a fabless perspective. Using the latest in photonics design software combined with access to a dedicated advanced 200mm fab. A fab run by leading R&D institute imec, which gives you a path to manufacturing with state-of-the-art performance and functionality. The accompanying demo session will show a practical example of fabless design flows and fab access.

WORKSHOP SPEAKERS:

Philippe Absil
3D and Optical Technologies Department Director, imec

Dan Deptuck
Staff Scientist, Optoelectronics Engineering at CMC

Roel Baets
Ghent University (UGent) & head imec-lab at Ghent University (UGent)

Amit Khanna
Research Engineer imec Silicon Photonics PDK Development

Peter O'Brien
Head of Group Photonics Packaging at Tyndall National Institute, University College Cork

Cary Gunn
President, CEO and a founder of Genalyte

Russ Pina
Engineering Manager, MOSIS Service

Eric Bernier
Leader for the Advanced Photonic Systems Group at Huawei Canada

On Wednesday February 11, Imec will showcase its hyperspectral imager technology on the exhibit floor (Product Demo area). This accompanying demo will show a practical example of fabless design flows and fab access.

2015 Updates to the US Munitions List That Will Impact ITAR - What Would You Like to See Changed?

Tuesday 10 February · 5:00 to 7:00 pm
Location: Room 101 (Exhibit Level)

MODERATOR:

Jennifer Douris
Lobbyist for SPIE

Join us for a discussion on upcoming changes to the US Munitions List (USML) that will impact ITAR regulations for both industry and research universities. The rewrite of Category XII of the U.S Munitions List (USML) is part of the overall effort undertaken by the Administration's Export Control Reform (ECR) initiative. The USML contains the items controlled under the International Traffic in Arms Regulations (ITAR). Category XII covers much of the optic and photonic commodities and components controlled under ITAR. Most of the other categories have already been addressed, but they have saved Category XII for last due to its complexity and importance to both industry and the military. We expect the proposed rules for this category to be published in 2015, come share your concerns and let us know what you would like to see changed.

WEDNESDAY

Working Hard and Earning Big: the Recipe for Making Good Money in Optics and Photonics

Wednesday 11 February · 8:00 to 9:30 am
Location: Room 101 (Exhibit Level)

What are the best approaches for maximizing personal earnings in optics and photonics industry? Is an MBA worth the effort and opportunity cost? Is the startup path worth the risks? Is it possible to keep one foot in the lab and another on the management fast track?

Industry leaders will share their perspectives and experience in a lively round table discussion. Insights from the SPIE Global Salary Survey on disciplines, geography, and workload.

Coffee and breakfast starting at 8:00 AM. Program begins 8:30 am. Free and open to all registered attendees.

MODERATOR:

Adam Resnick
Marketing Analyst
SPIE

PANELISTS:

Philip Crowley
President and CEO
Market Tech, Inc.

Kim Pope
VP Human Resources,
IDEX Optics & Photonics

Barbara Paldus
CEO
Finesse Solutions, Inc.

SPONSORED BY:

SPIE. CAREER CENTER

Conflict Minerals: What You Need to Know

Wednesday 11 February · 8:00 to 10:00am
Location: Room 134 (Exhibit Level)

If your company sells a product that you manufacture (or that you have manufactured for you), you need to understand how the conflict minerals rule applies to you. If you are in the supply chain for the electronics, telecom, automotive, aerospace, medical device, or industrials industries, you are probably fielding inquiries from your customers about the source of tin, tantalum, tungsten, or gold in your products. Even if you aren't a public company, you may have to provide sourcing information to your customers to become (or remain) a qualified supplier. Depending on your customer demands, conflict minerals sourcing information may be a commercial necessity. You'll benefit from this workshop if you want to know "How does the conflict minerals rule apply to me?" or "What do I have to do if there is tin, tantalum, tungsten or gold in my product?" or "What are the best practices for gathering the sourcing information to keep my customer happy or make any required filings?" There will be an opportunity to ask questions and share best practices on compliance readiness, supplier engagement, and customer interaction.

INTENDED AUDIENCE
Procurement and supply chain managers, sales executives, compliance officers and in-house counsel who want to maintain and grow their companies' customer relationships and comply with the US rule on conflict minerals.

MODERATOR:

Rosemarie Szostak
Senior Analyst
Nerac

PANELISTS:

Dynda Thomas
Partner
Squire Patton Boggs (US) LLP

Douglas Hileman
P.E., CPEA, QEP, CRMA
Making Business Sense of Sustainability

Lydia Hultquist
Program Manager
Social & Environmental Responsibility

WEDNESDAY

Inbound Marketing: How to Bring Customers to You

Wednesday 11 February · 10:30 am to 12:00 pm
Location: Room 101 (Exhibit Level)

INSTRUCTOR:

Michele Nichols
PLS Launch Solutions

Your customer is changing, and your strategy must, too. You may have heard a lot of talk about inbound marketing, but how does it translate to our industry? Engineers, scientists and program managers want to come to their own conclusion, and do their own research before they engage with you. Learn from others in the industry about what works in attracting and engaging with the new customer.

INTENDED AUDIENCE: CEOs, VP of Marketing or Sales, product managers, marketing staff, and others in "customer development" with responsibility for ensuring a healthy pipeline.

Executive Perspectives on the World of Optics and Photonics

Wednesday 11 February · 1:30 to 2:30 pm
Location: Room 134 (Exhibit Level)

MODERATOR:

Stephen G. Anderson
Industry and Market Strategist
SPIE

Top executives, representing different aspects of the marketplace, will share their insight and hard-fought lessons regarding trends and opportunities in optics and photonics. Weathering the last few years has required extraordinary skills and experience to successfully reset goals and allocate resources. Listening to and questioning these executives will help you understand the current environment better and set priorities for your business.

PANELISTS:

Amy Eskilson
President and CEO
Inrad Optics

Dirk Rothweile
Executive VP,
Optical Systems
Jenoptik

Christof Lehner
General Manager,
North America
TRUMPF

Dennis Werth
Senior VP,
Photonics Group
Newport

Eric Mottay
President and CEO
Amplitude
Systemes

Getting Hired Panel

Wednesday 11 February · 1:30 to 2:30 pm
Location: Room 101 (Exhibit Level)

Join us for a panel discussion on careers in optics and photonics outside the academic world. Learn about the process of getting hired at tech-based companies and non-academic jobs directly from professionals in the optics and photonics sector.

Hiring Strategies: How to Hire the Best Employees

Wednesday 11 February · 3:00 to 4:30 pm
Location: Room 101 (Exhibit Level)

Iwona A.Palusinski
Department Director and Recruiting Expert Aerosapce

Hiring exceptional talent is critical to your business success. Whether it's the executive who offers visionary leadership, the manager who can quickly execute on business plans, or the sales professional who won't settle for less than 100%, a business needs great people to thrive. And employers should always reach towards the goal to bring the best to their organization in any economic climate.

Here's a look at best practices for securing the top talent you need to drive business results.

SPIE Startup Challenge

Wednesday 11 February · 3:30 to 6:00 pm
Location: Room 134 (Exhibit Level)

FREE to All Attendees

See and hear pitches for the "best of the best" new photonics businesses. This pitch competition is a lively, interactive event showcasing the power of entrepreneurs to move photonics technology to the global marketplace. New entrepreneurs in photonics will have just 3 minutes each to pitch their businesses to a team of expert judges.

The top pitch presenter will go home with $10,000 in cash from JENOPTIK and $5,000 of equipment. Join fellow business development, investment, and product managers to scout new talent and see what the future of entrepreneurship in photonics looks like.

The event will conclude with a networking reception from 5 to 6:00 pm where you can meet the presenters, judges, and fellow attendees involved in photonics entrepreneurship.

See the Startup Challenge webpage for more details on presenters, logistics, prizes, and sponsors: www.spie.org/startup

FOUNDING PARTNER:

JENOPTIK

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INTELLECTUAL PROPERTY LAW
PERKINSCOIE
COUNSEL TO GREAT COMPANIES

STARTUP challenge

SPIE.

8 FINALISTS, 3 MINUTES

$10,000

WEDNESDAY
3:30 TO 6PM

CONVENTION CTR.
ROOM 134

EIGHT PRE-REVENUE PHOTONICS ENTREPRENEURS HAVE 3 MINUTES TO PITCH THEIR BUSINESS IDEAS AND A CHANCE TO WIN $10,000 CASH AND $5,000 WORTH OF EQUIPMENT

WWW.SPIE.ORG/STARTUP

SUPPORTING SPONSORS

TRUMPF

Edmund optics worldwide

openphotonics open innovation inspired by light

Knobbe Martens INTELLECTUAL PROPERTY LAW

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JENOPTIK

WEDNESDAY

PRISM Awards Ceremony and Banquet

Wednesday 11 February · 6:00 to 10:00 pm
Location: Marriott Marquis Hotel, Yerba Buena Ballroom

Seating is limited. Tickets are required in advance.

Join this gala event in which the most innovative photonic products on the market are recognized. 27 companies (finalists) from nine categories will share the room with industry leaders and visionaries. The event has become the largest gathering of CEOs and VIPs in the photonics industry. The evening begins with a reception, followed by an elegant dinner and award ceremony. Dress is business and formal attire.

2015 FINALISTS

Advanced Scientific Concepts
ALPhANOV
BacterioScan
Clearbridge Biophotonics
Cobolt
ESPROS Photonics
FEMTOprint
Fianium
Hamamatsu
Inrad Optics
Intel, Corning, & US Conec
IPG Photonics
JDSU
Lufft
LUXeXcel
Mahr
Multiphoton Optics
Northrop Grumman – Cutting Edge Optronics
OndaVia
Optonicus
Polytec
Seek Thermal & Raytheon
TelAztec
TomoWave Laboratories
Varioptics, a BU of Parrot
Vescent Photonics
WITec

Questions? Email innovation@spie.org or visit www.prismawards.org.

PRESENTED BY SPIE.

MEDIA SPONSOR PHOTONICS MEDIA

THURSDAY

Photonics Industry Update: A Global Industry Profile

Thursday 12 February · 9:15 to 9:45 am
Location: Room 134 (Exhibit Level)

Measuring the size of an industry is difficult for many reasons. What categories and suppliers are included? What data are available? How can they be compared? Stephen G. Anderson, Industry and Market Strategist at SPIE, will provide an update on his 2014 presentation and a broader look into the profile of the global optics and photonics industry. Don't miss this valuable presentation after the SPIE Photonics West Exhibitor Breakfast. Free and open to all attendees.

Startup Alley: Commercialization and Prototype Showcase

Thursday 12 February · 10:00 am to 12:00 pm
Location: Demo Area 2 (Hall D North)

Meet one-on-one with the entrepreneurs pitching their new photonics businesses featured in the Startup Challenge. See the prototypes and talk with the entrepreneurs to explore potential partnerships, investment, or sales.

Software Tutorial on Optoelectronic Device Simulation

Thursday 12 February 2015 · 1:00 to 5:00 pm
Location: Marriott Marquis Hotel, Sierra A

INSTRUCTOR:

Joachim Piprek
Founder and President
NUSOD Institute

The tutorial gives a hands-on introduction to high-end simulation tools for electronic and optoelectronic devices (APSYS, LASTIP, PICS3D from Crosslight Software). These software packages combine electrical, thermal, optical, and quantum-mechanical models in two or three dimensions and can be applied to a large variety of semiconductor devices such as laser diodes, LEDs, solar cells and transistors.

The tutorial explains and demonstrates the basic operation of these software tools. Strategies for setting the right model options and material parameters to obtain realistic simulation results are also discussed. Deep insight into micro- and nano-scale physical processes is provided using realistic device examples.

SPIE. PHOTONICS WEST

JOB FAIR

Sponsored by SPIE Career Center

GET A JOB

Visit the Job Fair in the South Exhbition Hall.

FREE ADMISSION

Tuesday 10 February, 10:00 am to 5:00 pm
Wednesday 11 February, 10:00 am to 5:00 pm

Participating Companies:

GoPro Be a HERO.

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COMPOUND PHOTONICS

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Microsoft

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KLA-Tencor

QUARTUS ENGINEERING

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University of Rochester • Laboratory for Laser Energetics www.lle.rochester.edu UR LLE

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SPIE. CAREER CENTER

For more information visit the SPIE Career Center Booth #1015.

PRISM AWARDS

Winners Announced at Photonics West

Award Ceremony

Wednesday 11 February
6:00 pm
Formal or business attire

For ticket information,
go to the SPIE Cashier

"It's amazing to have an idea at a university and to see it installed at a BP refinery and to make one place in the world a little bit safer."

–Allison Lami Sawyer
Rebellion Photonics CEO
2013 Wall Street Journal Startup of the Year
2013 Prism Award Presenter

Congratulations to the 2015 finalists.

Category of Additive Manufacturing

FEMTOprint

LUXeXcel

Multiphoton Optics

Category of Biomedical Instrumentation

BacterioScan

Clearbridge Biophotonics

TomoWave Laboratories

Category of Detectors and Sensors

Hamamatsu

Lufft

OndaVia

Category of Imaging + Cameras

Advanced Scientific Concepts

ESPROS Photonics

Seek Thermal, Raytheon

Category of Industrial Laser

Cobolt

IPG Photonics

JDSU

Category of Materials + Coatings

ALPhANOV

Inrad Optics

TelAztec

Category of Optics + Optical Components

Intel, Corning, US Conec

Varioptics, a BU of Parrot

Vescent Photonics

Category of Other Metrology Instrumentation

Mahr

Polytec

WITec

Category of Scientific Lasers

Fianium

Northrop Grumman–Cutting Edge Optronics

Optonicus

www.prismawards.org

SPIE. PHOTONICS MEDIA

NETWORK

Networking Receptions · Student Social Events · SPIE Member Events

Join your colleagues and develop new relationships at these relaxed-atmosphere networking events.

Some events open to all attendees; some require tickets or invitations. See individual event descriptions for details.

FRIDAY

Student Chapter Leadership Workshop

Friday 6 February · 12:30 to 5:30 pm
Location: Marriott Marquis Hotel, Golden Gate C3

Open to SPIE Student Chapter Members

Join SPIE student chapter leaders from around the world at this half-day Leadership Workshop. The workshop will start with lunch and follow with student chapter problem solving, SPIE student chapter news and benefits, and professional development.

All SPIE Student Chapter Members are welcome but must register by Friday 23 January to attend. Email students@spie.org to register, or for more information. Please provide your SPIE Member ID number and current SPIE Student Chapter in your registration email.

SUNDAY

Lunch with the Experts - A BiOS Student Networking Event

Sunday 8 February · 12:30 to 1:30 pm
Location: InterContinental Hotel, Ballroom B

Open to BiOS Student Attendees

Enjoy a casual meal with colleagues at this engaging networking opportunity, hosted by SPIE Student Services. This event features experts willing to share their experience and wisdom on career paths in biomedical optics and an award presentation for SPIE scholarships. Seating is limited and will be granted on a first-come, first-served basis.

Student Chapter Meeting

Sunday 8 February · 6:00 to 9:00 pm
Location: InterContinental Hotel, Ballroom C

Open to SPIE Student Chapter Members

Get the latest news on the Student Chapter program direct from SPIE Student Services. Join us for dinner, professional development and networking with chapter members from around the world.

All SPIE Student Chapter Members are welcome but must register by Friday 23 January to attend. Email students@spie.org to register, or for more information. Please provide your SPIE Member ID number and current SPIE Student Chapter in your registration email.

MONDAY

SPIE Fellows Luncheon

Monday 9 February · 12:00 to 1:30 pm
Location: InterContinental Hotel, Ballroom B

All Fellows of SPIE are invited to join your colleagues for an SPIE hosted lunch. The new SPIE Fellows attending Photonics West will be introduced and recognized. Please join us for this informal gathering and a chance to interact with other Fellows. Fellows planning to attend are asked to RSVP to Brent Johnson brentj@spie.org.

Fellows Luncheon Presentation

FUTURE AND PRESENT TECHNOLOGIES OF SOLID STATE LIGHTING

Prof. Shuji Nakamura
Materials and ECE Departments
University of California Santa Barbara
(2014 Nobel Laureate)

Blue nitride-based LEDs have been grown hetero-epitaxially on sapphire, SiC and Si substrates. Homo-epitaxial growth of LEDs grown on GaN substrate is getting popular to improve the reliability and to increase the power density per chip. Laser lighting also would be a promising lighting technology to improve the power density per chip in the future.

Shuji Nakamura received B.E., M.S., and Ph.D. degrees in Electrical Engineering from the University of Tokushima, Japan in 1977, 1979, and 1994, respectively. In 1993 and 1995 he developed the first group-III nitride-based blue/green LEDs and violet laser diodes. Since 2000, he is a professor of Materials and ECE Departments of University of California Santa Barbara.

Significantly, Prof. Nakamura was just awarded the 2014 Nobel Prize in Physics, jointly with Isamu Akasaki and Hiroshi Amano "for the invention of efficient blue light-emitting diodes which has enabled bright and energy-saving white light sources".

Women in Optics Panel Discussion and Reception

Monday 9 February · 5:00 to 6:30 pm
Location: InterContinental Hotel, Ballroom B/C

WOMEN IN SCIENCE AND TECHNOLOGY LEADERSHIP

Join us for an early evening of networking and inspiration: Our distinguished panelists who will share insight and wisdom about their individual journeys.

Panel discussion is followed by a reception, offering refreshments and the opportunity to meet the panelists and connect with peers.

PANELISTS:

Susan Tousi
VP of Enginering
Illumina (USA)

Allison Lami Sawyer
CEO and co-founder
Rebellion Photonics (USA)

Nicoletta Casanova
CEO FEMTOPrint (Switzerland)

Photonics West Welcome Reception

Monday 9 February · 7:00 to 8:30 pm
Location: Marriott Marquis Hotel, Yerba Buena Ballroom

CREATURES OF THE LIGHT!

Come and celebrate the International Year of Light with a creative look backward to the beginning of time when light was all we had. All conference attendees are invited to relax, connect with old and new friends, and enjoy refreshments. Please remember to wear your conference badge. Dress is casual.

TUESDAY

SPIE Senior Member Breakfast

Tuesday 10 February · 8:00 to 9:00 am
Location: InterContinental Hotel, Ballroom C

All SPIE Senior Members are invited to join your colleagues for this SPIE-hosted buffet breakfast. Please join us for this informal gathering and a chance to interact with other Senior Members. Please plan to wear your yellow Senior Member ribbon for entry into this event. Senior Members planning to attend are asked to RSVP to Brent Johnson (brentj@spie.org).

Lunch with the Experts - A Student Networking Event

Tuesday 10 February · 12:30 to 1:30 pm
Location: InterContinental Hotel, Ballroom B

Open to Student Attendees

Enjoy a casual meal with colleagues at this engaging networking opportunity. This event features experts willing to share their experience and wisdom on career paths in optics and photonics. Seating is limited and will be granted on a first-come, first-served basis.

SPONSORED BY:

Newport Experience | Solutions

NEWPORT RESEARCH EXCELLENCE TRAVEL AWARDS

The Newport Research Excellence Travel Awards Program provides financial support for university students to attend the two largest SPIE meetings in order to present their research. These travel grants are open to any student who has an accepted paper for presentation at Photonics West or Optics & Photonics. Recipients will be selected based on both the quality of the original research described in the submitted paper(s) and financial need.

For application information for this and other SPIE travel grants visit Scholarships and Grants online at **www.spie.org/scholarships**

Student Chapter Info Session

Tuesday 10 February · 1:45 to 2:30 pm
Location: InterContinental Hotel, Jackson

Open to All Attendees

Interested in starting a Student Chapter or just want to learn more about the program and its benefits? Get your questions answered at this informal information session hosted by SPIE Student Services.

Speed Networking Social

Tuesday 10 February · 4:30 to 6:00 pm
Location: Thirsty Bear Brewing Co.

Open to All Attendees

Join us for the next generation of networking. Add a new contact to your network every three minutes while enjoying appetizers at an off-site venue. Bring plenty of business cards, practice your pitch, and prepare to expand your network.

ThirstyBear Brewing Co.

661 Howard Street

From the Moscone Center:

Head Northwest on 3rd Street

Turn right on Howard Street

ThirstyBear is just up the block on your right

WEDNESDAY

"No Ties" Student Social

Wednesday 11 February · 8:00 to 10:00 pm
Location: Jillian's

Student Conference Attendees Only.

Relax and hang out with new friends and peers while enjoying the atmosphere of a great off-site venue. No ties required but please bring photo ID.

Jillian's Billiards Club

175 4th Street

From the Moscone Center:

Head Southwest on Howard St toward 4th St

Turn right on 4th St

Jillian's is on the right

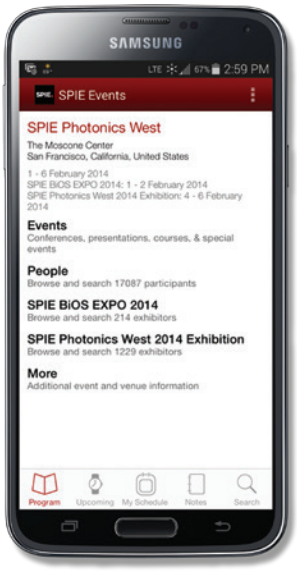
SPIE Member Reception

Tuesday 10 February · 8:00 to 9:30 pm
Location: ROE Restaurant

For SPIE Members Only

ROE Restaurant
651 Howard Street

SPIE Members are invited to the ROE Restaurant for an after dinner reception in their honor. Come relax and talk with your colleagues while enjoying dessert, coffee. Please note: this reception is limited to SPIE Members only. Membership cards or invitations will be requested at the entrance. If you join SPIE on-site, please bring your registration receipt. Dress is casual or business attire.



Available on the App Store Google play

SPIE Event Mobile App

SPIE Conference and Exhibitions are known for their networking and information gathering opportunities.

Schedule your time in the conferences... find your way around the exhibition floor... make new connections. Download a free Conference + Exhibition App for iPad, iPhone, and Android.

PROFESSIONAL DEVELOPMENT

Spend some time focusing on your career development while you're at Photonics West. Workshops and presentations will help you hone valuable job skills.

Some events open to all attendees; some require registration and payment. See individual event descriptions for details.

Charting a Course in the Photonics Industry

Sunday 8 February · 1:30 to 3:30 pm
Location: Room 134 (Exhibit Level)

SHAPE YOURSELF FOR A FUTURE IN PHOTONICS

This speaker series will help you explore potential career pathways in the world of photonics outside of academia. Get solid advice on how you can translate your knowledge, abilities, and interests into meaningful work. Whether you work for an existing company, or start your own, getting a clear picture of the options from experienced leaders will help you better manage your career trajectory. The series will conclude with a question-and-answer session (with all speakers) and a light refreshment reception.

PANELISTS:

Caroline Boudoux
Co-Founder and Associate Professor
Castor Optics and École Polytechnique de Montréal

Professor Boudoux earned her PhD from the Harvard-MIT Division of Health Sciences and Technology in 2007. She is a principal investigator in the Laboratory for Optical Diagnoses and Imaging at École Polytechnique Montréal, a researcher at Sainte-Justine Hospital Research Center and a visiting associate professor in the Department of Otology and Laryngology at Harvard Medical School. Her area of research involves biomedical optics imaging including optical coherence tomography, confocal and nonlinear microscopy and endoscopic imaging.

Sam Sadoulet
President and CEO
Edmund Optics

With over 15 years of engineering and management experience, Mr. Sadoulet is the President and Chief Operating Officer, for Edmund Optics (EO), a worldwide leader in optical and imaging manufacturing technology. He began his career with EO as an application engineer and rapidly advanced through the engineering ranks as a respected optical design engineer and technical strategist. In addition to his strong technical contribution, he has held several Management and Director level positions. In his current role, Mr. Sadoulet orchestrates the company's day to day operations to exceed customers' expectations. Beyond leading the global executive team in this mission, he plays a prominent role in the Edmund Optics' corporate strategy development.

Aaron Weinroth
VP of Technology Commercialization
Tornado Spectral Systems

Aaron Weinroth studied electrical and biomedical engineering at the University of Toronto before starting work in the medical device industry. He has served in a variety of technical and business roles for both small and large companies, eventually making the switch to an optics start-up. Mr. Weinroth is currently the VP Technology Commercialization for Tornado Spectral Systems where he is applying his experience and skills across a wide range of corporate activities including strategic planning, business development, intellectual property, marketing, and product management.

Career Advancement through SPIE Involvement

Wednesday 11 February · 11:30 am to 12:30 pm
Location: Room 133 (Exhibit Level)

Get plugged in to the SPIE community. SPIE has volunteer opportunities at all levels of the organization. Come to this informal session to learn what opportunities best match your interests and career plans.

WORKSHOPS

Registration required for the workshops below.
These workshops are free to SPIE Student Members, but you must register to attend.

Resumes to Interviews: Strategies for a Successful Job Search

WS1059 · Course Level: Introductory
CEU: 0.25 $50 Members | $100 Non-Members USD
Tuesday 1:30 pm to 4:30 pm

This workshop is free to SPIE Student Members. You must register to attend.

This course reviews effective strategies and techniques for a successful job search such as: compiling resumes, writing cover letters, and interviewing tips. The primary goal of the course is to provide creative and proven techniques for new college graduates and professionals to plan and conduct their job search and secure a job.

Instructors: **Paige Lawson** has been in professional recruiting for more than 20 years. She has extensive experience with both in-house corporate environments as well as outside agency/consulting environments. Paige is currently a recruiter for LightWorks Optical Systems in Murrieta, CA, and a member of the local networking group Professionals in Human Resources (PHIRA).

Suzanne Krinsky has been in human resources and corporate recruiting for more than 15 years. She has extensive experience with both in-house corporate environments as well as outside agency/consulting environments. Suzanne is currently the Human Resource Director for Daylight Solutions in San Diego, and also a long-time Board member for the Biotech Human Resource Development Coalition (BEDC) and Human Resource Roundtable member.

This workshop presents introductory information and is intended primarily for university students and others with little professional experience.

The Craft of Scientific Presentations: A Workshop on Technical Presentations

WS667 · Course Level: Introductory
CEU: 0.35 $75 Members | $125 Non-Members USD
Monday 8:30 am to 12:30 pm

This workshop is free to SPIE Student Members. You must register to attend.

This course provides attendees with an overview of what distinguishes the best scientific presentations. The course introduces a new design for presentation slides that is both more memorable and persuasive from what is typically shown at conferences.

Instructor: **Christine Haas** brings ten years of experience working at the intersection of communication and science. She held positions as the director of marketing for Drexel's College of Engineering and director of operations for the dean of engineering at Worcester Polytechnic Institute. Now, as CEO of Christine Haas Consulting, LLC and director of the Engineering Ambassadors Network, she continues to work with scientists and engineers across government, industry and higher education to deliver training on presentations and technical writing.

COURSE PRICE INCLUDES the text *The Craft of Scientific Presentations* (Springer, 2003) by Michael Alley.

The Craft of Scientific Writing: A Workshop on Technical Writing

WS668 · Course Level: Introductory
CEU: 0.35 $75 Members | $125 Non-Members USD
Monday 1:30 pm to 5:30 pm

This workshop is free to SPIE Student Members. You must register to attend.

This course provides an overview on writing a scientific paper. The course focuses on the structure, language, and illustration of scientific papers.

Instructor: **Christine Haas** brings ten years of experience working at the intersection of communication and science. She held positions as the director of marketing for Drexel's College of Engineering and director of operations for the dean of engineering at Worcester Polytechnic Institute. Now, as CEO of Christine Haas Consulting, LLC and director of the Engineering Ambassadors Network, she continues to work with scientists and engineers across government, industry and higher education to deliver training on presentations and technical writing.

COURSE PRICE INCLUDES the text *The Craft of Scientific Writing* (Springer, 2003) by Michael Alley

E. EXHIBITION

Discover new possibilities at two free world-class exhibitions

BiOS EXPO

Saturday 7 February · Noon to 5:00 pm
Sunday 8 February · 10:00 am to 5:00 pm

The world's largest biomedical optics and biophotonics exhibition. BiOS EXPO, held Saturday and Sunday, kicks off the Photonics West week. Find the latest technologies from 220 suppliers in biomedical optics and photonics.

Technologies you will see:

- Biomedical optics components, systems, instrumentation, and applications
- Lasers
- Molecular imaging
- Therapeutic devices
- Nano/biophotonics
- Biosensors
- Spectroscopic instruments
- Microscopic imaging

PHOTONICS WEST

Tuesday 10 February · 10:00 am to 5:00 pm
Wednesday 11 February · 10:00 am to 5:00 pm
Thursday 12 February · 10:00 am to 4:00 pm

Photonics West is the premier photonics and laser event. With more than 1,250 companies, this exhibition is the best place to find the latest products, tools, and devices.

Technologies you will see:

- Lasers and other light sources
- Laser accessories, laser systems
- Cameras and CCD components
- Fiber optic components, equipment, systems
- Optical components
- Communication
- Optical detectors
- High speed imaging and sensing
- Optical materials and substrates
- IR sources and detectors
- Electronic imaging components
- Optical coatings
- Lenses and filters
- Positions and mounts
- Metrology
- See the latest Product Launches from exhibitors

"Photonics West is the single most important exhibition and conference that we participate in every year. There is nowhere else we can go to learn, be seen, and catch the beat of the industry. Going to Photonics West is worth it, believe me!"

Turan Erdogan
CTO and VP of Business Development, IDEX

PRODUCT DEMONSTRATIONS

Product Demonstrations are open to all attendees. Exhibiting companies will be showcasing products in half-hour demonstrations.

	SATURDAY 7 FEBRUARY	SUNDAY 8 FEBRUARY
TIME	**BiOS DEMO AREA / A SOUTH**	**BiOS DEMO AREA / A SOUTH**
10:30 am	**EXHIBITION CLOSED**	**FREEDOM – the latest advances in compact spectroscopy** **Thomas Rasmussen**, Ibsen Photonics
11:30 pm	**OPENS 12:00 pm**	**Thermal Medical Imaging for Epidemic Outbreaks Such As Ebola** **Hervé Copin,** Xenics
12:30 pm		**Improving fluorescence microscopy outcomes from LED Light Engines with thin-film interference filters.** **Dr. Prashant Prabhat,** Semrock
1:30 pm	**Broadly Tunable Ultrafast Optical Parametric Oscillators for the IR** **Sara Otero,** Radiantis	**Rapid Prototyping** **David Montgomery,** CVI Laser Optics
2:30 pm	**Advances In High Speed Laser Scanning** **Donald Wenzel,** Lincoln Laser Company	
3:30 pm	**Focus-tunable Lenses as Enabling Technology for Biomedical Imaging Application.** **David Leuenberger,** Optotune	**1310 nm OCT Swept Laser Engine** **Dr. Jason Ensher,** Insight Photonic Solutions

TUESDAY 10 FEBRUARY		
TIME	**DEMO AREA 1 / ABC SOUTH**	**DEMO AREA 2/D NORTH**
10:30 am	**Low Noise QCL Driver Instrument Operation and Applications** **Mary Johnson,** Wavelength Electronics, Inc.	**Single Frequency Pulsed Fiber Laser with mJ Level Pulse Energy** **Shibin Jiang,** AdValue Photonics
11:30 am	**Green Laser Core with High Eyes Sensitivity Wavelength 545nm** **Jiyang Wan,** Qingdao Lasence Co., Ltd.	**Waveoptical Simulation and Design of Laser Systems for Beam Shaping, Splitting and Homogenization using VirtualLab.** **Daniel Asoubar,** LightTrans VirtualLab UG
12:30 pm	**Integrating Finite Element Analysis with Optical Analysis** **Gregory Michels,** Sigmadyne, Inc.	**RogueScope - Real-Time Spectrometer at Hundred Million Frames-Per-Second** **Claire Chen, Mohammad Hossein Asghari,** UCLA Photonics Lab.
1:30 pm	**Improve Image Quality with Optical Filters** **Georgy Das,** Midwest Optical Systems	**Fiber Optic Rotary and Linear Encoders for Motion Control Applications** **Robert Rickenbach,** Micronor Inc.
2:30 pm	**ALIO's Patent Pending Hybrid Hexapod®** **Randy Graves,** Alio Industries	**Birefringent Polarization Converters Fabricated with Femtosecond Laser** **Titas Gertus,** Workshop of Photonics
3:30 pm	**Increasing Consistency, Time to Surface Finish, and Polishing Capability using Nanophase Cerium Oxide Slurry** **Patrick Murray, Ph.D.,** Nanophase Technologies Corporation	**Varioptic Liquid Lens Solutions for Ultra Fast Auto Focus with No Moving Parts** **Olivier Jacques-Sermet,** Varioptic, a BU of Parrot SA
4:30 pm	**Hyperspectral SWIR Imaging and Laser Beam Profiling Up to 2.35 µm** **Hervé Copin,** Xenics	**High Pulse Energy 2 Micron Mode-Locked Fiber Laser** **Shibin Jiang,** AdValue Photonics

WEDNESDAY 11 FEBRUARY

TIME	DEMO AREA 1 / ABC SOUTH	DEMO AREA 2/D NORTH
10:30 am	**Filter Glass Spectral Calculator for New Product Design** **Adam Willsey,** Kopp Glass, Inc.	**The Spectrum of Material Selection** **Mark Middleton,** Crystran Ltd
11:30 am	**FREEDOM – The Latest Advances in Compact Spectroscopy** **Thomas Rasmussen,** Ibsen Photonics	**Introduction to APEX** **Mary G. Turner, Ph.D,** Breault Research
12:30 pm	**Rapid Prototype Cell (RPC) Technology** **David Montgomery & Konrad Goffin,** CVI Laser Optics	**Position Sensing Detector Control** **Robert Kay,** Elite Engineering Corp.
1:30 pm	**Linear Variable Filters for Fluorescence and Hyperspectral Imaging Applications** **Dr.-Ing. Oliver Pust,** DELTA Optical Filters	**SCHOTT XLD glasses** **Dr. Ralf Jedamzik,** SCHOTT North America Inc.
2:30 pm	**Optical Systems** **Alexis Vogt,** Melles Griot Optical Systems	**Dynavac Spectrum-Pro Broad Band Optical Monitoring System** **Sean Smith,** Dynavac
3:30 pm	**Swept Fiber Interrogators Change Everything** **Dr. Jason Ensher,** Insight Photonic Solutions, Inc.	**THz Spectrometer: Making the Invisible Visible** **Dr. Ronja Gärtner,** HÜBNER GmbH & Co. KG
4:30 pm	**Hyperspectral Imager Technology** **Representative from IMEC,** IMEC	**MEMS FT-IR for In-Situ Analyses in Agriculture/Food** **F.J. Oukes,** SoilCares / DutchSprouts

THURSDAY 12 FEBRUARY

TIME	DEMO AREA 1 / ABC SOUTH	DEMO AREA 2/D NORTH
10:30 am	**Detection of Single-Photons and Generation of Entangled Photon Pairs** **Dr. Andreas Poppe**, Roithner LaserTechnik GmbH and AIT	**Start-Up Alley** **Dirk Fabian,** SPIE
11:30 am	**ZOOM Spectra – Compact High-rate Wavemeter and Laser Spectrum analyzer** **Eleonore Hardy,** RESOLUTION Spectra Systems	**Start-Up Alley** **Dirk Fabian,** SPIE
12:30 pm	**InP+TriPleX photonic integration: Full-Value-Chain Demo of an Open-access Platform** **Arne Leinse,** LioniX	**New Fujikura CT-105/CT-106 LDF Cleavers** **Doug Duke,** AFL
1:30 pm	**State-of-the-Art Instrumentation for Laser Applications** **Sadik Hafizovic,** Zurich Instruments AG	**Photonic IC supply chain presents demonstrator of hybrid integration of InP and TriPleX photonic IC's.** **Arne Leinse,** LioniX
2:30 pm	**Scalable system implementation for 3-D machine vision using award-winning TI DLP® technology** **Chelsea Swan,** Texas Instruments	**New Fujikura FSR-05/06/07 Recoaters** **Doug Duke,** AFL
3:30 pm		**High Temperature Stable FBGs and FBGs for Harsh Environments in Carbon Coated Fiber** **Dr. Margarethe Kampling,** FemtoFiberTec GmbH

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SHIMADZU
Excellence in Science

Booth #234 (South Hall)

Designed for Excellence

SHIMADZU OPTICAL AND LASER DEVICES

NEW Fiber-Coupled Blue Direct Diode Laser

Blue direct diode laser
(405 nm/450 nm, etc.)

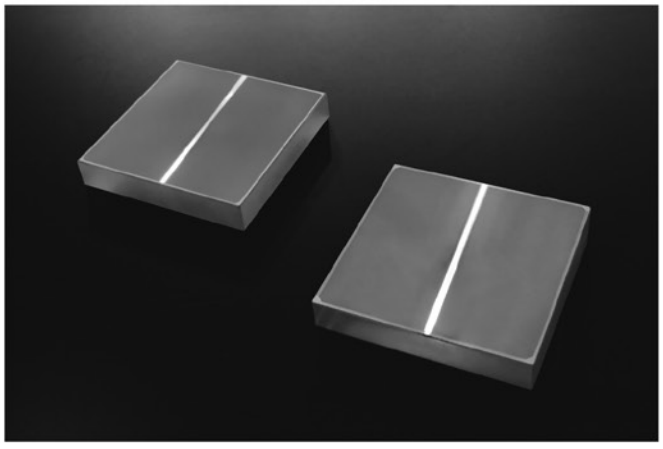
Cu
Au
The optimal laser light source for processing highly reflective materials

High brightness
Fiber core diameter : 100 µm

High power
Output in excess of 10 W

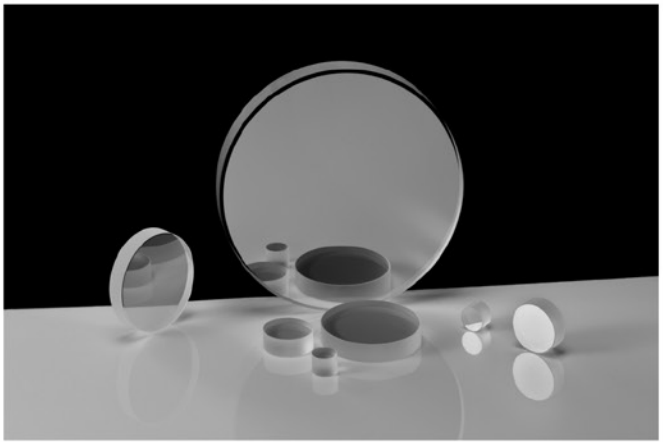
This fiber-coupled blue semiconductor laser provides a top class, high brightness light source.
This is the optimal laser light source for processing highly reflective materials*.
*Highly reflective materials: copper (Cu), gold (Au), etc.

Diffraction Grating for Laser Systems LA Series



Features
- High diffraction efficiency
- Wide wavelength coverage
- Wide selection
- Customizable

Laser Mirrors & Laser Windows for High Power Laser

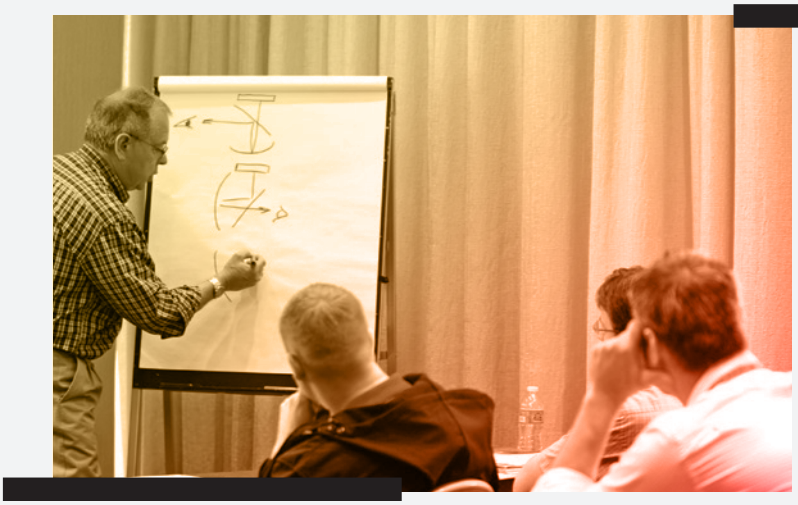


Features
- High damage threshold
- High reflectivity (Laser Mirrors)
- High transmittance (Laser Windows)
- Customizable

CONTACT

SHIMADZU CORPORATION
3, Kanda-Nis hikicho 1-Chome, Chiyoda-ku, Tokyo 101-8448, JAPAN
Phone : +81(3)3219-5797 FAX : +81(3)3219-5567
E-mail : sensor@group.shimadzu.co.jp

SHIMADZU PRECISION INSTRUMENTS, INC.
(Shimadzu Industrial Equipment, USA Company)
2340-C Walsh Avenue,Santa Clara,CA 95051 U.S.A.
Phone : + 1(408)566-0960 FAX : +1(408)566-0961
E-mail : sales@spi-sie.com



65
SPIE COURSES & WORKSHOPS

SPIE STUDENT MEMBERS GET 50% OFF COURSES— SEE DETAILS ONLINE

Take advantage of face-to-face instruction from some of the biggest names in industry and research.

Make the most of your time at SPIE Photonics West—get training and access to professional development courses to stay competitive and advance your career. Learn current approaches in lasers and applications, sensors, imaging, IR systems, optical & optomechanical engineering, and more. With 65 half- and full-day courses and workshops offered, you can find those that meet your specific needs and earn CEUs to fulfill ongoing professional education requirements. **SEE DETAILED DESCRIPTIONS AND REGISTER FOR COURSES ONLINE.**

NEW AND FEATURED COURSES:

- Head Mounted Displays for Augmented Reality Applications
- Laser Systems Engineering
- Powering and Integration of Laser Diode Systems
- Laser Diode Beam Basics, Characteristics and Manipulations
- Vibration Control for Optomechanical Systems
- Introduction to Quantitative Phase Imaging (QPI)
- Photon Upconversion Nanomaterials, Technologies and Biomedical Applications
- Flow Cytometry Trends & Drivers
- Laser Welding and Drilling Fundamentals & Practices
- Monte Carlo Modeling Explained
- A Practical Guide to Specifying Optical Components
- GaN Optoelectronics: Material Properties and Device Principles
- Cost Conscious Tolerancing of Optical Systems
- MTF in Optical and ElectroOptical Systems

MONEY-BACK GUARANTEE

We are confident that once you experience an SPIE course for yourself you will look to us for your future education needs. However, if for any reason you are dissatisfied, we will gladly refund your money. We just ask that you tell us what you did not like; suggestions for improvement are always welcome.

CONTINUING EDUCATION UNITS

AUTHORIZED IACET PROVIDER

SPIE has been approved as an authorized provider of CEUs by IACET, The International Association for Continuing Education and Training (Provider #1002091). In obtaining this approval, SPIE has demonstrated that it complies with the ANSI/IACET Standards which are widely recognized as standards of good practice.

SPIE reserves the right to cancel a course due to insufficient advance registration.

DAILY COURSE SCHEDULE

SPIE. PHOTONICS WEST

LEARN DIRECTLY FROM INDUSTRY EXPERTS AND GET THE TRAINING YOU NEED TO STAY AT THE TOP OF YOUR FIELD.

SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
New Courses for 2015					
	SC1149 **Photon Upconversion Nanomaterials, Technologies and Biomedical Applications** *(Prasad)* 1:30 pm to 5:30 pm, $375 / $430	SC1147 **Vibration Control for Optomechanical Systems** *(Ryaboy)* 8:30 am to 5:30 pm, $600 / $710	SC1144 **Laser Systems Engineering** *(Kasunic)* 8:30 am to 5:30 pm, $600 / $710	SC1096 **Head Mounted Displays for Augmented Reality Applications** *(Browne, Melzer)* 8:30 am to 5:30 pm, $600 / $710	
		SC1150 **Flow Cytometry Trends & Drivers** *(Vacca)* 1:30 pm to 5:30 pm, $375 / $430	SC1145 **Powering and Integration of Laser Diode Systems** *(Bystryak, Trestman)* 1:30 pm to 5:30 pm, $375 / $430	SC1148 **Introduction to Quantitative Phase Imaging (QPI)** *(Popescu, Park)* 8:30 am to 5:30 pm, $600 / $710	
		SC1151 **Laser Welding and Drilling - Fundamentals & Practices** *(Engel)* 8:30 am to 5:30 pm, $600 / $710	SC1146 **Laser Diode Beam Basics, Characteristics and Manipulation** *(Sun)* 8:30 am to 12:30 pm, $375 / $430	SC720 **Cost-Conscious Tolerancing of Optical Systems** *(Youngworth)* 1:30 pm to 5:30 pm, $375 / $430	
			SC1152 **Monte Carlo Modeling Explained** *(Kanick)* 8:30 am to 5:30 pm, $600 / $710		
			SC1153 **A Practical Guide to Specifying Optical Components** *(Aikens)* 8:30 am to 12:30 pm, $375 / $430		
			SC157 **MTF in Optical and Electro-Optical Systems** *(Boreman)* 8:30 am to 5:30 pm, $640 / $750		
			SC822 **GaN Optoelectronics: Material Properties and Device Principles** *(Piprek)* 8:30 am to 12:30 pm, $375 / $430		
Advanced Quantum and Optoelectronic Applications					
			SC1152 **Monte Carlo Modeling Explained** *(Kanick)* 8:30 am to 5:30 pm, $600 / $710		

See SPIE Cashier, North Lobby, to register for courses

COURSES

DAILY COURSE SCHEDULE

SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Biomedical Spectroscopy, Microscopy, and Imaging					
	SC1020 **Splicing of Specialty Fibers and Glass Processing of Fused Components for Fiber Laser and Medical Probe Applications** *(Wang)* 8:30 am to 12:30 pm, $375 / $430	SC868 **Optical Design for Biomedical Imaging** *(Liang)* 8:30 am to 12:30 pm, $455 / $510	SC952 **Applications of Detection Theory** *(Carrano)* 8:30 am to 5:30 pm, $600 / $710	SC1148 **Introduction to Quantitative Phase Imaging (QPI)** *(Popescu, Park)* 8:30 am to 5:30 pm, $600 / $710	
	SC1072 **Statistics for Imaging and Sensor Data** *(Bajorski)* 8:30 am to 5:30 pm, $660 / $770	SC1150 **Flow Cytometry Trends & Drivers** *(Vacca)* 1:30 pm to 5:30 pm, $375 / $430	SC1152 **Monte Carlo Modeling Explained** *(Kanick)* 8:30 am to 5:30 pm, $600 / $710		
	SC746 **Introduction to Ultrafast Optics** *(Trebino)* 1:30 pm to 5:30 pm, $375 / $430	SC1003 **Optical Scatter Metrology for Industry** *(Stover)* 1:30 pm to 5:30 pm, $445 / $500	SC309 **Fluorescent Markers: Usage and Optical System Optimization** *(Levi)* 1:30 pm to 5:30 pm, $375 / $430		
	SC1126 **Neurophotonics** *(Levi, Dufour)* 1:30 pm to 5:30 pm, $375 / $430		SC1123 **The Building Blocks of IR Instrument Design** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430		
	SC1149 **Photon Upconversion Nanomaterials, Technologies and Biomedical Applications** *(Prasad)* 1:30 pm to 5:30 pm, $375 / $430				
Clinical Technologies and Systems					
	SC1020 **Splicing of Specialty Fibers and Glass Processing of Fused Components for Fiber Laser and Medical Probe Applications** *(Wang)* 8:30 am to 12:30 pm, $375 / $430	SC868 **Optical Design for Biomedical Imaging** *(Liang)* 8:30 am to 12:30 pm, $455 / $510	SC952 **Applications of Detection Theory** *(Carrano)* 8:30 am to 5:30 pm, $600 / $710	SC972 **Basic Laser Technology** *(Sukuta)* 8:30 am to 12:30 pm, $375 / $430	
	C1072 **Statistics for Imaging and Sensor Data** *(Bajorski)* 8:30 am to 5:30 pm, $660 / $770	SC1150 **Flow Cytometry Trends & Drivers** *(Vacca)* 1:30 pm to 5:30 pm, $375 / $430	SC1152 **Monte Carlo Modeling Explained** *(Kanick)* 8:30 am to 5:30 pm, $600 / $710	SC1096 **Head Mounted Displays for Augmented Reality Applications** *(Browne, Melzer)* 8:30 am to 5:30 pm, $600 / $710	
	SC1126 **Neurophotonics** *(Levi, Dufour)* 1:30 pm to 5:30 pm, $375 / $430		SC1123 **The Building Blocks of IR Instrument Design** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430	SC1148 **Introduction to Quantitative Phase Imaging (QPI)** *(Popescu, Park)* 8:30 am to 5:30 pm, $600 / $710	
	SC1149 **Photon Upconversion Nanomaterials, Technologies and Biomedical Applications** *(Prasad)* 1:30 pm to 5:30 pm, $375 / $430				
	SC312 **Principles and Applications of Optical Coherence Tomography** *(Fujimoto)* 1:30 pm to 5:30 pm, $375 / $430				

SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Displays and Holography					
		SC011 **Design of Efficient Illumination Systems** *(Cassarly)* 8:30 am to 12:30 pm, $375 / $430		SC1096 **Head Mounted Displays for Augmented Reality Applications** *(Browne, Melzer)* 8:30 am to 5:30 pm, $600 / $710	
Advanced Quantum and Optoelectronic Applications					
	SC1072 **Statistics for Imaging and Sensor Data** *(Bajorski)* 8:30 am to 5:30 pm, $660 / $770		SC157 **MTF in Optical and Electro-Optical Systems** *(Boreman)* 8:30 am to 5:30 pm, $640 / $750	SC1096 **Head Mounted Displays for Augmented Reality Applications** *(Browne, Melzer)* 8:30 am to 5:30 pm, $600 / $710	
				SC1148 **Introduction to Quantitative Phase Imaging (QPI)** *(Popescu, Park)* 8:30 am to 5:30 pm, $600 / $710	
Laser Applications					
	SC818 **Laser Beam Quality** *(Paschotta)* 8:30 am to 12:30 pm, $375 / $430	SC1151 **Laser Welding and Drilling - Fundamentals & Practices** *(Engel)* 8:30 am to 5:30 pm, $600 / $710	SC1146 **Laser Diode Beam Basics, Characteristics and Manipulation** *(Sun)* 8:30 am to 12:30 pm, $375 / $430		
	SC746 **Introduction to Ultrafast Optics** *(Trebino)* 1:30 pm to 5:30 pm, $375 / $430		SC1144 **Laser Systems Engineering** *(Kasunic)* 8:30 am to 5:30 pm, $600 / $710		
			SC1145 **Powering and Integration of Laser Diode Systems** *(Bystryak, Trestman)* 1:30 pm to 5:30 pm, $375 / $430		
			SC1089 **Laser Safety for Engineers** *(Lieb)* 8:30 am to 12:30 pm, $375 / $430		
Laser Micro-/Nanoengineering					
	SC818 **Laser Beam Quality** *(Paschotta)* 8:30 am to 12:30 pm, $375 / $430	SC1151 **Laser Welding and Drilling - Fundamentals & Practices** *(Engel)* 8:30 am to 5:30 pm, $600 / $710	SC1144 **Laser Systems Engineering** *(Kasunic)* 8:30 am to 5:30 pm, $600 / $710	SC1089 **Laser Safety for Engineers** *(Lieb)* 8:30 am to 12:30 pm, $375 / $430	
	SC746 **Introduction to Ultrafast Optics** *(Trebino)* 1:30 pm to 5:30 pm, $375 / $430	SC743 **Micromachining with Femtosecond Lasers** *(Nolte, Schaffer)* 8:30 am to 12:30 pm, $375 / $430			
		SC689 **Precision Laser Micromanufacturing** *(Schaeffer)* 1:30 pm to 5:30 pm, $375 / $430			

See SPIE Cashier, North Lobby, to register for courses

COURSES

DAILY COURSE SCHEDULE

SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Laser Source Engineering					
	SC748 **High-Power Fiber Sources** *(Nilsson)* 8:30 am to 5:30 pm, $600 / $710	SC931 **Applied Nonlinear Frequency Conversion** *(Paschotta)* 8:30 am to 5:30 pm, $600 / $710	SC1146 **Laser Diode Beam Basics, Characteristics and Manipulation** *(Sun)* 8:30 am to 12:30 pm, $375 / $430	SC972 **Basic Laser Technology** *(Sukuta)* 8:30 am to 12:30 pm, $375 / $430	SC1012 **Coherent Mid-Infrared Sources and Applications** *(Vodopyanov)* 1:30 pm to 5:30 pm, $375 / $430
	SC818 **Laser Beam Quality** *(Paschotta)* 8:30 am to 12:30 pm, $375 / $430	SC047 **Introduction to Nonlinear Optics** *(Fisher)* 1:30 pm to 5:30 pm, $375 / $430	SC1144 **Laser Systems Engineering** *(Kasunic)* 8:30 am to 5:30 pm, $600 / $710	SC1089 **Laser Safety for Engineers** *(Lieb)* 8:30 am to 12:30 pm, $375 / $430	
	SC1020 **Splicing of Specialty Fibers and Glass Processing of Fused Components for Fiber Laser and Medical Probe Applications** *(Wang)* 8:30 am to 12:30 pm, $375 / $430		SC744 **Ultrafast Fiber Lasers and Frequency Combs** *(Fermann)* 8:30 am to 12:30 pm, $375 / $430	SC752 **Solid State Laser Technology** *(Hodgson)* 8:30 am to 5:30 pm, $600 / $710	
	SC746 **Introduction to Ultrafast Optics** *(Trebino)* 1:30 pm to 5:30 pm, $375 / $430		SC1145 **Powering and Integration of Laser Diode Systems** *(Bystryak, Trestman)* 1:30 pm to 5:30 pm, $375 / $430		
Metrology & Standards					
		SC1003 **Optical Scatter Metrology for Industry** *(Stover)* 1:30 pm to 5:30 pm, $445 / $500	SC1153 **A Practical Guide to Specifying Optical Components** *(Aikens)* 8:30 am to 12:30 pm, $375 / $430	SC1089 **Laser Safety for Engineers** *(Lieb)* 8:30 am to 12:30 pm, $375 / $430	
			SC1152 **Monte Carlo Modeling Explained** *(Kanick)* 8:30 am to 5:30 pm, $600 / $710	SC212 **Modern Optical Testing** *(Wyant)* 8:30 am to 12:30 pm, $410 / $465	
				SC700 **Understanding Scratch and Dig Specifications** *(Aikens)* 8:30 am to 12:30 pm, $445 / $500	
				SC1017 **Optics Surface Inspection Workshop** *(Aikens)* 1:30 pm to 5:30 pm, $455 / $510	

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SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
MOEMS-MEMS in Photonics					
	SC818 **Laser Beam Quality** *(Paschotta)* 8:30 am to 12:30 pm, $375 / $430	SC743 **Micromachining with Femtosecond Lasers** *(Nolte, Schaffer)* 8:30 am to 12:30 pm, $375 / $430	SC454 **Fabrication Technologies for Micro- and Nano-Optics** *(Suleski)* 8:30 am to 12:30 pm, $375 / $430	SC1125 **Design Techniques for Micro-optics** *(Kress)* 8:30 am to 12:30 pm, $375 / $430	
		SC689 **Precision Laser Micromanufacturing** *(Schaeffer)* 1:30 pm to 5:30 pm, $375 / $430	SC1146 **Laser Diode Beam Basics, Characteristics and Manipulation** *(Sun)* 8:30 am to 12:30 pm, $375 / $430		
		SC1071 **Understanding Diffractive Optics** *(Soskind)* 1:30 pm to 5:30 pm, $410 / $465	SC1144 **Laser Systems Engineering** *(Kasunic)* 8:30 am to 5:30 pm, $600 / $710		
Nano/Biophotonics					
	SC1126 **Neurophotonics** *(Levi, Dufour)* 1:30 pm to 5:30 pm, $375 / $430		SC1152 **Monte Carlo Modeling Explained** *(Kanick)* 8:30 am to 5:30 pm, $600 / $710		
	SC1149 **Photon Upconversion Nanomaterials, Technologies and Biomedical Applications** *(Prasad)* 1:30 pm to 5:30 pm, $375 / $430		SC309 **Fluorescent Markers: Usage and Optical System Optimization** *(Levi)* 1:30 pm to 5:30 pm, $375 / $430		
Nanotechnologies in Photonics					
	SC608 **Photonic Crystals: A Crash Course, from Bandgaps to Fibers** *(Johnson)* 8:30 am to 12:30 pm, $420 / $475				
	SC1149 **Photon Upconversion Nanomaterials, Technologies and Biomedical Applications** *(Prasad)* 1:30 pm to 5:30 pm, $375 / $430				
Nonlinear Optics					
	SC1020 **Splicing of Specialty Fibers and Glass Processing of Fused Components for Fiber Laser and Medical Probe Applications** *(Wang)* 8:30 am to 12:30 pm, $375 / $430	SC931 **Applied Nonlinear Frequency Conversion** *(Paschotta)* 8:30 am to 5:30 pm, $600 / $710			
		SC047 **Introduction to Nonlinear Optics** *(Fisher)* 1:30 pm to 5:30 pm, $375 / $430			
		Thu SC1012 **Coherent Mid-Infrared Sources and Applications** *(Vodopyanov)* 1:30 pm to 5:30 pm, $375 / $430			

DAILY COURSE SCHEDULE

SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Optical Engineering & Fabrication					
		SC321 **Thin Film Optical Coatings** *(Macleod)* 8:30 am to 5:30 pm, $600 / $710	SC1153 **A Practical Guide to Specifying Optical Components** *(Aikens)* 8:30 am to 12:30 pm, $375 / $430	SC972 **Basic Laser Technology** *(Sukuta)* 8:30 am to 12:30 pm, $375 / $430	SC1039 **Evaluating Aspheres for Manufacturability** *(Hall)* 8:30 am to 12:30 pm, $375 / $430
		SC1003 **Optical Scatter Metrology for Industry** *(Stover)* 1:30 pm to 5:30 pm, $445 / $500	SC454 **Fabrication Technologies for Micro- and Nano-Optics** *(Suleski)* 8:30 am to 12:30 pm, $375 / $430	SC700 **Understanding Scratch and Dig Specifications** *(Aikens)* 8:30 am to 12:30 pm, $445 / $500	
		SC1071 **Understanding Diffractive Optics** *(Soskind)* 1:30 pm to 5:30 pm, $410 / $465	SC1086 **Optical Materials, Fabrication and Testing for the Optical Engineer** *(DeGroote Nelson)* 1:30 pm to 5:30 pm, $375 / $430	SC720 **Cost-Conscious Tolerancing of Optical Systems** *(Youngworth)* 1:30 pm to 5:30 pm, $375 / $430	
				SC1017 **Optics Surface Inspection Workshop** *(Aikens)* 1:30 pm to 5:30 pm, $455 / $510	
Optical Systems & Lens Design					
	SC156 **Basic Optics for Engineers** *(Boreman)* 8:30 am to 5:30 pm, $640 / $750	SC011 **Design of Efficient Illumination Systems** *(Cassarly)* 8:30 am to 12:30 pm, $375 / $430	SC1123 **The Building Blocks of IR Instrument Design** *(Grant)* 1:30 pm to 5:30 pm, $375 / $430	SC1125 **Design Techniques for Micro-optics** *(Kress)* 8:30 am to 12:30 pm, $375 / $430	SC1039 **Evaluating Aspheres for Manufacturability** *(Hall)* 8:30 am to 12:30 pm, $375 / $430
	SC690 **Optical System Design: Layout Principles and Practice** *(Greivenkamp)* 8:30 am to 5:30 pm, $635 / $745	SC003 **Practical Optical System Design** *(Youngworth)* 8:30 am to 5:30 pm, $690 / $800		SC935 **Introduction to Lens Design** *(Bentley)* 8:30 am to 5:30 pm, $635 / $745	
		SC609 **Basic Optics for Non-Optics Personnel** *(Harding)* 1:30 pm to 4:00 pm, $175 / $225		SC720 **Cost-Conscious Tolerancing of Optical Systems** *(Youngworth)* 1:30 pm to 5:30 pm, $375 / $430	
Optoelectronic Materials and Devices					
	SC1091 **Fundamentals of Reliability Engineering for Optoelectronic Devices** *(Leisher)* 8:30 am to 12:30 pm, $375 / $430		SC822 **GaN Optoelectronics: Material Properties and Device Principles** *(Piprek)* 8:30 am to 12:30 pm, $375 / $430	SC1125 **Design Techniques for Micro-optics** *(Kress)* 8:30 am to 12:30 pm, $375 / $430	
	SC747 **Semiconductor Photonic Device Fundamentals** *(Linden)* 8:30 am to 5:30 pm, $600 / $710				
	SC817 **Silicon Photonics** *(Michel, Saini)* 1:30 pm to 5:30 pm, $375 / $430				

SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Optomechanics					
		SC015 **Structural Adhesives for Optical Bonding** *(Daly)* 8:30 am to 12:30 pm, $375 / $430	SC010 **Introduction to Optical Alignment Techniques** *(Castle)* 8:30 am to 5:30 pm, $600 / $710	SC1120 **Finite Element Analysis of Optics** *(Doyle, Genberg)* 8:30 am to 5:30 pm, $670 / $780	SC1085 **Optomechanical Systems Engineering** *(Kasunic)* 8:30 am to 5:30 pm, $600 / $710
		SC1147 **Vibration Control for Optomechanical Systems** *(Ryaboy)* 8:30 am to 5:30 pm, $600 / $710		SC720 **Cost-Conscious Tolerancing of Optical Systems** *(Youngworth)* 1:30 pm to 5:30 pm, $375 / $430	
Photonic Integration					
	SC1091 **Fundamentals of Reliability Engineering for Optoelectronic Devices** *(Leisher)* 8:30 am to 12:30 pm, $375 / $430		SC822 **GaN Optoelectronics: Material Properties and Device Principles** *(Piprek)* 8:30 am to 12:30 pm, $375 / $430	SC1125 **Design Techniques for Micro-optics** *(Kress)* 8:30 am to 12:30 pm, $375 / $430	
	SC608 **Photonic Crystals: A Crash Course, from Bandgaps to Fibers** *(Johnson)* 8:30 am to 12:30 pm, $420 / $475				
	SC747 **Semiconductor Photonic Device Fundamentals** *(Linden)* 8:30 am to 5:30 pm, $600 / $710				
	SC817 **Silicon Photonics** *(Michel, Saini)* 1:30 pm to 5:30 pm, $375 / $430				
Photonic Therapeutics and Diagnostics					
	SC1072 **Statistics for Imaging and Sensor Data** *(Bajorski)* 8:30 am to 5:30 pm, $660 / $770	SC702 **Optics and Optical Quality of the Human Eye** *(Roorda)* 8:30 am to 12:30 pm, $375 / $430		SC972 **Basic Laser Technology** *(Sukuta)* 8:30 am to 12:30 pm, $375 / $430	
	SC1126 **Neurophotonics** *(Levi, Dufour)* 1:30 pm to 5:30 pm, $375 / $430			SC1096 **Head Mounted Displays for Augmented Reality Applications** *(Browne, Melzer)* 8:30 am to 5:30 pm, $600 / $710	

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DAILY COURSE SCHEDULE

SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Semiconductor Lasers and LEDs					
	SC747 **Semiconductor Photonic Device Fundamentals** *(Linden)* 8:30 am to 5:30 pm, $600 / $710	SC011 **Design of Efficient Illumination Systems** *(Cassarly)* 8:30 am to 12:30 pm, $375 / $430	SC822 **GaN Optoelectronics: Material Properties and Device Principles** *(Piprek)* 8:30 am to 12:30 pm, $375 / $430	SC1125 **Design Techniques for Micro-optics** *(Kress)* 8:30 am to 12:30 pm, $375 / $430	SC1012 **Coherent Mid-Infrared Sources and Applications** *(Vodopyanov)* 1:30 pm to 5:30 pm, $375 / $430
	SC1020 **Splicing of Specialty Fibers and Glass Processing of Fused Components for Fiber Laser and Medical Probe Applications** *(Wang)* 8:30 am to 12:30 pm, $375 / $430	SC1151 **Laser Welding and Drilling - Fundamentals & Practices** *(Engel)* 8:30 am to 5:30 pm, $600 / $710	SC1146 **Laser Diode Beam Basics, Characteristics and Manipulation** *(Sun)* 8:30 am to 12:30 pm, $375 / $430	SC1089 **Laser Safety for Engineers** *(Lieb)* 8:30 am to 12:30 pm, $375 / $430	
		SC052 **Light-Emitting Diodes** *(Schubert)* 1:30 pm to 5:30 pm, $450 / $505	SC1145 **Powering and Integration of Laser Diode Systems** *(Bystryak, Trestman)* 1:30 pm to 5:30 pm, $375 / $430		
Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering					
	SC1072 **Statistics for Imaging and Sensor Data** *(Bajorski)* 8:30 am to 5:30 pm, $660 / $770	SC868 **Optical Design for Biomedical Imaging** *(Liang)* 8:30 am to 12:30 pm, $455 / $510	SC1152 **Monte Carlo Modeling Explained** *(Kanick)* 8:30 am to 5:30 pm, $600 / $710	SC1148 **Introduction to Quantitative Phase Imaging (QPI)** *(Popescu, Park)* 8:30 am to 5:30 pm, $600 / $710	
	SC312 **Principles and Applications of Optical Coherence Tomography** *(Fujimoto)* 1:30 pm to 5:30 pm, $375 / $430				
	SC029 **Tissue Optics** *(Jacques)* 1:30 pm to 5:30 pm, $375 / $430				
Professional Development Workshops					
		WS667 **The Craft of Scientific Presentations: A Workshop on Technical Presentations** *(Haas)* 8:30 am to 12:30 pm, $150 / $200	WS1059 **Resumes to Interviews: Strategies for a Successful Job Search** *(Lawson, Krinsky)* 1:30 pm to 4:30 pm, $125 / $175		
		WS668 **The Craft of Scientific Writing: A Workshop on Technical Writing** *(Haas)* 1:30 pm to 5:30 pm, $150 / $200			

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SPIE. PHOTONICS WEST BIOS

THE WORLD'S LARGEST INTERNATIONAL BIOMEDICAL OPTICS AND BIOPHOTONICS CONFERENCE

SYMPOSIUM CHAIRS:

James Fujimoto
Massachusetts Institute of Technology (USA)

R. Rox Anderson
Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA), and Harvard School of Medicine (USA)

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PHOTONIC THERAPEUTICS AND DIAGNOSTICS

Program Chair: **Brian Jet-Fei Wong,** Beckman Laser Institute and Medical Clinic, Univ. of California, Irvine (USA)

CLINICAL TECHNOLOGIES AND SYSTEMS

Program Chairs: **Tuan Vo-Dinh,** Fitzpatrick Institute for Photonics, Duke Univ. (USA) and **Anita Mahadevan-Jansen,** Vanderbilt Univ. (USA)

TISSUE OPTICS, LASER-TISSUE INTERACTION, AND TISSUE ENGINEERING

Program Chairs: **Steven L. Jacques,** Oregon Health & Science Univ. (USA)

BIOMEDICAL SPECTROSCOPY, MICROSCOPY, AND IMAGING

Program Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA); **Daniel L. Farkas,** Univ. of Southern California (USA)

NEW

NANO/BIOPHOTONICS

Program Chairs: **Paras Prasad,** SUNY/Univ. Buffalo (USA); **Dan V. Nicolau,** McGill Univ. (Canada)

BIOS DAILY CONFERENCE SCHEDULE

SPIE. PHOTONICS WEST BIOS

THE WORLD'S LARGEST INTERNATIONAL BIOMEDICAL OPTICS AND BIOPHOTONICS CONFERENCE

SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
BiOS POSTER SESSION & COFFEE BREAK 3:00 to 4:00 pm	**TRANSLATIONAL RESEARCH LUNCHTIME FORUM** 12:30 to 2:00 pm	**BiOS POSTER SESSION** 5:30 to 7:30 pm	**NANO/ BIOPHOTONICS PROGRAM TRACK PLENARY SESSION** 10:30 to 11:30 am		
BiOS HOT TOPICS 7:00 to 9:30 pm	**BiOS POSTER SESSION & COFFEE BREAK** 3:00 to 4:00 pm		**NEUROPHOTONICS PLENARY SESSION** 2:00 to 3:00 pm	HEAR A NOBEL LAUREATE	
	FDA POLICIES AND PROCEDURES 5:00 to 7:00 pm		**BiOS POSTER SESSION** 6:00 to 8:00 pm		
	BiOS POSTER SESSION 5:30 to 7:00 pm		**IBOS: INTERNATIONAL BIOMEDICAL OPTICS SOCIETY** 7:30 to 9:00 pm		
	BiOS SUNDAY PLENARY SESSION 7:00 to 8:30 pm HEAR TWO NOBEL LAUREATES				

Photonic Therapeutics and Diagnostics

Program Chair: **Brian Jet-Fei Wong,** Beckman Laser Institute and Medical Clinic, Univ. of California, Irvine (USA)

9303A **Photonics in Dermatology and Plastic Surgery** (Choi, Kollias, Zeng) p. 73

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9303C **Optical Imaging, Therapeutics, and Advanced Technology in Head and Neck Surgery and Otolaryngology** (Wong, Ilgner, Nuttal, Richter) p. 77

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	FDA POLICIES AND PROCEDURES 5:00 to 7:00 pm		**BiOS POSTER SESSION** 6:00 to 8:00 pm		
	BiOS POSTER SESSION 5:30 to 7:00 pm		**IBOS: INTERNATIONAL BIOMEDICAL OPTICS SOCIETY** 7:30 to 9:00 pm		
	BiOS SUNDAY PLENARY SESSION 7:00 to 8:30 pm HEAR TWO NOBEL LAUREATES				

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	FDA POLICIES AND PROCEDURES 5:00 to 7:00 pm		**BiOS POSTER SESSION** 6:00 to 8:00 pm		
	BiOS POSTER SESSION 5:30 to 7:00 pm		**IBOS: INTERNATIONAL BIOMEDICAL OPTICS SOCIETY** 7:30 to 9:00 pm		
	BiOS SUNDAY PLENARY SESSION 7:00 to 8:30 pm (HEAR TWO NOBEL LAUREATES)				

Clinical Technologies and Systems

Program Chairs: **Tuan Vo-Dinh,** Fitzpatrick Institute for Photonics, Duke Univ. (USA) and **Anita Mahadevan-Jansen,** Vanderbilt Univ. (USA)

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SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
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	BiOS SUNDAY PLENARY SESSION 7:00 to 8:30 pm (HEAR TWO NOBEL LAUREATES)				

Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering

Program Chair: **Steven L. Jacques,** Oregon Health & Science Univ. (USA)

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BIOS DAILY CONFERENCE SCHEDULE

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	BiOS POSTER SESSION 5:30 to 7:00 pm		**IBOS: INTERNATIONAL BIOMEDICAL OPTICS SOCIETY** 7:30 to 9:00 pm		
	BiOS SUNDAY PLENARY SESSION 7:00 to 8:30 pm (HEAR TWO NOBEL LAUREATES)				

Biomedical Spectroscopy, Microscopy, and Imaging

Program Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA); **Daniel L. Farkas,** Univ. of Southern California (USA)

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Nano/Biophotonics

Program Chairs: **Paras Prasad,** SUNY/Univ. Buffalo (USA); **Dan V. Nicolau,** McGill Univ. (Canada)

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CONFERENCE 9303A
LOCATION: ROOM 120 (EXHIBIT LEVEL)

Saturday–Sunday 7–8 February 2015 • Part of Proceedings of SPIE Vol. 9303

Photonics in Dermatology and Plastic Surgery

Conference Chairs: **Bernard Choi,** Beckman Laser Institute and Medical Clinic (USA); **Nikiforos Kollias,** Consultant (USA); **Haishan Zeng,** The BC Cancer Agency Research Ctr. (Canada)

Program Committee: **Anthony J. Durkin,** Beckman Laser Institute and Medical Clinic (USA); **Iltefat Hamzavi M.D.,** Henry Ford Hospital (USA); **Kristen Marie Kelly M.D.,** Univ. of California, Irvine School of Medicine (USA); **Jessica C. Ramella-Roman,** The Catholic Univ. of America (USA); **Lise Lyngsnes Randeberg,** Norwegian Univ. of Science and Technology (Norway); **Tsung-Hua Tsai,** Far Eastern Memorial Hospital (Taiwan)

SATURDAY 7 FEBRUARY

SESSION 1
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . . .SAT 8:10 AM TO 9:20 AM

Skin Cancer
Session Chair: **Haishan Zeng,**
The BC Cancer Agency Research Ctr. (Canada)

8:10 am: **Differentiating pigmented skin tumors by the tumor-associated melanocytes based on in vivo third harmonic generation microscopy**, Wei-Hung Weng M.D., Ming-Rung Tsai, National Taiwan Univ. (Taiwan); Yi-Hua Liao M.D., National Taiwan Univ. Hospital (Taiwan); Chi-Kuang Sun, National Taiwan Univ. (Taiwan) . . . . . [9303-100]

8:30 am: **Assessment of cutaneous melanoma and basal cell carcinoma with photoacoustic imaging**, Aedán Breathnach, National Univ. of Ireland, Galway (Ireland); Liz Concannon, Galway Univ. Hospitals (Ireland); Hrehesh Molly Subhash, National Univ. of Ireland, Galway (Ireland); Jack Kelly, Galway Univ. Hospitals (Ireland); Martin J. Leahy, National Univ. of Ireland, Galway (Ireland) . . . . . [9303-101]

8:50 am: **In vivo multiphoton microscopy imaging of basal cell carcinoma** *(Invited Paper)*, Mihaela Balu, Beckman Laser Institute and Medical Clinic (USA); Christopher B. Zachary M.D., Ronald M. Harris M.D., Univ. of California, Irvine (USA); Tatiana B. Krasieva, Beckman Laser Institute and Medical Clinic (USA); Karsten König, JenLab GmbH (Germany) and Univ. des Saarlandes (Germany); Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA); Kristen M. Kelly M.D., Univ. of California, Irvine (USA) . . . . . [9303-102]

SESSION 2
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . . SAT 9:20 AM TO 10:30 AM

Multimodal Skin Characterization I
Session Chair: **Bernard Choi,**
Beckman Laser Institute and Medical Clinic (USA)

9:20 am: **Ultra mobile skin imaging system mapping optical coherence tomography on common-path epiluminescence microscopy**, Juan Sancho-Durá, Jose L. Rubio-Guivernau, Eduardo Margallo-Balbas, MedLumics S.L. (Spain); Wolfgang Drexler, Medizinische Univ. Wien (Austria) . . . . . [9303-103]

9:40 am: **In-vivo quantification of cutaneous melanin concentration and distribution: a comparison of multiphoton microscopy and spatially modulated quantitative spectroscopy** *(Invited Paper)*, Rolf B. Saager, Mihaela Balu, Viera Crosignani, Ata Sharif, Anthony J. Durkin, Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA); Kristen M. Kelly M.D., Beckman Laser Institute and Medical Clinic (USA) and Univ. of California, Irvine (USA) . . . . . [9303-104]

10:10 am: **Quantitative characterization of traumatic bruises by combined pulsed photothermal radiometry and diffuse reflectance spectroscopy**, Luka Vidovic, Matija Milanic, Jo?ef Stefan Institut (Slovenia); Lise L. Randeberg, Norwegian Univ. of Science and Technology (Norway); Boris Majaron, Jo?ef Stefan Institut (Slovenia) . . . . . [9303-105]

Coffee Break . . . . . .Sat 10:30 am to 11:00 am

SESSION 3
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . . .SAT 11:00 AM TO 12:10 PM

Multimodal Skin Characterization II
Session Chair: **Lise L. Randeberg,**
Norwegian Univ. of Science and Technology (Norway)

11:00 am: **Assessment of venous and arterial occlusion in skin flaps using visible diffuse reflectance spectroscopy and autofluorescence spectroscopy in a rodent model**, Caigang Zhu, Shuo Chen, Nanyang Technological Univ. (Singapore); Christopher Hoe-Kong Chui, Bien-Keem Tan, Singapore General Hospital (Singapore); Quan Liu, Nanyang Technological Univ. (Singapore) . . . . . [9303-106]

11:20 am: **In vivo multimodal optical microscopy for longitudinal tracking of adverse effects following topical steroid treatment**, Andrew J. Bower, Univ. of Illinois at Urbana-Champaign (USA); Zane A. Arp, GlaxoSmithKline (USA); Youbo Zhao, Eric J. Chaney, Marina Marjanovic, Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9303-107]

11:40 am: **Visualizing and quantifying melanoma risk factors with coherent anti-Stokes Raman scattering (CARS) and multiphoton microscopy** *(Invited Paper)*, Hequn Wang, Sam Osseiran, Elisabeth Roider, Vivien Igras, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA); Peter T. C. So, Massachusetts Institute of Technology (USA); David E. Fisher, Conor L. Evans, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) . . . . . [9303-108]

Lunch/Exhibition Break . . . . . .Sat 12:10 pm to 1:40 pm

SESSION 4
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . . SAT 1:40 PM TO 3:30 PM

Wound Healing
Session Chair: **Jessica C. Ramella-Roman,**
Florida International Univ. (USA)

1:40 pm: **Evaluation of the effect of pericytes as treatment for non-healing diabetic wounds using integrated multimodal microscopy**, Joanne Li, Andrew J. Bower, Yair Pincu, Marina Marjanovic, Eric J. Chaney, Marni D. Boppart, Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9303-109]

2:00 pm: **A rapid-drying liquid bandage for the non-invasive transdermal two-dimensional mapping of cutaneous oxygenation** *(Invited Paper)*, Zongxi Li, Conor L. Evans, Massachusetts General Hospital (USA) . . . [9303-110]

2:30 pm: **Microvascular complications associated with injection of cosmetic facelift dermal fillers**, Siavash Yousefi, Stanford Univ. (USA) and Univ. of Washington (USA); Mark Prendes M.D., Shu-Hong Chang M.D., Ruikang K. Wang, Univ. of Washington (USA) . . . . . [9303-111]

2:50 pm: **Improvement of the healing process in superficial skin wounds after treatment with EMOLED**, Riccardo Cicchi, Istituto Nazionale di Ottica (Italy) and Consiglio Nazionale delle Ricerche (Italy) and European Lab. for Non-linear Spectroscopy (Italy); Francesca P. Rossi, Francesca Tatini, Istituto di Fisica Applicata Nello Carrara (Italy) and Consiglio Nazionale delle Ricerche (Italy); Stefano Bacci, Univ. degli Studi di Firenze (Italy); Domenico Alfieri, Light4Tech Firenze S.r.l. (Italy); Gaetano De Siena, Univ. degli Studi di Firenze (Italy); Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy) and Consiglio Nazionale delle Ricerche (Italy); Francesco S. Pavone, European Lab. for Non-linear Spectroscopy (Italy) and Univ. degli Studi di Firenze (Italy). . . . . [9303-112]

3:10 pm: **Monitoring wound healing by multiphoton tomography/ endoscopy**, Karsten König, Univ. des Saarlandes (Germany) and JenLab GmbH (Germany); Martin Weinigel, JenLab GmbH (Germany); Volker Huck, Katharina Zens, Stefan W. Schneider, Ruprecht-Karls-Univ. Heidelberg, Medizinische Fakultät Mannheim (Germany) . . . . . [9303-113]

Coffee Break . . . . . .Sat 3:30 pm to 4:00 pm

CONFERENCE 9303A
LOCATION: ROOM 120 (EXHIBIT LEVEL)

SESSION 5
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . . .SAT 4:00 PM TO 5:30 PM

Scar Remodeling
Session Chair: **Kristen M. Kelly M.D.,**
Univ. of California, Irvine School of Medicine (USA)

4:00 pm: **Longitudinal imaging study of vasculature in human burn scars in response to laser treatment using optical coherence tomography**, Peijun Gong, Shaghayegh Es'haghian, The Univ. of Western Australia (Australia); Alexandra Murray, Karl-Anton Harms, Royal Perth Hospital (Australia); Suzanne Rea, Brendan F. Kennedy, Fiona M. Wood M.D., David D. Sampson, Robert A. McLaughlin, The Univ. of Western Australia (Australia) . . . . [9303-114]

4:20 pm: **Non-invasive volumetric imaging of hypertrophic scars in vivo** *(Invited Paper)*, William Lo, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine (USA) and Massachusetts General Hospital (USA); Martin L. Villiger, Harvard Medical School (USA) and Massachusetts General Hospital (USA); Alexander Goldberg, Massachusetts General Hospital (USA) and Tel Aviv Univ. (Israel); Saiqa Khan, William Austen Jr., Massachusetts General Hospital (USA); Martin Yarmush, Massachusetts General Hospital (USA) and Rutgers Univ. (USA); Brett E. Bouma, Harvard Medical School (USA) and Massachusetts General Hospital (USA) and Wellman Ctr. for Photomedicine (USA) . . [9303-115]

4:50 pm: **Preferential alignment of birefringent tissue measured with polarization sensitive techniques**, Jessica C. Ramella-Roman, Florida International Univ. (USA); Pejhman Ghassemi, The Catholic Univ. of America (USA) . . . . . [9303-116]

5:10 pm: **Microvascular changes during acne lesion initiation and scarring within human skin is revealed in vivo using optical microangiography**, Utku Baran, Woo June Choi, Yuandong Li, Ruikang K. Wang, Univ. of Washington (USA) . . . . . [9303-117]

BIOS HOT TOPICS
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

KEYNOTE SESSION
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . .SUN 8:50 AM TO 9:20 AM

Session Chair: **Anthony J. Durkin,**
Beckman Laser Institute and Medical Clinic (USA)

8:50 am: **Assessing the colors of human skin** *(Keynote Presentation)*, Nikiforos Kollias, Consultant (USA) . . . . . [9303-118]

SESSION 6
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . .SUN 9:20 AM TO 10:00 AM

Burn Wounds
Session Chair: **Anthony J. Durkin,**
Beckman Laser Institute and Medical Clinic (USA)

9:20 am: **Real-time photoacoustic imaging of grafted artificial dermis in rat burn models**, Hideaki Iwazaki, Taiichiro Ida, Yasushi Kawaguchi, Advantest Corp. (Japan); Keiichi Iwaya, Hitoshi Tsuda, Satoko Kawauchi, Daizoh Saitoh, Shunichi Sato, National Defense Medical College (Japan) . . . . . [9303-119]

9:40 am: **The importance of illumination in a non-contact photoplethysmography imaging system for burn wound assessment**, Weirong Mo, Spectral MD, Inc. (USA); Rachit Mohan, Spectral MD (USA); Weizhi Li, Xu Zhang, Eric Sellke, Wensheng Fan, Michael J. DiMaio, Jeffery E. Thatcher, Spectral MD, Inc. (USA) . . . . . [9303-120]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 7
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . SUN 10:30 AM TO 12:20 PM

Therapeutics
Session Chair: **Nikiforos Kollias,** Consultant (USA)

10:30 am: **The stepwise multi-photon activation fluorescence guided ablation of melanin**, Zhenhua Lai, Zetong Gu, Charles A. DiMarzio, Northeastern Univ. (USA) . . . . . [9303-122]

10:50 am: **Controlled laser delivery into biological tissue via thin-film optical tunneling and refraction** *(Invited Paper)*, Paul J. D. Whiteside, Benjamin S. Goldschmidt, Randy D. Curry, Univ. of Missouri-Columbia (USA); John A. Viator, Duquesne Univ. (USA) . . . . . [9303-123]

11:20 am: **Study on fractional CO_2 laser-assisted drug delivery with optical coherence tomography**, Ting-Yen Tsai, Chang Gung Univ. (Taiwan); FengYu Preston Chang, Yi-Cheng Lee, Meng-Tsan Tsai, Chang Gung Univ. (Taiwan); Chih-Hsung Yang M.D., Chang Gung Memorial Hospital (Taiwan) . . . [9303-124]

11:40 am: **Quantification of skin quality through speckle analysis**, John M. Girkin, Durham Univ. (United Kingdom); Kim-Kristin K. Buttenschoen, Durham Univ. (United Kingdom) and Lein Applied Diagnostics (United Kingdom); Amrit Lotay, Durham Univ. (United Kingdom) . . . . . [9303-125]

12:00 pm: **Laser technology and propranolol in the treatment of complex infantile hemangiomas**, Ivan A. Abushkin, South Ural State Medical Univ. (Russian Federation); Olga A. Sudeikina M.D., Lipetsk Oblast Children's Hospital (Russian Federation) and South Ural State Medical Univ. (Russian Federation); Anna Denis, Olga Romanova, Igor S. Vasilyev M.D., Veniamin O. Lapin, South Ural State Medical Univ. (Russian Federation); Alexander V. Lappa, Chelyabinsk State Univ. (Russian Federation); Valeriy A. Privalov M.D., South Ural State Medical Univ. (Russian Federation) . . . . . [9303-126]

POSTERS-SUNDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Co-registration of optical microangiography and multiphoton microscopy for tracking dynamic wound healing, Wan Qin, Yuandong Li, Ruikang K. Wang, Univ. of Washington (USA) . . . . . [9303-127]

BIOS SUNDAY PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their groundbreaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9303B
LOCATION: ROOM 250 (MEZZANINE)

Saturday 7 February 2015 • Part of Proceedings of SPIE Vol. 9303

Therapeutics and Diagnostics in Urology

Conference Chair: **Hyun Wook Kang,** Pukyong National Univ. (Korea, Republic of)

Program Committee: **Geoffrey N. Box M.D.,** The Ohio State Univ. (USA); **Kin Foong Chan,** Dermira, Inc. (USA); **Nathaniel M. Fried,** The Univ. of North Carolina at Charlotte (USA); **Babak Shadgan M.D.,** The Univ. of British Columbia (Canada); **Ronald Sroka,** Laser-Forschungslabor (Germany); **Joel M. Teichman M.D.,** St. Paul's Hospital (Canada); **Matthias Trottmann,** Univ. München (Germany); **Rudolf M. Verdaasdonk,** Vrije Univ. Medical Ctr. (Netherlands)

SATURDAY 7 FEBRUARY

SESSION 9

LOCATION: ROOM 250 (MEZZANINE) . . . . . SAT 9:00 AM TO 10:20 AM

Bladder Disease Diagnosis

Session Chairs: **Ronald Sroka,** Laser-Forschungslabor (Germany); **Matthias Trottmann,** Univ. München (Germany)

9:00 am: **Discrimination of healthy and cancer cells of the bladder by metabolic state, based on autofluorescence**, Scott Palmer, Karina Litvinova, Univ. of Dundee (United Kingdom); Edik U. Rafailov, Aston Univ. (United Kingdom); Ghulam Nabi, Univ. of Dundee (United Kingdom) . . . . . [9303-200]

9:20 am: **Near infrared spectroscopy evaluation of bladder function: the impact of skin pigmentation on detection of physiologic change during voiding**, Babak Shadgan M.D., Andrew J. Macnab M.D., The Univ. of British Columbia (Canada); Behnam Molavi, BC Children's Hospital (Canada); Lynn Stothers M.D., The Univ. of British Columbia (Canada) . . . . . [9303-201]

9:40 am: **Method for improving photodynamic diagnosis and surgery of bladder tumours in cystoscopy**, Lars R. Lindvold, Technical Univ. of Denmark (Denmark); Gregers G. Hermann, Frederiksberg Hospital (Denmark) . . [9303-202]

10:00 am: **A novel excitation-emission wavelength model to facilitate the diagnosis of urinary bladder diseases**, Ilya E. Rafailov, Scott Palmer, Karina Litvinova, Univ. of Dundee (United Kingdom); Victor Dremin, Andrey V. Dunaev, State Univ. Educational Scientific Production Complex (Russian Federation); Ghulam Nabi, Univ. of Dundee (United Kingdom) . . . . . [9303-203]

Coffee Break . . . . . Sat 10:20 am to 11:00 am

SESSION 10

LOCATION: ROOM 250 (MEZZANINE) . . . . . SAT 11:00 AM TO 12:00 PM

Urinary Tract Diagnosis

Session Chairs: **HyunWook Kang,** Pukyong National Univ. (Korea, Republic of); **Kin Foong Chan,** BioPharmX, Inc. (USA)

11:00 am: **In-vivo laser induced urethral stricture animal model for investigating the potential of LDR-brachytherapy**, Ronald Sroka, Laser-Forschungslabor (Germany); Katja Lellig, Markus Bader, Christian G. Stief, Ludwig-Maximilians-Univ. Hospital München (Germany); Patrick Weidlich, Klinikum Traunstein AG (Germany); Walter Assmann, Ludwig-Maximilians-Univ. München (Germany); Ricarda Becker, Laser-Forschungslabor (Germany); Wael Khoder, Ludwig-Maximilians-Univ. München (Germany) . . . . . [9303-204]

11:20 am: **Optical diagnosis of urinary tract infection**, Babak Shadgan M.D., Mark Nigro, Andrew J. Macnab M.D., Lynn Stothers M.D., The Univ. of British Columbia (Canada); A. M. Kajbafzadeh, Tehran Univ. of Medical Sciences (Iran, Islamic Republic of) . . . . . [9303-205]

11:40 am: **Label-free serial optical coherence tomography for visualizing development of unilateral ureteral obstruction**, Sungbea Ban, Songyee Baek, Junwon Lee, Sunwoo Jung, Eunjung Min, Andrey Vavilin, Woonggyu Jung, Ulsan National Institute of Science and Technology (Korea, Republic of) . . . . . [9303-206]

Lunch/Exhibition Break . . . . . Sat 12:00 pm to 1:40 pm

SESSION 11

LOCATION: ROOM 250 (MEZZANINE) . . . . . SAT 1:40 PM TO 3:00 PM

Kidney Disease Treatment

Session Chairs: **Nathaniel M. Fried,** The Univ. of North Carolina at Charlotte (USA); **Joel M. Teichman M.D.,** St. Paul's Hospital (Canada)

1:40 pm: **Kidney stone ablation times and peak saline temperatures during Holmium:YAG and Thulium fiber laser lithotripsy, in vitro, in a ureteral model**, Luke A. Hardy, Christopher R. Wilson, The Univ. of North Carolina at Charlotte (USA); Pierce B. Irby M.D., Carolinas Medical Ctr. (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) . . . . . [9303-207]

2:00 pm: **Study of fiber-tip damage mechanism during Ho:YAG laser lithotripsy by high-speed camera and the Schlieren method**, Jian J. Zhang, American Medical Systems (USA) . . . . . [9303-208]

2:20 pm: **Innovative techniques for partial nephrectomy: comparison of clinical outcome**, Wael Khoder, Ludwig-Maximilians-Univ. München (Germany); Armin J. Becker, Christian G. Stief, Matthias Trottmann, Ludwig-Maximilians-Univ. Hospital München (Germany); Ronald Sroka, Laser-Forschungslabor (Germany) . . . . . [9303-209]

2:40 pm: **In-vivo, percutaneous, optical biopsy of renal masses using optical coherence tomography**, Abel Swaan, Peter G. Wagstaff, Henricus J. C. M. Sterenborg, Jean J. de la Rosette, M. Pilar Laguna Pes, Otto M. Van Delden, Ton G. Van Leeuwen, Daniel M. de Bruin, Dirk J. Faber, Academisch Medisch Centrum (Netherlands) . . . . . [9303-210]

POSTER SESSION AND COFFEE BREAK

LOCATION: HALL A (WITH BIOS EXPO) . . . . . SAT 3:00 PM TO 4:00 PM

Session Chair: **HyunWook Kang,**
Pukyong National Univ. (Korea, Republic of)

Attendees are invited to view the conference posters, which will be available on Saturday. The poster session, with authors present, will be held from 3:00 to 4:00 PM on Saturday afternoon, in conjunction with the coffee break.

POSTER AUTHORS: Poster setup is scheduled from 12:00 PM (noon) on Saturday in South Hall A. Please plan to stand with your poster during the poster session on Saturday from 3:00 to 4:00 PM. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

Quantitative diagnosis of bladder cancer by morphometric analysis of H&E images, Binlin Wu, Weill Cornell Medical College (USA); Samantha V. Nebylitsa, Bronx High School of Science (USA); Sushmita Mukherjee, Manu Jain, Weill Cornell Medical College (USA) . . . . . [9303-214]

Optical and electrical stimulation of the rat prostate cavernous nerves: priming and fatigue studies, Ghallia S. Kaouk, William C. Perkins, The Univ. of North Carolina at Charlotte (USA); Gwen A. Lagoda, Arthur L. Burnett M.D., The Johns Hopkins Hospital (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) . . . . . [9303-215]

Infrared laser sealing of porcine tissues: preliminary in vivo studies, Christopher M. Cilip, Thomas C. Hutchens, The Univ. of North Carolina at Charlotte (USA); Duane E. Kerr, Cassandra Latimer, Covidien (USA); Sarah B. Rosenbury, Nicholas C. Giglio, Gino R. Schweinsberger, William C. Perkins, Christopher R. Wilson, The Univ. of North Carolina at Charlotte (USA); Arlen K. Ward, William H. Nau Jr., Covidien (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) . . . . . [9303-216]

Thulium fiber laser damage to Nitinol stone baskets, Christopher R. Wilson, Luke A. Hardy, The Univ. of North Carolina at Charlotte (USA); Pierce B. Irby M.D., Carolinas Medical Ctr. (USA); Nathaniel M. Fried, The Univ. of North Carolina at Charlotte (USA) . . . . . [9303-217]

CONFERENCE 9303B
LOCATION: ROOM 250 (MEZZANINE)

Photoacoustic imaging guided laser treatment for superficial bladder carcinoma: feasibility study, Van Phuc Nguyen, Pukyong National Univ. (Korea, Republic of) and Interdisciplinary Program of Marine-Bio, Electrical & Mechanical Engineering (Korea, Republic of); JungHwan Oh, Hyun Wook Kang, Pukyong National Univ. (Korea, Republic of) and Ctr. for Marine-Integrated Biomedical Technology (Korea, Republic of) . . . . . [9303-218]

Transurethral application of optical cylindrical diffuser for urethrostenosis treatment, Hyun Shin, Pukyong National Univ. (Korea, Republic of); Trung Hau Nguyen, Ctr. of Marine-Interated Biomedical Technology, Pukyong National Univ. (Korea, Republic of); HyunWook Kang, Pukyong National Univ. (Korea, Republic of) . . . . . [9303-219]

Photoactive dye-enhanced tissue ablation for endoscopic laser prostatectomy, Minwoo Ahn, Van Phuc Nguyen , Trung Hau Nguyen, Pukyong National Univ. (Korea, Republic of); JungHwan Oh, Pukyong National Univ. (Korea, Republic of) and Interdisciplinary Program of Marine-Bio, Electrical & Mechanical Engineering, Pukyong National Univ. (Korea, Republic of) and Ctr. for Marine-Integrated Biomedical Technology (BK21 Plus), Pukyong National Univ. (Korea, Republic of); Hyun Wook Kang, Pukyong National Univ. (Korea, Republic of) and Interdisciplinary Program of Marine-Bio, Electrical & Mechanical Engineering, Pukyong National Univ. (Korea, Republic of) and Ctr. for Marine-Integrated Biomedical Technology, Pukyong National Univ. (Korea, Republic of) . . . . . [9303-220]

SESSION 12

LOCATION: ROOM 250 (MEZZANINE) . . . . . SAT 4:00 PM TO 5:00 PM

Diagnostic Cell Imaging

Session Chairs: **Babak Shadgan M.D.,** The Univ. of British Columbia (Canada); **Hyun Wook Kang,** Pukyong National Univ. (Korea, Republic of)

4:00 pm: **Probed-based confocal laser endomicroscopy (pCLE): a new life cell imaging technique to evaluate sperm-oviduct interaction**, Sabine Koelle, Univ. College Dublin (Ireland); Irene Alba-Alejandre, Univ. Medical Ctr. of Obstetrics and Gynaecology, Ludwig-Maximilians-Univ. München (Germany); Regina Leeb, Ludwig-Maximilians-Univ. München (Germany); Ronald Sroka, Herbert Stepp, LIFE Ctr., Klinikum Grosshadern, Ludwig-Maximilians-Univ. München (Germany); Bernhard Liedl, Clinics for Surgery, Munich-Bogenhausen (Ghana); Kate Dulohery, Univ. College Dublin (Ireland); Christian G. Stief, Ludwig-Maximilians-Univ. München (Germany); Matthias Trottmann, Univ. München (Germany) . . . . . [9303-211]

4:20 pm: **Intravital two-photon microscopy of the aging kidney**, Hengchang Guo, Univ. of Maryland, College Park (USA); Peter M. Andrews, Erik Anderson M.D., Georgetown Univ. Medical Ctr. (USA); Tikina Smith, Yu Chen, Univ. of Maryland, College Park (USA) . . . . . [9303-212]

4:40 pm: **Investigation of the potential of optical coherence tomography (OCT) as a non-invasive diagnostic tool in reproductive medicine**, Matthias Trottmann, Regina Leeb, Ludwig-Maximilians-Univ. Hospital München (Germany); Christian Homann, Daniel Doering, Julia Kuznetsova, Laser-Forschungslabor (Germany); Sven Reese, Institute of Veterinary Anatomy, Histology and Embryology, Ludwig-Maximilians-Univ. München (Germany); Christian G. Stief, Ludwig-Maximilians-Univ. Hospital München (Germany); Sabine Koelle, Univ. College Dublin (Ireland); Ronald Sroka, Laser-Forschungslabor (Germany) . . . . . [9303-213]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

CONFERENCE 9303C

LOCATION: ROOM 122 (EXHIBIT LEVEL)

COSPONSOR:

BIOS

Saturday–Sunday 7–8 February 2015 • Part of Proceedings of SPIE Vol. 9303

Optical Imaging, Therapeutics, and Advanced Technology in Head and Neck Surgery and Otolaryngology

Conference Chairs: **Brian J. F. Wong M.D.,** Beckman Laser Institute and Medical Clinic (USA); **Justus F. Ilgner M.D.,** Univ. Hospital Aachen (Germany); **Alfred Nuttal,** Oregen Health and Science Univ. (USA); **Claus-Peter Richter,** Northwestern Univ. (USA)

Program Committee: **Christian S. Betz,** Ludwig-Maximilians-Univ. München (Germany); **Waseem K. Jerjes,** Univ. College London (United Kingdom); **Milind Rajadhyaksha,** Memorial Sloan-Kettering Cancer Ctr. (USA); **Chung-Ku Rhee M.D.,** Dankook Univ. Hospital (Korea, Republic of); **Jennifer E. Rosen,** Boston Univ. (USA); **Henricus J. C. M. Sterenborg,** Erasmus MC (Netherlands)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 122 (EXHIBIT LEVEL) ..... SAT 8:50 AM TO 10:30 AM

OCT for Imaging and Functional Assessment of Middle Ear Structures

Session Chair: **Justus F. Ilgner M.D.,** Univ. Hospital Aachen (Germany)

8:50 am: **Quantitative measurement of tympanic membrane compliance in normal and diseased patients**, Ryan L. Shelton, Guillermo L. Monroy, Ryan M. Nolan, Univ. of Illinois at Urbana-Champaign (USA); Michael A. Novak M.D., Malcolm C. Hill M.D., Carle Foundation Hospital (USA); Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA). . . . . [9303-301]

9:10 am: **A compact structured light based otoscope for three dimensional imaging of the tympanic membrane**, Anshuman J. Das, Massachusetts Institute of Technology (USA); Julio C. Estrada-Rico, Ctr. de Investigaciones en Óptica, A.C. (Mexico); Zhifei Ge, Sara Dolcetti, Deborah L Chen, MIT (USA); Ramesh Raskar, MIT Media Lab. (USA) . . . . . [9303-302]

9:30 am: **Initial results of an OCT vibration measuring otoscope**, Tracy C. Petrie, Anh T. Nguyen-Huynh, Steven L. Jacques, Alfred L. Nuttall, Oregon Health & Science Univ. (USA) . . . . . [9303-303]

9:50 am: **Middle ear full-range vibrometry with Fourier-domain phase sensitive optical coherence tomography** , Hrebesh Molly Subhash, National Univ. of Ireland, Galway (Ireland). . . . . [9303-323]

10:10 am: **Light-based contact hearing device: maximum equivalent pressure output and gain before feedback**, Sunil Puria, Rodney Perkins, EarLens Corp. (USA); Peter Santa Maria, Stanford Univ. (USA) . . . . . [9303-326]

Coffee Break . . . . . .Sat 10:30 am to 11:00 am

SESSION 2

LOCATION: ROOM 122 (EXHIBIT LEVEL) ..... SAT 11:00 AM TO 1:20 PM

Novel Approaches in Physiology, Diagnosis, and Treatment Options for the Inner Ear

Session Chairs: **Justus F. Ilgner M.D.,** Univ. Hospital Aachen (Germany); **Chung-Ku Rhee M.D.,** Dankook Univ. Hospital (Korea, Republic of)

11:00 am: **Label-free imaging of in vivo cochlear blood flow using functional optical coherence tomography**, Ruikang K. Wang, Univ. of Washington (USA); Alfred L. Nuttall, Oregon Health & Science Univ. (USA) . . . . . [9303-305]

11:20 am: **In vivo vibratory response of the organ of Corti in the apex of the mouse cochlea**, Audrey K. Ellerbee, Hee Yoon Lee, Patrick D. Raphael, John S. Oghalai M.D., Stanford Univ. (USA); Brian E. Applegate, Texas A&M Univ. (USA) . . . . . [9303-306]

11:40 am: **Two dimensional vibrations of the organ of Corti measured using phase sensitive Fourier domain optical coherence tomography**, Sripriya Ramamoorthy, Yuan Zhang, Tracy C. Petrie, Oregon Health & Science Univ. (USA); Anders Fridberger, Linköping Univ. (Sweden); Tianying Ren, Oregon Health & Science Univ. (USA); Ruikang K. Wang, Univ. of Washington (USA); Steven L. Jacques, Alfred L. Nuttall, Oregon Health & Science Univ. (USA) . . . . . [9303-307]

12:00 pm: **The optimal low level laser therapy (LLLT) dosage to treat noise-induced hearing loss (NIHL) in rats**, Chung-Ku Rhee M.D., Dankook Univ. Hospital (Korea, Republic of); Kevin Song, Univ. of Illinois at Champaign-Urbana (USA); So Young Chang, Dankook Univ. Hospital (Korea, Republic of); Jae Yun Jung, Dankook Univ. (Korea, Republic of); Phil-Sang Chung M.D., Dankook Univ. Hospital (Korea, Republic of); Myung-Whan Suh M.D., Seoul National Univ. (Korea, Republic of) . . . . . [9303-309]

12:20 pm: **Comparison of temporal properties of auditory single units in response to cochlear infrared laser stimulation recorded with multi-channel and single tungsten electrodes**, Xiaodong Tan, Northwestern State Univ. (USA); Hunter K. Young, Northwestern Univ. (USA); Agnella I. Matic, Consultant (USA); Nan Xia, Claus-Peter Richter, Northwestern Univ. (USA) . . . . . [9303-324]

12:40 pm: **A family of fiber-optic based pressure sensors for intracochlear measurements**, Elizabeth Olson, Columbia Univ. (USA); Hideko Heidi Nakajima, Harvard Medical School (USA) . . . . . [9303-325]

1:00 pm: **In-situ two-photon imaging: mouse organ of corti cytoarchitecture from base to apex**, Joris A. Soons, Stanford Univ. (USA) and Univ. Antwerpen (Belgium); Anthony Ricci, Stanford Univ. School of Medicine (USA); Charles R. Steele, Stanford Univ. (USA); Sunil Puria, Stanford Univ. (USA) and Stanford Univ. School of Medicine (USA) . . . . . [9303-329]

Lunch/Exhibition Break . . . . . .Sat 1:20 pm to 2:30 pm

SESSION 3

LOCATION: ROOM 122 (EXHIBIT LEVEL) ..... SAT 2:30 PM TO 5:20 PM

Advances In Upper Airway Imaging: Functional Assessment and Therapeutic Options

Session Chairs: **Brian J. F. Wong M.D.,** Beckman Laser Institute and Medical Clinic (USA); **Chung-Ku Rhee M.D.,** Dankook Univ. Hospital (Korea, Republic of)

2:30 pm: **Monte Carlo modeling of light propagation in the human head for applications in sinus imaging**, Albert E. Cerussi, Beckman Laser Institute and Medical Clinic (USA); Nikhil Mishra, Northwood High School (USA) and Beckman Laser Institute and Medical Clinic (USA); Joon You, Praxis BioSciences, Inc. (USA); Naveen Bhandarkar M.D., Univ. of California, Irvine School of Medicine (USA); Brian J. F. Wong M.D., Beckman Laser Institute and Medical Clinic (USA) . . . . . [9303-310]

2:50 pm: **Future aspects of cellular and molecular research in clinical voice treatment**, Mette K. Pedersen, Sanila Mahmood, The Medical Ctr. (Denmark) . . . . . [9303-311]

3:10 pm: **Swept-source anatomical optical coherence tomography for quantitative upper airway geometry to inform computational fluid dynamics**, Amy L. Oldenburg, Kushal C. Wijesundara, Julia Kimbell, The Univ. of North Carolina at Chapel Hill (USA); Nicusor V. Iftimia, Physical Sciences Inc. (USA); Carlton Zdanski, The Univ. of North Carolina at Chapel Hill (USA) . . . . . [9303-312]

Coffee Break . . . . . .Sat 3:30 pm to 4:00 pm

4:00 pm: **Localization of biogel injection in scar tissue enabled by ultrafast laser ablation: model for treatment of vocal fold scar**, Murat Yildirim, Adela Ben-Yakar, The Univ. of Texas at Austin (USA); Steven M. Zeitels M.D., James B. Kobler, Sandeep Karajanagi, Massachusetts General Hospital (USA) . . . . . [9303-313]

CONFERENCE 9303C
LOCATION: ROOM 122 (EXHIBIT LEVEL)

4:20 pm: **Tracheal stenosis treatment with balloon catheter-based diffuser**, Trung Hau Nguyen, Hyeon Shin, Junghwan Oh, Hyun Wook Kang, Pukyong National Univ. (Korea, Republic of) . . . . . [9303-314]

4:40 pm: **Improving anatomical accuracy of 3D models of the upper airway by incorporating magnetic tracking with optical coherence tomography in the awake patient**, Brian T. Lemieux, Erica Su, Max Wiedmann, Brian J. F. Wong M.D., Beckman Laser Institute and Medical Clinic (USA) and Univ. of California, Irvine (USA). . . . . [9303-327]

5:00 pm: **Measurement of ciliary beat frequency using high speed fourier domain Doppler optical coherence tomography**, Brian T. Lemieux, Joseph C. Jing, Zhongping Chen, Brian J. F. Wong M.D., Beckman Laser Institute and Medical Clinic (USA) and Univ. of California, Irvine (USA) . . . . . [9303-328]

5:20 pm: **Vertical cavity surface emission laser based optical coherence tomography and optical Doppler tomography of the vocal folds**, Giriraj K. Sharma M.D., Joseph C. Jing, Zhongping Chen, Brian J. F. Wong M.D., Beckman Laser Institute and Medical Clinic (USA). . . . . [9303-331]

BIOS HOT TOPICS
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 4
LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . .SUN 9:00 AM TO 10:00 AM

Non-Invasive Head and Neck Cancer Diagnosis: OCT and Other Modalities

Session Chair: **Jennifer E. Rosen,** Boston Univ. (USA)

9:00 am: **Rapid in vivo wide-field OCT imaging in the oral cavity**, Anthony Lee M.D., Lucas Cahill, Kelly Y. P. Liu, Catherine F. Poh D.D.S., Calum E. MacAulay, The BC Cancer Agency Research Ctr. (Canada); Samson Ng D.D.S., The Univ. of British Columbia (Canada); Pierre M. Lane, The BC Cancer Agency Research Ctr. (Canada) . . . . . [9303-316]

9:20 am: **Full-field OCT for fast diagnostic of head and neck cancer**, Frederic De Leeuw, Odile Casiraghi, Aïcha Ben Lakhdar , Muriel Abbaci, Corinne Laplace-Builhé, Institut Gustave Roussy (France). . . . . [9303-317]

9:40 am: **Development of a supraglottic and subglottic tumor model and multimodal imaging of endobronchial ultrasound and optical coherence tomography**, Sung Won Kim, Kosin Univ., College of Medicine (Korea, Republic of); Sang-Seok Hwang, Yugyeong Chae, Jaechul Jung, Pukyong National Univ. (Korea, Republic of) and Ctr. for Marine-Integrated Biomedical Technology (Korea, Republic of); Chulho Oak, Kosin Univ., College of Medicine (Korea, Republic of) and Innovative Biomedical Technology Research Ctr. (Korea, Republic of); Yeh-Chan Ahn, Pukyong National Univ. (Korea, Republic of) and Ctr. for Marine-Integrated Biomedical Technology (Korea, Republic of) and Innovative Biomedical Technology Research Ctr. (Korea, Republic of) [9303-318]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 5
LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . .SUN 10:30 AM TO 11:30 AM

Minimally Invasive Head and Neck Cancer Treatment: PDT and Nanoparticles

Session Chairs: **Colin Hopper,** Univ. College London Hospitals NHS Foundation Trust (United Kingdom);
Brian J. F. Wong M.D., Beckman Laser Institute and Medical Clinic (USA); **Jennifer E. Rosen,** Boston Univ. (USA)

10:30 am: **The feasibility of photothermal treatment using locally injected nanoshell-loaded macrophage around tumor in animal model**, Seung-Kuk Baek M.D., Korea Univ. College of Medicine (Korea, Republic of); Taeseok D. Yang, KAIST (Korea, Republic of); Wonshik Choi, Jungho Moon, Jae-Seung Lee, Jang Ho Joo, Korea Univ. (Korea, Republic of); Min-Goo Lee M.D., Korea Univ. College of Medicine (Korea, Republic of); Byoungjae Kim, Kyung Min Choi, Hong Soon Yim, Korea Univ. (Korea, Republic of); Jung Joo Lee, Heejin Kim, Dong Wook Lee, LivsMed Inc. (Korea, Republic of); Min Woo Park M.D., Kwang-Yoon Jung M.D., Korea Univ. College of Medicine (Korea, Republic of) . . . . . [9303-319]

10:50 am: **Combined concurrent photodynamic and gold nanoshell loaded macrophage-mediated photothermal therapies: an in vitro study on squamous cell head and neck carcinoma**, Henry Hirschberg M.D., Anthony Trinidad, Catherine E. Christie M.D., Beckman Laser Institute and Medical Clinic (USA); Qian Peng M.D., DNR (Norway); Steen J. Madsen III, Univ. of Nevada, Las Vegas (USA) . . . . . [9303-320]

11:10 am: **LLLT on anaplstic thyroid cancer**, Yun-Hee Rhee, Jeon-Hwan Moon, Dankook Univ. (Korea, Republic of); Jin-Chul Ahn M.D., Phil-Sang Chung M.D., Dankook Univ. Hospital (Korea, Republic of) . . . . . [9303-321]

POSTERS-SUNDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Wide-field diagonal scanning 3D OCT probe for in vivo human tympanic membrane, Kibeom Park, Nam Hyun Cho, Kyungpook National Univ. (Korea, Republic of); Jeong Hun Jang, Kyungpook National Univ., College of Medicine (Korea, Republic of); Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of) . . . . . [9303-300]

The color mapping of a tympanic membrane in vivo using Doppler OCT, Deokmin Jeon, Nam Hyun Cho, Kibeom Park, Kanghae Kim, Jihyeon Kim, Kyungpook National Univ. (Korea, Republic of) . . . . . [9303-304]

3D-OCT imaging for endolymphatic hydrops models evaluation of surgical method, Nam Hyun Cho, Kyungpook National Univ. (Korea, Republic of); Woonggyu Jung, Ulsan National Institute of Science and Technology (Korea, Republic of); Jeong Hun Jang, Kyungpook National Univ., College of Medicine (Korea, Republic of); Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of) . . . . . [9303-308]

Comparing methods for enhancement of ALA-induced PpIX in skin: Contrasting ALA penetration enhancement, heme cycle enhancement and iron chelation, Ana Luisa Ribeiro de Souza, Thayer School of Engineering at Dartmouth (USA) and CAPES Foundation (Brazil); Kimberley S. Samkoe, Thayer School of Engineering at Dartmouth (USA) and Geisel School of Medicine at Dartmouth (USA); Stephen Chad Kanick, Jason R. Gunn, Thayer School of Engineering at Dartmouth (USA); Edward V. Maytin M.D., Cleveland Clinic Lerner Research Institute (USA); Tayyaba Hasan, Wellman Ctr. for Photomedicine (USA); Clovis Augusto Ribeiro, UNESP (Brazil); Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA) and Geisel School of Medicine at Dartmouth (USA) and Wellman Ctr. for Photomedicine (USA) . . . . . [9303-330]

BIOS SUNDAY PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their ground-breaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9303D
LOCATION: ROOM 110 (EXHIBIT LEVEL)

New

Saturday 7 February 2015 • Part of Proceedings of SPIE Vol. 9303D

Diagnosis and Treatment of Diseases in the Breast and Reproductive System

Conference Chairs: **Melissa C. Skala,** Vanderbilt Univ. (USA); **Mark W. Dewhirst D.V.M.,** Duke Univ. (USA)

Program Committee: **Ji-Xin Cheng,** Purdue Univ. (USA); **Darren M. Roblyer,** Boston Univ. (USA); **Anita Mahadevan-Jansen,** Vanderbilt Univ. (USA); **Bruce J. Tromberg,** Beckman Laser Institute and Medical Clinic (USA)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . .SAT 8:00 AM TO 10:10 AM

Extracellular Matrix Studies

Session Chair: **Melissa C. Skala,** Vanderbilt Univ. (USA)

8:00 am: **Imaging the tumor/stromal boundary** *(Invited Paper)*, Patricia Keely, Kevin W. Eliceiri, Univ. of Wisconsin-Madison (USA) . . . . . [9303-400]

8:30 am: **Polarimetry for organizational analysis of collagen in breast cancer**, Adam Gribble, I. Alex Vitkin, Univ. of Toronto (Canada) . . . . . [9303-401]

8:50 am: **Quantitative changes in collagen subtypes during breast cancer progression by multivariate analysis of Raman and second harmonic generation microscopy**, Sixian You, Yuan Liu, Haohua Tu, Eric J. Chaney, Marina Marjanovic, Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9303-402]

9:10 am: **Monitoring nanostructural ECM changes by mammary fibroblasts using polarization-sensitive optical coherence tomography to image diffusing gold nanorods**, Richard L. Blackmon, Patricia Carabas-Hernendez, Melissa A. Troester, The Univ. of North Carolina at Chapel Hill (USA); Joseph B. Tracy, Wei-Chen Wu, North Carolina State Univ. (USA); Amy L. Oldenburg, The Univ. of North Carolina at Chapel Hill (USA) . . . . . [9303-403]

9:30 am: **Optical coherence micro-elastography on excised breast cancer specimens: comparison with optical coherence tomography and histology**, Brendan F. Kennedy, Robert A. McLaughlin, Kelsey M. Kennedy, Lixin Chin, Philip Wijesinghe, Alan Tien, The Univ. of Western Australia (Australia); Bruce Latham, PathWest (Australia); Christobel M. Saunders, David D. Sampson, The Univ. of Western Australia (Australia) . . . . . [9303-404]

9:50 am: **Multiphoton microscopy for the characterization and treatment of malignant breast lesions**, Alex J. Walsh, Rebecca S. Cook, Melinda E. Sanders M.D., Carlos L. Arteaga, Melissa C. Skala, Vanderbilt Univ. (USA). . . . [9303-405]

Coffee Break . . . . . .Sat 10:10 am to 10:40 am

SESSION 2

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . SAT 10:40 AM TO 12:10 PM

Gynocology

Session Chair: **Anita Mahadevan-Jansen,** Vanderbilt Univ. (USA)

10:40 am: **Imaging and modeling the extracellular matrix in ovarian cancer** *(Invited Paper)*, Paul J. Campagnola, Karissa B. Tilbury, Kirby Campbell, Visar Ajeti, Kevin W. Eliceiri, Manish Patankar, Univ. of Wisconsin-Madison (USA) . . . . . [9303-406]

11:10 am: **Characterization of cervical remodeling during pregnancy using in vivo Raman spectroscopy**, Christine M. O'Brien, Vanderbilt Univ. (USA); Elizabeth Vargis, Utah State Univ. (USA); Chris Slaughter, Kelly A. Bennett, Jeff Reese, Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) . . . . . [9303-407]

11:30 am: **In vivo angle-resolved low coherence interferometry for detection of cervical dysplasia**, Tyler K. Drake, Derek Ho, Duke Univ. (USA); Loris Hwang, Univ. of California, San Francisco, School of Medicine (USA); Adam Wax, Duke Univ. (USA) . . . . . [9303-408]

11:50 am: **Photodynamic therapy as a new approach in vulvovaginal candidiasis in murine model**, Maria E. Santi M.D., Renato A. Prates, Alessandro M. Deana, Aline Sousa, Luis R. Ferreira, Rubia G. Lopes, UNINOVE (Brazil); Adjaci U. Fernandes, UNICASTELO (Brazil); Sandra K. Bussadori, UNINOVE (Brazil) . . . . . [9303-409]

Lunch/Exhibition Break . . . . . .Sat 12:10 pm to 1:20 pm

SESSION 3

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . SAT 1:20 PM TO 3:00 PM

Diffuse Optics and Spectroscopy

Session Chair: **Mark W. Dewhirst D.V.M.,** Duke Univ. (USA)

1:20 pm: **Preclinical monitoring of breast and prostate chemotherapy response with spatial frequency domain imaging**, Darren M. Roblyer, Syeda Tabassum, Raeef Istfan, Yanyu Zhao, Junjie Wu, David J. Waxman, Boston Univ. (USA) . . . . . [9303-410]

1:40 pm: **Diffuse optical quantification of early hemodynamic changes by chemotherapy on breast cancer xenografts & its implication for therapeutic prediction in clinic**, Regine Choe, Ashley R. Proctor, Ki Won Jung, Russell R. Adams, Hyun Jin Kim, Songfeng Han, Emmanuel K. Mannoh, Daniel K. Byun, Kelley S. Madden, Edward B. Brown III, Univ. of Rochester (USA); Parisa Farzam, Turgut Durduran, ICFO - Institut de Ciències Fotòniques (Spain) . . . . . [9303-411]

2:00 pm: **Identification of non-responding locally advanced breast tumors after a single cycle of neoadjuvant chemotherapy**, Boudewijn E. Schaafsma M.D., Leiden Univ. Medical Ctr. (Netherlands); Martijn Van de Giessen, Leiden Univ. Medical Ctr. (Netherlands) and Technische Univ. Delft (Netherlands); Ayoub Charehbili M.D., Vincent T. H. B. M. Smit M.D., Judith R. Kroep M.D., Leiden Univ. Medical Ctr. (Netherlands); Boudewijn P. F. Lelieveldt M.D., Leiden Univ. Medical Ctr. (Netherlands) and Technische Univ. Delft (Netherlands); Gerrit-Jan Liefers M.D., Leiden Univ. Medical Ctr. (Netherlands); Alan Chan, Leiden Univ. Medical Ctr. (Netherlands) and Percuros B.V. (Netherlands); Clemens W. G. M. Lowik, Jouke Dijkstra, Cornelis J. H. Van de Velde M.D., Martin N. J. M. Wasser M.D., Alexander L. Vahrmeijer M.D., Leiden Univ. Medical Ctr. (Netherlands) . . . . . [9303-412]

2:20 pm: **Photoacoustic spectroscopy based evaluation of breast cancer condition**, Mallika Priya, Biophysics Unit, School Of Life Sciences, Manipal Univ. (India); Subhas Chandra, Bola Sadashiva Sadashiva S. Rao, School Of Life Sciences, Manipal Univ. (India); Satadru Ray, Prashanth Shetty, Stanley Mathew, Kasturba Medical Collage, Manipal Univ. (India); Krishna Kishore Mahato, School Of Life Sciences, Manipal Univ. (India) . . . . . [9303-413]

2:40 pm: **Intraoperative breast cancer margin assessment by a hand-held microsecond scale vibrational spectroscopy pen**, ChienSheng Liao, Pu Wang, Ping Wang, Robert A. Oglesbee, Ji-Xin Cheng, Purdue Univ. (USA) . . . . . [9303-414]

POSTER SESSION AND COFFEE BREAK

LOCATION: HALL A (WITH BIOS EXPO) . . . . . SAT 3:00 PM TO 4:00 PM

Attendees are invited to view the conference posters, which will be available on Saturday. The poster session, with authors present, will be held from 3:00 to 4:00 PM on Saturday afternoon, in conjunction with the coffee break.

POSTER AUTHORS: Poster setup is scheduled from 12:00 PM (noon) on Saturday in South Hall A. Please plan to stand with your poster during the poster session on Saturday from 3:00 to 4:00 PM. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

Measurement of the optical redox ratio in breast cancer cell lines with a microplate reader, Taylor M. Cannon, Amy T. Shah, Melissa C. Skala, Alex J. Walsh, Vanderbilt Univ. (USA) . . . . . [9303-420]

Cervical confocal endoscope for in vivo cellular resolution biopsy target selection, Colin L. Schlosser, The BC Cancer Agency Research Ctr. (Canada); Fahime Sheikhzadeh, The BC Cancer Agency Research Ctr. (Canada) and UBC (Canada); Calum E. MacAulay, The BC Cancer Agency Research Ctr. (Canada); Michele Follen M.D., Brookdale Univ. Hospital and Medical Ctr. (USA); Martial Guillaud, Pierre M. Lane, The BC Cancer Agency Research Ctr. (Canada) . . . . . [9303-421]

Longitudinal in vivo transcutaneous observation of Raman signals from breast cancer during chemotherapy in small animal model, Myeongsu Seong, Gwangju Institute of Science and Technology (Korea, Republic of); NoSoung Myoung, Advanced Photonics Research Institute (Korea, Republic of); Sang-Youp Yim, Jae G. Kim, Gwangju Institute of Science and Technology (Korea, Republic of). . . . . [9303-422]

Predictive potential of photoacoustic spectroscopy in breast tumor detection based on xenograft serum profiles, Mallika Priya, Biophysics Unit, School Of Life Sciences, Manipal Univ. (India); Bola Sadashiva S. Rao, Subhas Chandra, School Of Life Sciences, Manipal Univ. (India); Satadru Ray, Kasturba Medical Collage, Manipal Univ. (India); Krishna Kishore Mahato, School Of Life Sciences, Manipal Univ. (India) . . . . . [9303-423]

An opto-electronic joint detection system based on DSP aiming at early cervical cancer screening, Weiya Wang, Mengyu Jia, School of Precision Instrument and Optoelectronics Engineering, Tianjin Univ. (China); Feng Gao, School of Precision Instrument and Optoelectronics Engineering, Tianjin Univ. (China) and Tianjin Key Lab. of Biomedical Detecting Techniques and Instruments (China); Lihong Yang, Pengpeng Qu, Tianjin Central Hospital of Gynecology Obstetrics (China); Changping Zou M.D., Univ. of Connecticut Health Ctr. (USA); Pengxi Liu, School of Precision Instrument and Optoelectronics Engineering, Tianjin Univ. (China); Huijuan Zhao, School of Precision Instrument and Optoelectronics Engineering, Tianjin Univ. (China) and Tianjin Key Lab. of Biomedical Detecting Techniques and Instruments (China) . . . . . [9303-424]

Time-domain hemoglobin diffuse optical tomography of breast: a pilot study, Wenjuan Ma, Shuping Zhang, Tianjin Medical Univ., Cancer Institute and Hospital, Tianjin (China) and National Clinical Research Ctr. of Cancer (China) and Key Lab. of Cancer Prevention and Therapy (China); Limin Zhang, Tianjin Univ. (China). . . . . [9303-425]

Full-field optical coherence tomography (FFOCT) for evaluation of endometrial cancer, Alexis Bruhat, Univ. of Pittsburgh (USA); Marais Combrinck, PathWest Lab. Medicine WA (Australia); Eugénie Dalimier, Fabrice Harms, LLTech SAS (France); Jeffrey L. Fine, Univ. of Pittsburgh (USA) . . . . . [9303-426]

SESSION 4

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . .SAT 4:00 PM TO 5:50 PM

Microscopy

Session Chair: **Darren M. Roblyer,** Boston Univ. (USA)

4:00 pm: **Quantitative optical imaging of cilia-driven fluid flow: a new area of research in reproductive health?** *(Invited Paper)*, Michael A. Choma M.D., Yale School of Medicine (USA) . . . . . [9303-415]

4:30 pm: **Optical imaging of breast cancer metabolic signatures in 3D acini using co-registered CARS and FLIM microscopy**, Jue Hou, Eric O. Potma, Elliot L. Botvinick, Chung-Ho Sun, Beckman Laser Institute and Medical Clinic, Univ. of California, Irvine (USA); Enrico Gratton, Beckman Laser Institute, Univ. of California, Irvine (USA); Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic, Univ. of California, Irvine (USA). . . . . [9303-416]

4:50 pm: **Optical diagnosis of mammary ductal carcinoma using advanced optical technology**, Yan Wu, Fujian Normal Univ. (China); Fangmeng Fu, Yuane Lian, The Affiliated Union Hospital, Fujian Medical Univ. (China); Yuting Nie, Shuangmu Zhuo, Fujian Normal Univ. (China); Chuan Wang, The Affiliated Union Hospital, Fujian Medical Univ. (China); Jianxin Chen, Fujian Normal Univ. (China) . . . . . [9303-417]

5:10 pm: **Evaluation of breast glandular proliferations with full-field optical coherence tomography**, Ana Tereza Nadan, Institut Curie (France); Eugénie Dalimier, LLTech SAS (France); Vincent Servois, Institut Curie (France); Fabrice Harms, LLTech SAS (France); Brigitte Sigal-Zafrani, Institut Curie (France) . . . . . [9303-418]

5:30 pm: **Differentiating cancerous from normal breast tissue by redox imaging**, He N. Xu, Julia C. Tchou, Min Feng, Univ. of Pennsylvania (USA); Huaqing Zhao, Temple Univ. (USA); Lin Z. Li, Univ. of Pennsylvania (USA) . . . . . [9303-419]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics prsentation listing on page 19.

CONFERENCE 9303E
LOCATION: ROOM 300 (ESPLANADE)

Saturday–Sunday 7–8 February 2015 • Part of Proceedings of SPIE Vol. 9303

Diagnostic and Therapeutic Applications of Light in Cardiology

Conference Chairs: **Guillermo J. Tearney M.D.,** Wellman Ctr. for Photomedicine (USA); **Kenton W. Gregory M.D.,** Oregon Medical Laser Ctr. (USA); **Laura Marcu,** Univ. of California, Davis (USA)

Program Committee: **Gijs van Soest,** Erasmus MC (Netherlands); **Carlo Di Mario,** Univ. College London (United Kingdom);

Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 300 (ESPLANADE) . . . . . .SAT 8:30 AM TO 10:10 AM

Photoacoustics and Laser Speckle

Session Chair: **Stanislav Y. Emelianov,**
The Univ. of Texas at Austin (USA)

8:30 am: **Ideal flushing agents for integrated optical acoustic imaging system**, Jiawen Li, Hataka Minami, Univ. of California, Irvine (USA); Dilbahar Mohar, Univ. of California, Irvine School of Medicine (USA); Teng Ma, Koping Kirk Shung, Qifa Zhou, The Univ. of Southern California (USA); Pranav M. Patel, Univ. of California, Irvine School of Medicine (USA); Zhongping Chen, Univ. of California, Irvine (USA) . . . . . [9303-500]

8:50 am: **Ca2+ sensitive photoacoustic imaging in vitro**, Nicholas P. Dana, R. Andrew Fowler, Laura Geuss, Alicia Allen, Laura J. Suggs, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA). . . . . [9303-501]

9:10 am: **Dual modality catheter for real-Time IVUS/IVPA imaging of atherosclerotic plaques**, Andrei B. Karpiouk, Donald VanderLaan, Douglas E. Yeager, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) . . . . . [9303-502]

9:30 am: **Intravascular laser speckle imaging of coronary plaque mechanical properties using an omni-directional viewing catheter**, Jing Wang, Wellman Ctr. for Photomedicine, Harvard Medical School and Massachusetts General Hospital (USA); Masaki Hosoda, Canon USA, Inc. (USA); Diane M. Tshikudi, Wellman Ctr. for Photomedicine, Harvard Medical School and Massachusetts General Hospital (USA); Seemantini K. Nadkarni, Wellman Ctr for Photomedicine, Harvard Medical School and Massachusetts General Hospital (USA) . . . . . [9303-503]

9:50 am: **Assessment of fibrinolytic activity using Optical Thromboelastography (OTEG) for cardiovascular applications**, Markandey M. Tripathi, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Diane M. Tshikudi, Massachusetts General Hospital (USA); Zeinab Hajjarian Kashany, Seemantini K. Nadkarni, Massachusetts General Hospital (USA) and Harvard Medical School (USA). . . . . [9303-504]

Coffee Break . . . . . .Sat 10:10 am to 10:40 am

SESSION 2

LOCATION: ROOM 300 (ESPLANADE) . . . . . .SAT 10:40 AM TO 12:00 PM

Multimodality Imaging

Session Chair: **Guillermo J. Tearney M.D.,**
Wellman Ctr. for Photomedicine (USA)

10:40 am: **Ultrahigh speed integrated intravascular ultrasound and optical coherence tomography imaging system and catheter**, Jiawen Li, Univ. of California, Irvine (USA); Teng Ma, The Univ. of Southern California (USA); Youmin He, Univ. of California, Irvine (USA); Koping Kirk Shung, Qifa Zhou, The Univ. of Southern California (USA); Zhongping Chen, Univ. of California, Irvine (USA) . . . . . [9303-505]

11:00 am: **Time-resolved fluorescence spectroscopy and ultrasound backscatter microscopy for non-destructive evaluation of vascular grafts**, Hussain Fatakdawala, Leigh G. Griffiths, Sterling Humphrey, Laura Marcu, Univ. of California, Davis (USA) . . . . . [9303-506]

11:20 am: **Second-generation optical coherence tomography and near-infrared spectroscopy for simultaneous microstructural and compositional imaging of coronary artery**, Ali M. Fard, Harvard Medical School (USA); Daryl Chulho Hyun, Robert R. Carruth, Joseph A. Gardecki, Hao Wang, Giovanni Jacopo J. Ughi, Guillermo J. Tearney M.D., Massachusetts General Hospital (USA) . . . . . [9303-507]

11:40 am: **Integrated optical coherence tomography and ultrasound imaging system towards intravascular diagnosis**, Jian Ren, Milen Shishkov, Martin L. Villiger, Brett E. Bouma, Wellman Ctr. for Photomedicine (USA) . . . . . [9303-508]

Lunch/Exhibition Break . . . . . .Sat 12:00 pm to 1:30 pm

SESSION 3

LOCATION: ROOM 300 (ESPLANADE) . . . . . .SAT 1:30 PM TO 3:10 PM

Imaging the Myocardium

Session Chair: **Kenton W. Gregory M.D.,**
Oregon Medical Laser Ctr. (USA)

1:30 pm: **Automated myocardial characterization using optical coherence tomography**, Yu Gan, Columbia Univ. (USA); David Tsay, Columbia Univ. Medical Ctr. (USA); Syed A. Bin Amir, Columbia Univ. (USA); Charles C. Marboe, Columbia Univ. Medical Ctr. (USA); Christine P. Hendon, Columbia Univ. (USA) . . . . . [9303-509]

1:50 pm: **Towards mapping the human Purkinje fiber network using high-resolution OCT**, Xinwen Yao, Christine P. Hendon, Columbia Univ. (USA) . . . . . [9303-510]

2:10 pm: **The direct interplay between collagen turnover and cardiac arrhythmogenesis in an intact animal heart: A new multimodal-imaging platform using SS PS-OCT and fluorescent optical mapping systems**, Jong Jin Kim, Korean Electrotechnology Research Institute (Korea, Republic of); Beop-Min Kim, Min-Gyu Hyeon, Korea Univ. (Korea, Republic of). . . . [9303-511]

2:30 pm: **Near-infrared spectroscopic device for lesion depth assessment in myocardial tissue**, Rajinder P. Singh-Moon, Christine P. Hendon, Columbia Univ. (USA) . . . . . [9303-512]

2:50 pm: **Imaging myocardial fiber architecture of the mouse heart using Stokes vector analysis from fiber-based polarization-sensitive optical frequency domain imaging**, Sun-Joo Jang, Taejin Park, Paul Shin, Wang-Yuhl Oh, KAIST (Korea, Republic of) . . . . . [9303-513]

Coffee Break . . . . . .Sat 3:10 pm to 3:40 pm

SESSION 4

LOCATION: ROOM 300 (ESPLANADE) . . . . . .SAT 3:40 PM TO 5:00 PM

Advances in Intravascular OCT

Session Chair: **Gijs van Soest,** Erasmus MC (Netherlands)

3:40 pm: **Three-dimensional analysis of stent malapposition and lack of coverage by intravascular optical coherence tomography**, Giovanni Jacopo J. Ughi, Tom Adriaenssens, Dries Decock, Walter Desmet, Jan D'Hooge, Katholieke Univ. Leuven (Belgium) . . . . . [9303-514]

4:00 pm: **Optical coherence tomography tissue type (OC3T) imaging: attenuation index for plaque diagnosis**, Muthukaruppan Gnanadesigan, Erasmus MC (Netherlands); Takeyoshi Kameyama, Erasmus MC (Netherlands) and Tohuku Univ. (Japan); Antonius F. W. van der Steen, Karen Witberg, Jurgen M. A. Ligthart, Antonis Karanasos, Nienke Ditzhuijzen, Evelyn Regar M.D., Gijs van Soest, Erasmus MC (Netherlands) . . . . . [9303-515]

4:20 pm: **Measuring collagen with intravascular polarization sensitive OCT**, Martin L. Villiger, Ellen Z. Zhang, Wellman Ctr. for Photomedicine, Massachusetts General Hospital and Harvard Medical School (USA); Wang-Yuhl Oh, KAIST (Korea, Republic of); Gijs van Soest, Heleen M. M. van Beusekom, Evelyn Regar M.D., Thorax Ctr., Erasmus MC (Netherlands); Benjamin J. Vakoc, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Seemantini K. Nadkarni, Wellman Ctr for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Brett E. Bouma, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA) . . . . . [9303-516]

4:40 pm: **Heartbeat OCT enables comprehensive visualization of coronary interventions**, Tianshi Wang, Erasmus MC (Netherlands); Tom Pfeiffer, Ludwig-Maximilians-Univ. München (Germany); Evelyn Regar M.D., Erasmus MC (Netherlands); Wolfgang Wieser, Ludwig-Maximilians-Univ. München (Germany); Heleen M. M. van Beusekom, Charles T. Lancee, Geert Springeling, Ilona Peters, Antonius F. W. van der Steen, Erasmus MC (Netherlands); Robert A. Huber, Univ. zu Lübeck (Germany); Gijs van Soest, Erasmus MC (Netherlands) . . . . . [9303-517]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

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See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 5

LOCATION: ROOM 300 (ESPLANADE) . . . . . SUN 9:00 AM TO 10:20 AM

OCT-NIRF

Session Chair: **Hongki Yoo,** Hanyang Univ. (Korea, Republic of)

9:00 am: **Automatic visualization of dual-modality intravascular optical coherence tomography (OCT) and near-infrared fluorescence (NIRF) images for assessing vessel wall microstructure and quantitative molecular imaging**, Giovanni Jacopo J. Ughi, Wellman Ctr. for Photomedicine (USA); Tetsuya Hara, Eric A. Osborn, Johan Verjans, Hao Wang, Harvard Medical School, Massachusetts General Hospital (USA); Ali M. Fard, Adam Mauskampf, Wellman Ctr. for Photomedicine (USA); Farouc A. Jaffer M.D., Harvard Medical School, Massachusetts General Hospital (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) . . . . . [9303-518]

9:20 am: **Preclinical validation of dual-modality optical coherence tomography (OCT) and near-infrared fluorescence (NIRF) molecular imaging for the in vivo assessment of atherosclerosis and current treatments**, Giovanni Jacopo J. Ughi, Wellman Ctr. for Photomedicine (USA); Eric A. Osborn, Tetsuya Hara, Harvard Medical School, Massachusetts General Hospital (USA); Johan Verjans, Harvard Medical School , Massachusetts General Hospital (USA); Iwata Hiroshi, Hao Wang, Brigham and Women's Hospital, Harvard Medical School (USA); Ali M. Fard, Wellman Ctr. for Photomedicine (USA); Adam Mauskampf, Harvard Medical School, Massachusetts General Hospital (USA); Masanori Aikawa, Brigham and Women's Hospital, Harvard Medical School (USA); Farouc A. Jaffer M.D., Harvard Medical School, Massachusetts General Hospital (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) . . . . . [9303-519]

9:40 am: **Intravascular structural/molecular imaging in-vivo using a clinically available ICG with high-speed OCT/NIRF hybrid system**, Han Saem Cho, KAIST (Korea, Republic of); Min Woo Lee, Hanyang Univ. (Korea, Republic of); Sunki Lee, Korea Univ. , Guro Hospital (Korea, Republic of); Sunwon Kim, Joon Woo Song, Korea Univ., Guro Hospital (Korea, Republic of); Kyunghun Kim, Tae Shik Kim, Sun-Joo Jang, KAIST (Korea, Republic of); Hyeong Soo Nam, Hanyang Univ. (Korea, Republic of); Kyeongsoon Park, Korea Basic Science Institute (Korea, Republic of); Sukyoung Ryu, KAIST (Korea, Republic of); Jin Won Kim, KAIST (Korea, Republic of) and Korea Univ., Guro Hospital (Korea, Republic of); Hongki Yoo, Hanyang Univ. (Korea, Republic of); Wang-Yuhl Oh, KAIST (Korea, Republic of) . . . . . [9303-520]

10:00 am: **Multimodal imaging approaches for macrophage-rich plaque in vivo with a mannose receptor targeting probe**, Min Woo Lee, Hanyang Univ. (Korea, Republic of); Han Saem Cho, Jiheun Ryu, KAIST (Korea, Republic of); Jae Joong Lee, Ji Bak Kim, Korea Univ., Guro Hospital (Korea, Republic of); Kyeongsoon Park, Chuncheon Ctr., Korea Basic Science Institute (Korea, Republic of); Joon Woo Song, Korea Univ., Guro Hospital (Korea, Republic of); Hyeong Soo Nam, Hanyang Univ. (Korea, Republic of); Dae-Gab Gweon, Wang-Yuhl Oh, KAIST (Korea, Republic of); Jin Won Kim, Korea Univ., Guro Hospital (Korea, Republic of); Hongki Yoo, Hanyang Univ. (Korea, Republic of) [9303-521]

Coffee Break . . . . . Sun 10:20 am to 10:50 am

SESSION 6

LOCATION: ROOM 300 (ESPLANADE) . . . . . SUN 10:50 AM TO 11:50 AM

Spectroscopy

Session Chair: **Laura Marcu,** Univ. of California, Davis (USA)

10:50 am: **Identifying the molecular source of near-infrared excited autofluorescence in lipid-rich atherosclerotic plaques**, Hao Wang, Joseph A. Gardecki, Jie Zhao, Brijesh Bhayana, Wellman Ctr. for Photomedicine (USA); James R. Stone, Massachusetts General Hospital, Harvard Medical School (USA); Giovanni Jacopo J. Ughi, Wellman Ctr. for Photomedicine (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) and Massachusetts General Hospital, Harvard Medical School (USA) and Harvard-MIT Health Sciences and Technology (USA) . . . . . [9303-522]

11:10 am: **In-vivo validation of fluorescence lifetime imaging (FLIm) of coronary arteries in swine**, Julien Bec, Dinglong M. Ma, Diego R. Yankelevich, Dimitris S. Gorpas, William T. Ferrier D.V.M., Jeffrey Southard M.D., Laura Marcu, Univ. of California, Davis (USA). . . . . [9303-523]

11:30 am: **Atherosclerotic plaque detection by confocal Brillouin and Raman microscopies**, Vladislav V. Yakovlev, Texas A&M Univ. (USA) . . . . . [9303-524]

POSTERS-SUNDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Automatic classification of atherosclerotic plaque in intravascular optical coherence tomography images, Hyeong Soo Nam, Hanyang Univ. (Korea, Republic of); Sun-Joo Jang, KAIST (Korea, Republic of); Jin Won Kim, Korea Univ. Medical Ctr. (Korea, Republic of); Wang-Yuhl Oh, KAIST (Korea, Republic of); Hongki Yoo, Hanyang Univ. (Korea, Republic of) . . . . . [9303-525]

Angioscopic image-enhanced observation of atherosclerotic plaque phantom by near-infrared multispectral imaging at wavelengths around 1200 nm, Katsunori Ishii, Ryo Nagao, Daichi Matsui, Kunio Awazu, Osaka Univ. (Japan). . . . . [9303-526]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their groundbreaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9303F
LOCATION: ROOM 234 (MEZZANINE)

Saturday 7 February 2015 • Proceedings of SPIE Vol. 9303F

Optics in Bone Surgery and Diagnostics

Conference Chair: **Andreas Mandelis,** Univ. of Toronto (Canada)

Conference Co-Chair: **Michael D. Morris,** Univ. of Michigan (USA)

Program Committee: **Robert R. Alfano,** The City College of New York (USA); **Bennett T. Amaechi,** The Univ. of Texas Health Science Ctr. at San Antonio (USA); **Peter Fratzl,** Max-Planck-Institut für Kolloid- und Grenzflächenforschung (Germany); **Huabei Jiang,** Univ. of Florida (USA); **Stephen J. Matcher,** The Univ. of Sheffield (United Kingdom); **Eleftherios P. Paschalis,** Ludwig Boltzmann Institut (Austria); **Rahul Tandon D.D.S.,** Loma Linda Univ. (USA); **Victor X. D. Yang,** Ryerson Univ. (Canada)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 234 (MEZZANINE) . . . . . SAT 8:10 AM TO 10:30 AM

Bone Surgery and Ablation

Session Chair: **Andreas Mandelis,** Univ. of Toronto (Canada)

8:10 am: **Depth feedback-controlled hard tissue ablation with one-micron industrial fiber laser** *(Invited Paper)*, Chenman Yin, Yang Ji, Christopher M. Galbraith, Queen's Univ. (Canada); Paul J. L. Webster, Laser Depth Dynamics Inc. (Canada); James M. Fraser, Queen's Univ. (Canada) . . . . . [9303-600]

8:40 am: **The use of optical coherence tomography in maxillofacial surgery** *(Invited Paper)*, Mohammed Al-Obaidi, Rahul Tandon D.D.S., Paul Tiwana, Univ. of Texas SW Medical Ctr. (USA) and Parkland Memorial Hospital (USA) . . . . . [9303-609]

9:10 am: **Changes in chemical composition of bone matrix in ovariectomized (OVX) rats detected by Raman spectroscopy and multivariate analysis**, Yusuke Oshima, Tadahiro Iimura D.D.S., Takashi Saitou, Takeshi Imamura M.D., Ehime Univ. (Japan) . . . . . [9303-601]

9:30 am: **Raman spectrum to evaluate the bone-ligament interface**, Yang Wu, Fudan Univ. (China); Michael B. Fenn, Larry L. Hench, Florida Institute of Technology (USA) . . . . . [9303-602]

9:50 am: **Tissue level material composition and mechanical properties in Brtl/+ mouse model of osteogenesis imperfecta after sclerostin antibody treatment**, William R. Lloyd III, Benjamin P. Sinder, Joseph Salemi, Univ. of Michigan (USA); Michael S. Ominsky, Amgen Inc. (USA); Joan C. Marini, National Institutes of Health (USA); Michelle S. Caird, Michael D. Morris, Univ. of Michigan (USA); Kenneth M. Kozloff, Univ. of Michigan (USA) . . . . . [9303-604]

10:10 am: **Photonic monitoring of chitosan nanostructured alginate microcapsule for drug release**, D. Roy Mahapatra, Deepak Kumar Khajuria, Indian Institute of Science (India) . . . . . [9303-608]

Coffee Break . . . . . Sat 10:30 am to 11:00 am

SESSION 2

LOCATION: ROOM 234 (MEZZANINE) . . . . . SAT 11:00 AM TO 12:20 PM

Muskuloskeletal Imaging and Diagnostics I

Session Chair: **Michael D. Morris,** Univ. of Michigan (USA)

11:00 am: **Photoacoustic imaging: a potential new platform for assessment of bone health** *(Invited Paper)*, Xueding Wang, Ting Feng, Jie Yuan, Kenneth M. Kozloff, Cheri Deng, Univ. of Michigan Medical School (USA) . . . . . [9303-603]

11:30 am: **Photoacoustic and ultrasound characterization of bone composition** *(Invited Paper)*, Bahman Lashkari, Univ. of Toronto (Canada); Lifeng Yang, Univ. of Toronto (Canada) and Univ. of Electronic Science and Technology of China (China); Joel W. Y. Tan, Univ. of Toronto (Canada); Andreas Mandelis, Univ. of Toronto (Canada) and Univ. of Electronic Science and Technology of China (China) . . . . . [9303-610]

12:00 pm: **Imaging microfractures and other abnormalities of bone using a supercontinuum laser source with wavelengths in the four NIR optical windows**, Laura A. Sordillo, Peter P. Sordillo M.D., Yury Budansky, The City College of New York (USA); Philippe Leproux, XLIM UMR CNRS (France); Robert R. Alfano, The City College of New York (USA) . . . . . [9303-611]

Lunch/Exhibition Break . . . . . Sat 12:20 pm to 1:20 pm

SESSION 3

LOCATION: ROOM 234 (MEZZANINE) . . . . . SAT 1:20 PM TO 3:10 PM

Muskuloskeletal Imaging and Diagnostics II

Session Chair: **Andreas Mandelis,** Univ. of Toronto (Canada)

1:20 pm: **Novel, near-infrared spectroscopic, label-free, techniques to assess bone abnormalities such as Paget's disease, osteoporosis and bone fractures** *(Invited Paper)*, Diana C. Sordillo, Laura A. Sordillo, Lingyan Shi, Yury Budansky, Peter P. Sordillo M.D., Robert R. Alfano, The City College of New York (USA). . . . . [9303-612]

1:50 pm: **Reinforcement of osteogenesis with nanofabricated hydroxyapatite and GelMA nanocomposite**, Vladislav V. Yakovlev, Texas A&M Univ. (USA) . . . . . [9303-605]

2:10 pm: **Bone tissue heterogeneity is associated with fracture toughness: a polarization Raman spectroscopy study**, Alexander J. Makowski, Vanderbilt Univ. (USA) and U.S. Dept. of Veterans Affairs (USA); Mathilde Granke, Sasidhar Uppuganti, Anita Mahadevan-Jansen, Vanderbilt Univ. (USA); Jeffry S. Nyman, Vanderbilt Univ. (USA) and U.S. Dept. of Veterans Affairs (USA) . . . . . [9303-607]

2:30 pm: **Probing microscopic mechanical properties of hard tissues with Brillouin spectroscopy**, Vladislav V. Yakovlev, Zhaokai Meng, Texas A&M Univ. (USA) . . . . . [9303-606]

2:50 pm: **Thermoacoustic imaging of finger joints and bones: a feasibility study**, Lin Huang, Weizhi Qi, Dan Wu, Jian Rong, Dakui Lai, Univ. of Electronic Science and Technology of China (China); Huabei Jiang, Univ. of Florida (USA) and Univ. of Electronic Science and Technology of China (China). . . . [9303-613]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

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See full Hot Topics presentation listing on page 18.

CONFERENCE 9304A
LOCATION: ROOM 222 (MEZZANINE)

Saturday–Sunday 7–8 February 2015 • Part of Proceedings of SPIE Vol. 9304

Optical Techniques in Pulmonary Medicine II

Conference Chairs: **Melissa J. Suter,** Massachusetts General Hospital (USA); **Stephen Lam M.D.,** The BC Cancer Agency Research Ctr. (Canada); **Matthew Brenner,** Univ. of California, Irvine (USA)

Program Committee: **Johannes de Boer,** Vrije Univ. Amsterdam (Netherlands); **Edmund Koch,** Universitätsklinikum Carl Gustav Carus Dresden (Germany); **David D. Sampson,** The Univ. of Western Australia (Australia); **Luc Thiberville,** Rouen Univ. Hospital (France); **Victor X. D. Yang,** Ryerson Univ. (Canada); **Septimiu D. Murgu M.D.,** The Univ. of Chicago (USA); **Robert A. McLaughlin,** The Univ. of Western Australia (Australia)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 222 (MEZZANINE) . . . . . SAT 1:40 PM TO 3:00 PM

Cilia and Mucus I

Session Chair: **Melissa J. Suter,** Massachusetts General Hospital (USA)

1:40 pm: **Optical imaging, microscale physiology, and pediatric respiratory disease** *(Invited Paper)*, Michael A. Choma M.D., Yale School of Medicine (USA) . . . . . [9304-100]

2:20 pm: **Quantification of transverse, sub-500 µm/s cilia-driven fluid flow using dynamic light scattering OCT**, Brendan K. Huang, Yale Univ. (USA); Mustafa K. Khokha M.D., Yale School of Medicine (USA); Michael A. Choma M.D., Yale Univ. (USA) and Yale School of Medicine (USA) . . . . . [9304-101]

2:40 pm: **Dual-modality µOCT and fluorescence imaging of the CF airway**, Tim N. Ford, Kengyeh K. Chu, Wellman Ctr. for Photomedicine (USA); Susan E. Birket, The Univ. of Alabama at Birmingham (USA); Diana Mojahed, Wellman Ctr. for Photomedicine (USA) and Tufts Univ. (USA); Steven M. Rowe, The Univ. of Alabama at Birmingham (USA) and Cystic Fibrosis Research Ctr. (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) and Massachusetts General Hospital (USA) and Harvard-MIT, Div. of Health Sciences and Technology (USA). . . . . [9304-102]

Coffee Break . . . . . .Sat 3:00 pm to 3:30 pm

SESSION 2

LOCATION: ROOM 222 (MEZZANINE) . . . . . SAT 3:30 PM TO 4:50 PM

Cilia and Mucus II

Session Chair: **Michael A. Choma M.D.,** Yale School of Medicine (USA)

3:30 pm: **Investigating exogeneous modulators of mucociliary clearance: effect of temperature and hyperoxia on cilia-driven flow velocity**, Ute A. Gamm, Brendan K. Huang, Mansoor Syed, Vineet Bhandari, Michael A. Choma M.D., Yale School of Medicine (USA) . . . . . [9304-103]

3:50 pm: **Micro-optical coherence tomography flow mapping of regenerating respiratory epithelium**, Kengyeh K. Chu, Vladimir Vinarsky, Jayaraj Rajagopal, Guillermo J. Tearney M.D., Massachusetts General Hospital (USA) . . . . . [9304-104]

4:10 pm: **Sensing mucus hydration via diffusion of gold nanorods using polarization-sensitive optical coherence tomography**, Richard L. Blackmon, David B. Hill, Brian Button, The Univ. of North Carolina at Chapel Hill (USA); Joseph B. Tracy, Wei-Chen Wu, North Carolina State Univ. (USA); Amy L. Oldenburg, The Univ. of North Carolina at Chapel Hill (USA) . . . . . [9304-105]

4:30 pm: **Fluorescence recovery after photobleaching (FRAP) implementation in micro-optical coherence tomography rheology**, Diana Mojahed, Massachusetts General Hospital (USA) and Tufts Univ. (USA); Kengyeh K. Chu, Tim N. Ford, Massachusetts General Hospital (USA); Susan E. Birket, The Univ. of Alabama at Birmingham School of Medicine (USA); Courtney Fernandez, Steven M. Rowe, The Univ. of Alabama at Birmingham (USA); Guillermo J. Tearney M.D., Massachusetts General Hospital (USA) . . . . . [9304-106]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

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See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 3

LOCATION: ROOM 222 (MEZZANINE) . . . . . SUN 8:50 AM TO 10:30 AM

Clinical I

Session Chair: **Pierre M. Lane,**
The BC Cancer Agency Research Ctr. (Canada)

8:50 am: **Optical and acoustic imaging in lung cancer: current status and opportunities** *(Invited Paper)*, Septimiu D. Murgu M.D., The Univ. of Chicago (USA) . . . . . [9304-107]

9:30 am: **Endotracheal tube biolfilm formation from adult intensive care patients quantified using 3-D optical coherence tomography**, Andrew E. Heidari, OCT Medical Imaging Inc.. (USA); Kimberly K. Truong M.D., Univ. of California, Irvine (USA); Samer Moghaddam M.D., Univ. of California, Irvine Medical Ctr. (USA); Li-Dek Chou, Sari B. Mahoni, Beckman Laser Institute and Medical Clinic, Univ. of California, Irvine (USA); Carl Genberg, N8 Medical (USA); Matthew Brenner M.D., Beckman Laser Institute and Medical Clinic, Univ. of California, Irvine (USA). . . . . [9304-110]

9:50 am: **Co-registered autofluorescence Doppler optical coherence tomography versus endoscopic ultrasound imaging for peripheral lung cancers**, Wei Zhang M.D., The BC Cancer Agency Research Ctr. (Canada); Alexander J. Ritchie M.D., The BC Cancer Agency Research Ctr (Canada); Hamid Pahlevaninezhad, The BC Cancer Agency Research Ctr. (Canada); Anthony Lee M.D., The BC Cancer Agency Research Ctr (Canada); Geoffrey Hohert, Lucas Cahill, Tawimas Shaipanich M.D., Calum E. MacAulay, Stephen Lam M.D., Pierre M. Lane, The BC Cancer Agency Research Ctr. (Canada) . . . . . [9304-109]

10:10 am: **In vivo polarization sensitive OCT imaging of human airways**, Anthony Lee M.D., Lucas Cahill, Hamid Pahlevaninezhad, Alexander J. Ritchie M.D., Wei Zhang M.D., Tawimas Shaipanich M.D., Calum E. MacAulay, Stephen Lam M.D., Pierre M. Lane, The BC Cancer Agency Research Ctr. (Canada) . . . . . [9304-108]

Coffee Break . . . . . Sun 10:30 am to 11:00 am

SESSION 4

LOCATION: ROOM 222 (MEZZANINE) . . . . . SUN 11:00 AM TO 12:20 PM

Clinical II

Session Chair: **Robert A. McLaughlin,**
The Univ. of Western Australia (Australia)

11:00 am: **In vivo co-registered Doppler optical coherence tomography and autofluorescence imaging of human airway**, Hamid Pahlevaninezhad, Anthony Lee M.D., Stephen Lam M.D., Geoffrey Hohert, Lucas Cahill, Tawimas Shaipanich M.D., Alexander J. Ritchie M.D., Wei Zhang M.D., Calum E. MacAulay, Pierre M. Lane, The BC Cancer Agency Research Ctr. (Canada) . . . . . [9304-111]

11:20 am: **Optical coherence tomography airway morphology measurements differ between lung lobes in subjects with chronic obstructive pulmonary disease**, Miranda Kirby, The Univ. of British Columbia (Canada) and The James Hogg iCAPTURE Ctr. for Cardiovascular and Pulmonary Research, St. Paul's Hospital (Canada); Keishi Ohtani M.D., Anthony Lee M.D., Calum E. MacAulay, Pierre M. Lane, Stephen Lam M.D., The BC Cancer Agency Research Ctr. (Canada); Harvey O. Coxson, The James Hogg iCAPTURE Ctr. for Cardiovascular and Pulmonary Research, St. Paul's Hospital (Canada) . . . . . [9304-112]

11:40 am: **Flow-through integrating cavity for analysis of exhaled breath**, Joel N. Bixler, Vladislav V. Yakovlev, Texas A&M Univ. (USA) . . . . . [9304-113]

12:00 pm: **Flexible optical coherence tomography needle for bronchoscopic biopsy**, Yan Wang, Milen Shishkov, Lida P. Hariri M.D., David C. Adams, Alyssa J. Miller, Brett E. Bouma, Michael Lanuti, Melissa J. Suter, Massachusetts General Hospital (USA) . . . . . [9304-114]

Lunch/Exhibition Break . . . . . .Sun. 12:20 pm to 2:00 pm

SESSION 5

LOCATION: ROOM 222 (MEZZANINE) . . . . . SUN 2:00 PM TO 3:20 PM

Animal Models I

Session Chair: **Matthew Brenner M.D.,** Univ. of California, Irvine (USA)

2:00 pm: **High-speed imaging of in-vivo mice trachea with fourier domain optical coherence microscopy**, Hinnerk Schulz-Hildebrandt, Mario Pieper, Peter König, Gereon Hüttmann, Univ. zu Lübeck (Germany) . . . . . [9304-115]

2:20 pm: **Multimodal optical coherence tomography and fluorescence spectroscopy MEMS probe to assess inflammation in acute lung injury**, Lida P. Hariri M.D., Massachusetts General Hospital (USA); Liane Bernstein, Ecole Polytechnique de Montréal (Canada); David C. Adams, Massachusetts General Hospital (USA); Wendy-Julie Madore, Ecole Polytechnique de Montréal (Canada); Alyssa J. Miller, Yan Wang, Massachusetts General Hospital (USA); Mathias Strupler, Étienne De Montigny, Kathy Beaudette, Nicolas Godbout, Caroline Boudoux, Ecole Polytechnique de Montréal (Canada); Melissa J. Suter, Massachusetts General Hospital (USA) . . . . . [9304-116]

2:40 pm: **Does low level light therapy reduce inflammation and tissue damage from ventilator induced lung injury?**, Alyssa J. Miller, Margit V. Szabari M.D., Lida P. Hariri M.D., Michael R. Hamblin, Guido Musch M.D., Melissa J. Suter, Massachusetts General Hospital (USA) . . . . . [9304-117]

3:00 pm: **Validation and exploration of airway smooth muscle distributions as visualized with PS-OCT**, David C. Adams, Alyssa J. Miller, Lida P. Hariri, Yan Wang, Andrew D. Luster, Benjamin D. Medoff, Massachusetts General Hospital (USA) . . . . . [9304-118]

Coffee Break . . . . . .Sun. 3:20 pm to 3:50 pm

SESSION 6

LOCATION: ROOM 222 (MEZZANINE) . . . . . SUN 3:50 PM TO 4:50 PM

Animal Models II

Session Chair: **Victor X. D. Yang M.D.,** Ryerson Univ. (Canada)

3:50 pm: **In vivo optical coherence tomography imaging of airway and alveolar dynamics during bronchial challenge test**, Chulho Oak, Kosin Univ., College of Medicine (Korea, Republic of) and Innovative Biomedical Technology Research Ctr. (Korea, Republic of); Sang-Seok Hwang, Yugyeong Chae, Pukyong National Univ. (Korea, Republic of) and Ctr. for Marine-Integrated Biomedical Technology (Korea, Republic of); Eun-Kee Park, Kosin Univ., College of Medicine (Korea, Republic of) and Innovative Biomedical Technology Research Ctr. (Korea, Republic of); Yeh-Chan Ahn, Pukyong National Univ. (Korea, Republic of) and Ctr. for Marine-Integrated Biomedical Technology (Korea, Republic of) and Innovative Biomedical Technology Research Ctr. (Korea, Republic of). . . . . [9304-119]

4:10 pm: **Electromagnetic optical coherence tomography guided needle biopsy of lung nodules**, Yan Wang, Milen Shishkov, Massachusetts General Hospital (USA); Kirby G. Vosburgh, Brigham and Women's Hospital (USA); Lida P. Hariri M.D., David C. Adams, Alyssa J. Miller, Massachusetts General Hospital (USA); Raúl San-Jose Estépar, Brigham and Women's Hospital (USA); Michael Lanuti, Brett E. Bouma, Melissa J. Suter, Massachusetts General Hospital (USA) . . . . . [9304-120]

4:30 pm: **Measuring the force of contraction of airway smooth muscle with PS-OCT**, David C. Adams, Lida P. Hariri, Alyssa J. Miller, Yan Wang, Melissa J. Suter, Massachusetts General Hospital (USA). . . . . [9304-121]

POSTERS-SUNDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Development of a micro structured reflective sensor for the wrist-worn pulse oximeter, Chang-Sheng Chu, Shuang-Chao Chung, Yeh Wen Lee, Chih-Chun Fan, Yu-Tang Li, Jyh-Chern Chen, Taiwan Biophotonic Corp. (Taiwan) . . . . . [9304-122]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their groundbreaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9304B
LOCATION: ROOM 304 (ESPLANADE)

Sunday–Monday 8–9 February 2015 • Part of Proceedings of SPIE Vol. 9304

Endoscopic Microscopy X

Conference Chairs: **Guillermo J. Tearney M.D.,** Wellman Ctr. for Photomedicine (USA); **Thomas D. Wang,** Univ. of Michigan (USA)

Program Committee: **David L. Dickensheets,** Montana State Univ. (USA); **Arthur F. Gmitro,** The Univ. of Arizona (USA); **Ralf Kiesslich M.D.,** Johannes Gutenberg Univ. Mainz (Germany); **Francois Lacombe,** Mauna Kea Technologies (France); **Stephen Lam M.D.,** The BC Cancer Agency Research Ctr. (Canada); **Hiroshi Mashimo,** VA Boston Healthcare System (USA); **Kenzi Murakami,** Olympus Corp. (Japan); **Norman S. Nishioka M.D.,** Massachusetts General Hospital (USA); **Wibool Piyawattanametha,** King Mongkut's Institute of Technology Ladkrabang (Thailand); **Mark J. Schnitzer,** Stanford Univ. School of Medicine (USA); **Peter T. C. So,** Massachusetts Institute of Technology (USA); **Melissa J. Suter,** Massachusetts General Hospital (USA)

SUNDAY 8 FEBRUARY

SESSION 1

LOCATION: ROOM 304 (ESPLANADE) . . . . . SUN 8:00 AM TO 8:30 AM

Invited Talk

Session Chair: **Guillermo J. Tearney M.D.,** Wellman Ctr. for Photomedicine (USA)

8:00 am: **Imaging self-luminous objects with a single optical fiber** *(Invited Paper)*, Jerome Mertz, Roman Barankov, Boston Univ. (USA). [9304-200]

SESSION 2

LOCATION: ROOM 304 (ESPLANADE) . . . . . SUN 8:30 AM TO 10:30 AM

New Techniques and Contrast Agents

Session Chair: **Thomas D. Wang M.D.,** Univ. of Michigan (USA)

8:30 am: **In vivo laser-based imaging of the human fallopian tube for future cancer detection**, Eric J. Seibel, Charles D. Melville, Richard S. Johnston, Yuanzheng Gong, Kathy Agnew, Seine Chiang, Elizabeth M. Swisher, Univ. of Washington (USA) . . . . . [9304-201]

8:50 am: **Near infrared probe-based confocal laser endomicroscopy for in vivo diagnostic of peritoneal carcinomatosis**, Muriel Abbaci, Peggy Dartigues, Ranya Soufan, Frederic De Leeuw, Corinne Laplace-Builhé, Institut Gustave Roussy (France) . . . . . [9304-202]

9:10 am: **Laparoscopic volume holographic system for in vivo: simultaneous multi-section imaging of ovary**, Jennifer K. Barton, Isela D. Howlett, Michael Gordon, Photini S. Rice, Kenneth D. Hatch M.D., Raymond K. Kostuk, The Univ. of Arizona (USA) . . . . . [9304-203]

9:30 am: **A six-color four-laser mobile platform for multi-spectral fluorescence imaging endoscopy**, John F. Black, Glannaventa, Inc. (USA); Tyler Tate, Molly Keenan, Elizabeth J. Swan, Urs Utzinger, Jennifer K. Barton, The Univ. of Arizona (USA) . . . . . [9304-204]

9:50 am: **Demonstration and performance of SERS enabled scanning fiber endoscope**, Liang Lim, Patrick Z. McVeigh, Santa Borel, Brian C. Wilson, Princess Margaret Cancer Ctr., Univ. Health Network (Canada) . . . . . [9304-205]

10:10 am: **Simultaneous fingerprint and high-wavenumber Raman endoscopy for in vivo diagnosis of colorectal precancer**, Mads Sylvest Bergholt, Kan Lin, Jianfeng Wang, Wei Zheng, National Univ. of Singapore (Singapore); Hongzhi Xu, Jian-lin Ren, Institute of Digestive Disease, Zhongshan Hospital (China); Khek Yu Ho, Yong Loo Lin School of Medicine (Singapore); Supriya Srivastava, Yong Loo Lin School of Medicine (Singapore) and National Univ. of Singapore (Singapore); Ming Teh, Khay Guan Yeoh, Yong Loo Lin School of Medicine (Singapore); Zhiwei Huang, National Univ. of Singapore (Singapore) . . . . . [9304-206]

Coffee Break . . . . . Sun 10:30 am to 11:00 am

SESSION 3

LOCATION: ROOM 304 (ESPLANADE) . . . . . SUN 11:00 AM TO 12:00 PM

Fiber Bundle Techniques

Session Chair: **Arthur F. Gmitro,** The Univ. of Arizona (USA)

11:00 am: **Real-time high-resolution fiber bundle-based two-photon endomicroscope**, Jiyi Cheng, Yina Chang, Shih-Chi Chen, The Chinese Univ. of Hong Kong (Hong Kong, China) . . . . . [9304-207]

11:20 am: **High-speed, quasi-simultaneous white light and line-scan confocal fluorescence endomicroscopy through a single fibre bundle**, Michael R. Hughes, Guang-Zhong Yang, Imperial College London (United Kingdom) . . . . . [9304-209]

11:40 am: **Electromagnetic tracking of handheld high-resolution microendoscopy probes to assist with real-time video mosaicking**, Khushi K. Vyas, Michael R. Hughes, Guang-Zhong Yang, Imperial College London (United Kingdom) . . . . . [9304-210]

Lunch/Exhibition Break . . . . . Sun 12:00 pm to 1:50 pm

SESSION 4

LOCATION: ROOM 304 (ESPLANADE) . . . . . SUN 1:50 PM TO 3:30 PM

New OCT Probes I

Session Chairs: **Michalina J. Gora,** Wellman Ctr. for Photomedicine (USA); **DongKyun Kang,** Massachusetts General Hospital (USA)

1:50 pm: **Integrated OCT-US catheter for detection of cancer in gastrointestinal tract**, Jiawen Li, Univ. of California, Irvine (USA); Teng Ma, Thomas M. Cummins, Koping Kirk Shung, Jacques Van Dam, Qifa Zhou, The Univ. of Southern California (USA); Zhongping Chen, Univ. of California, Irvine (USA) . . . . . [9304-211]

2:10 pm: **Ultrahigh speed endoscopic optical coherence tomography for structural and angiographic imaging**, Osman O. Ahsen, Hsiang-Chieh Lee, Kaicheng Liang, Michael G. Giacomelli, Zhao Wang, Massachusetts Institute of Technology (USA); Benjamin M. Potsaid, Massachusetts Institute of Technology (USA) and Thorlabs Inc. (USA); Marisa Figueiredo, Qin Huang, VA Boston Healthcare System (USA); Alex E. Cable, Thorlabs, Inc. (USA); Vijaysekhar Jayaraman, Praevium Research, Inc. (USA); Hiroshi Mashimo M.D., VA Boston Healthcare System (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA) . . . . . [9304-212]

2:30 pm: **Endoscopic full-field optical coherence tomography for in vivo and in situ head and neck cancer assessment with a rigid probe**, Emilie Benoit à La Guillaume, Fabrice Harms, Franck Martins, LLTech SAS (France); A. Claude Boccara, Institut Langevin (France) . . . . . [9304-213]

2:50 pm: **Tethered capsule endomicroscopy for comprehensive imaging of the human small intestine**, Michalina J. Gora, Amna R. Soomro, Weina Lu, Robert W. Carruth, Mireille Rosenberg, Norman S. Nishioka M.D., Wellman Ctr. for Photomedicine (USA); Alessio Fasano M.D., Massachusetts General Hospital (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) . . . . . [9304-214]

3:10 pm: **Endoscopic polarization sensitive optical coherence tomography with completely fiber based passive optical components**, Lucas Cahill, Anthony Lee M.D., Hamid Pahlevaninezhad, Catherine F. Poh D.D.S., The BC Cancer Agency Research Ctr. (Canada); Samson Ng D.D.S., UBC Dentistry (Canada); Calum E. MacAulay, Pierre M. Lane, The BC Cancer Agency Research Ctr. (Canada) . . . . . [9304-215]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 5

LOCATION: ROOM 304 (ESPLANADE) . . . . . SUN 4:00 PM TO 5:00 PM

New OCT Probes II

Session Chair: **Pierre M. Lane,**
The BC Cancer Agency Research Ctr. (Canada)

4:00 pm: **Ultrahigh speed swept source OCT forward viewing endomicroscopy**, Kaicheng Liang, Osman O. Ahsen, Zhao Wang, Hsiang-Chieh Lee, Michael G. Giacomelli, Massachusetts Institute of Technology (USA); Benjamin M. Potsaid, Massachusetts Institute of Technology (USA) and Thorlabs Inc. (USA); Vijaysekhar Jayaraman, Praevium Research, Inc. (USA); Tsung-Han Tsai, Massachusetts Institute of Technology (USA); Wenxuan Liang, Johns Hopkins Univ. (USA); Alex E. Cable, Thorlabs, Inc. (USA); Hiroshi Mashimo M.D., VA Boston Healthcare System (USA); Xingde Li, Johns Hopkins Univ. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA) . . . . . [9304-216]

4:20 pm: **Tethered capsule OCT endomicroscopy with image guided biopsy for technology validation**, Amna R. Soomro, Michalina J. Gora, William Puricelli, Mireille Rosenberg, Norman S. Nishioka, Guillermo J. Tearney M.D., Massachusetts General Hospital (USA). . . . . [9304-217]

4:40 pm: **Polarization sensitive OCT imaging with needle probes**, Martin L. Villiger, Wellman Ctr. for Photomedicine (USA) and Massachusetts General Hospital (USA) and Harvard Medical School (USA); Dirk Lorenser, The Univ. of Western Australia (Australia); Brett E. Bouma, Wellman Ctr. for Photomedicine (USA) and Massachusetts Institute of Technology (USA) and Harvard Medical School (USA); Robert A. McLaughlin, David D. Sampson, The Univ. of Western Australia (Australia) . . . . . [9304-218]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

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Stefan W. Hell, Max Planck Institute Göttingen (via video message)
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W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

MONDAY 9 FEBRUARY

SESSION 6

LOCATION: ROOM 304 (ESPLANADE) . . . . . MON 8:30 AM TO 10:30 AM

Advances in SECM/SEE Technology

Session Chair: **Guillermo J. Tearney M.D.,**
Wellman Ctr. for Photomedicine (USA)

8:30 am: **Spectrally dispersed illumination spectral imaging**, Dvir Yelin, Yair Bar Ilan, Technion-Israel Institute of Technology (Israel) . . . . . [9304-219]

8:50 am: **Comprehensive confocal microscopy of human esophagus in vivo using an SECM endoscopic probe**, DongKyun Kang, Robert W. Carruth, Minkyu Kim, Tao Wu, Simon C. Schlachter, Nima Tabatabaei, Amna R. Soomro, Mireille Rosenberg, Norman S. Nishioka M.D., Guillermo J. Tearney M.D., Massachusetts General Hospital (USA) . . . . . [9304-220]

9:10 am: **Large-area imaging of breast tissues with spectrally encoded confocal microscopy (SECM)**, Elena F. Brachtel, Barbara L. Smith, Guillermo J. Tearney M.D., DongKyun Kang, Massachusetts General Hospital (USA) . . . . . [9304-221]

9:30 am: **Confocal microscopy of the esophagus using a tethered capsule endomicroscopy device enables the visualization of individual eosinophils in eosinophilic esophagitis patients**, Nima Tabatabaei, DongKyun Kang, Weina Lu, Tao Wu, Minkyu Kim, Robert W. Carruth, Amna R. Soomro, Elena G. Quijano, Mireille Rosenberg, Jenny S. Sauk, Paul E. Hesterberg, Norman S. Nishioka M.D., Qian Yuan, John J. Garber, Aubrey J. Katz M.D., Guillermo J. Tearney M.D., Massachusetts General Hospital (USA). . . . . [9304-222]

9:50 am: **Spectral imaging using forward-viewing spectrally encoded endoscopy**, Adel Zeidan, Dvir Yelin, Technion-Israel Institute of Technology (Israel) . . . . . [9304-223]

10:10 am: **Mega-pixel imaging through a 350-µm-diameter spectrally encoded endoscopy (SEE) probe**, DongKyun Kang, Massachusetts General Hospital (USA); Mitsuhiro Ikuta, Canon USA, Inc. (USA); Daryl Chulho Hyun, Massachusetts General Hospital (USA); Ramses V. Martinez, George M. Whitesides, Harvard Univ. (USA); Guillermo J. Tearney M.D., Massachusetts General Hospital (USA) . . . . . [9304-224]

Coffee Break . . . . . Mon 10:30 am to 11:00 am

SESSION 7

LOCATION: ROOM 304 (ESPLANADE) . . . . . MON 11:00 AM TO 12:20 PM

Endoscopic Microscopy I

Session Chair: **Francois Lacombe,** Mauna Kea Technologies (France)

11:00 am: **Dual-modal optical imaging microendoscope for ovarian cancer detection**, Molly Keenan, Tyler Tate, Elizabeth J. Swan, The Univ. of Arizona (USA); John F. Black, Glannaventa, Inc. (USA); Urs Utzinger, Jennifer K. Barton, The Univ. of Arizona (USA) . . . . . [9304-225]

11:20 am: **Improved chromatical and field correction of high-NA GRIN-based endomicroscopic imaging systems for new biophotonic applications**, Gregor Matz, Bernhard Messerschmidt, Grintech GmbH (Germany); Herbert Gross, Friedrich-Schiller-Univ. Jena (Germany) . . [9304-226]

11:40 am: **In-vivo multispectral fluorescence imaging of murine colonic dysplasia with scanning fiber endoscopy**, Arlene Smith, Asha Pant, B ishnu P. Joshi, Emily F. Rabinsky, Juan Zhou, Xiyu Duan, Univ. of Michigan (USA); Chenying Yang, Eric J. Seibel, Univ. of Washington (USA); Thomas D. Wang M.D., Univ. of Michigan (USA) . . . . . [9304-227]

12:00 pm: **Towards the development of an ultracompact optically sectioning endoscope with no distal optics**, Youngchan Kim, Sean Warren, Imperial College London (United Kingdom); James M. Stone, James Roper, Jonathan C. Knight, Univ. of Bath (United Kingdom); Mark Neil, Carl Paterson, Christopher W. Dunsby, Paul M. W. French, Imperial College London (United Kingdom) . . . . . [9304-228]

Lunch/Exhibition Break . . . . . Mon 12:20 pm to 1:50 pm

SESSION 8

LOCATION: ROOM 304 (ESPLANADE) . . . . . MON 1:50 PM TO 3:10 PM

Endoscopic Microscopy II

Session Chair: **Jerome Mertz,** Boston Univ. (USA)

1:50 pm: **Clinical experience with a confocal microlaparoscope for ovarian cancer detection**, Andrew R. Rouse, Matthew D. Risi, Setsuko K. Chambers, Kenneth D. Hatch M.D., Wenxin Zheng, Arthur F. Gmitro, The Univ. of Arizona (USA) . . . . . [9304-229]

2:10 pm: **Aberration correction of gradient index lens based combined two-photon microscopy and optical coherence tomography**, Taejun Wang, Won Hyuk Jang, Pohang Univ. of Science and Technology (Korea, Republic of); Jungho Moon, Eunsung Seo, Korea Univ. (Korea, Republic of); Gyungseok Oh, Gwangju Institute of Science and Technology (Korea, Republic of); Young Eun Kim, G-One Ahn, Pohang Univ. of Science and Technology (Korea, Republic of); Euiheon Chung, Gwangju Institute of Science and Technology (Korea, Republic of); Wonshik Choi, Korea Univ. (Korea, Republic of); Seung-Jae Myung, Asan Medical Ctr. (Korea, Republic of); Ki Hean Kim, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9304-230]

2:30 pm: **Two-photon endoscope with no distal optics**, Hervé Rigneault, Esben R. Andresen, Institut Fresnel (France); Géraud Bouwmans, Univ. des Sciences et Technologies de Lille (France); Serge Monneret, Institut Fresnel (France) . . . . . [9304-231]

2:50 pm: **Low cost and compact nonlinear (SHG/TPE) laser scanning endoscope for bio-medical application**, Hao Li, Jia Yun Liu, Hon Luen Seck, Xia Yu, Shawwei Kok, Ying Zhang, Singapore Institute of Manufacturing Technology (Singapore). . . . . [9304-232]

Coffee Break . . . . . Mon 3:10 pm to 3:40 pm

CONFERENCE 9304B
LOCATION: ROOM 304 (ESPLANADE)

SESSION 9
LOCATION: ROOM 304 (ESPLANADE) . . . . . .MON 3:40 PM TO 5:00 PM

Miniature Instruments for Endoscopic Microscopy

Joint Session with Conferences 9304 and 9375

Session Chair: **Wibool Piyawattanametha,** King Mongkut's Institute of Technology Ladkrabang (Thailand), Chulalongkorn Univ. (Thailand)

3:40 pm: **MEMS-based handheld multiphoton endomicroscope for in vivo imaging**, Xiyu Duan, Haijun Li, Zhen Qiu, Bishnu P. Joshi, Asha Pant, Katsuo Kurabayashi, Kenn R. Oldham, Thomas D. Wang M.D., Univ. of Michigan (USA) . . . . . [9304-233]

4:00 pm: **Forward-viewing MEMS fiber scanner for endomicroscopic applications**, Yeong-Hyeon Seo, Hyeon-Cheol Park, Kyungmin Hwang, Ki-Hun Jeong, KAIST (Korea, Republic of) . . . . . [9304-234]

4:20 pm: **Maskless fabrication of micro-optical elements for functional endomicroscopic fiber tips**, Jae-Beom Kim, Ki-Hun Jeong, KAIST (Korea, Republic of) . . . . . [9375-1]

4:40 pm: **Monolithic microfabrication of microprism arrays for 3D stereoscopic endoscope**, Sung-Pyo Yang, Jae-Jun Kim, Kyung-Won Jang, Ki-Hun Jeong, KAIST (Korea, Republic of) . . . . . [9375-2]

POSTERS-MONDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . MON 5:30 PM TO 7:30 PM

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Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Multi-camera synchronization core implemented on USB3 based FPGA platform, Ricardo M. Sousa, Univ. da Madeira (Portugal); Martin Wäny, Pedro Santos, AWAIBA Lda. (Portugal); Morgado Dias, Univ. da Madeira (Portugal) . . . . . [9304-235]

Stray light mitigation in a novel endoscope for fallopian tubes, Elizabeth J. Swan, Tyler Tate, Molly Keenan, The Univ. of Arizona (USA); John F. Black, Glannaventa, Inc. (USA); Urs Utzinger, Jennifer K. Barton, The Univ. of Arizona (USA) . . . . . [9304-236]

Endoscopic imaging probe for high-resolution optical coherence tomography, Jun Young Kim, Hyeong Soo Nam, Min Woo Lee, Hanyang Univ. (Korea, Republic of); Seung-Il Jang, Se-Hun Kwon, Pusan National Univ. (Korea, Republic of); Hongki Yoo, Hanyang Univ. (Korea, Republic of) . . . . . [9304-237]

Development of a new laparoscopic system for detection of gastric cancer using fluorescent clip emitting near-infrared light, Shunko A. Inada, Nagoya Univ. (Japan); Shingo Fuchi, Aoyama Gakuin Univ. (Japan); Kensaku Mori, Nagoya Univ. (Japan); Junichi Hasegawa, Chukyo Univ. (Japan); Kazunari Misawa M.D., Hayao Nakanishi, Aichi Cancer Ctr. (Japan) . . [9304-238]

CONFERENCE 9305A
LOCATION: ROOM 121 (EXHIBIT LEVEL)

Saturday–Sunday 7–8 February 2015 • Part of Proceedings of SPIE Vol. 9305

Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology

Conference Chairs: **Henry Hirschberg M.D.,** Beckman Laser Institute and Medical Clinic (USA); **Steen J. Madsen,** Univ. of Nevada, Las Vegas (USA)

Program Committee: **David Abookasis,** Ariel Univ. of Samaria (Israel); **Frederic Leblond,** Ecole Polytechnique de Montréal (Canada); **Herbert Stepp,** Ludwig-Maximilians-Univ. München (Germany); **Pablo A. Valdes,** Dartmouth College (USA); **Victor X. D. Yang,** Ryerson Univ. (Canada)

SATURDAY 7 FEBRUARY

SESSION 1
LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . .SAT 8:30 AM TO 10:10 AM

OCT and Microscopy I
Session Chair: **Victor X. D. Yang M.D.,** Ryerson Univ. (Canada)

8:30 am: **Micro-optical coherence tomography of ependymal cilia**, Kengyeh K. Chu, Massachusetts General Hospital (USA); Timothy W. Vogel, Cincinnati Children's Hospital Medical Ctr. (USA); Robert W. Carruth, Guillermo J. Tearney M.D., Massachusetts General Hospital (USA). . . [9305-100]

8:50 am: **Integration of optical coherence tomography with tissue clearing for deep brain imaging**, Sunwoo Jung, Junwon Lee, Eunjung Min, Woonggyu Jung, Ulsan National Institute of Science and Technology (Korea, Republic of) . . . . . [9305-101]

9:10 am: **Quantitative biochemical investigation of various neuropathologies using high-resolution spectral CARS microscopy**, Kelvin W. C. Poon, Craig Brideau, Tak Ho Chu, Andrew V. Caprariello, Jason R. Plemel, Univ. of Calgary (Canada); Geert J. Schenk, Roel Klaver, Vrije Univ. Medical Ctr. (Netherlands); Antoine M. Klauser, Jean H. Kawasoe, Univ. of Calgary (Canada); Jeroen J. Geurts, Vrije Univ. Medical Ctr. (Netherlands); Peter K. Stys, Univ. of Calgary (Canada). . . . . [9305-102]

9:30 am: **Coaxial cavity injected OCT and fiber laser ablation system for real-time monitoring of ablative processes**, Jamil Jivraj, Yize Huang, Ronnie Wong, Yi Lu, Barry Vuong, Joel Ramjist, Xijia J. Gu, Victor X. D. Yang M.D., Ryerson Univ. (Canada). . . . . [9305-103]

9:50 am: **Cellular resolution imaging of healthy and pathological human brain tissue at 800nm and 1300nm with SD-OCT**, Kostadinka Bizheva, Mojtaba Hajialamdari, Univ. of Waterloo (Canada); Sandrine de Ribaupierre, The Univ. of Western Ontario (Canada). . . . . [9305-104]

Coffee Break . . . . . .Sat 10:10 am to 10:40 am

SESSION 2
LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . .SAT 10:40 AM TO 12:00 PM

OCT and Microscopy II
Session Chair: **Steen J. Madsen,** Univ. of Nevada, Las Vegas (USA)

10:40 am: **Cadaveric in-situ testing of optical coherence tomography system based skull base surgery guidance**, Cuiru Sun, Ryerson Univ. (Canada); Osaama H. Khan, Sunnybrook Health Sciences Ctr. (Canada); Peter Siegler, Jamil Jivraj, Ronnie Wong, Barry Vuong, Ryerson Univ. (Canada); Victor X. D. Yang M.D., Ryerson Univ. (Canada) and Sunnybrook Health Sciences Ctr. (Canada) and Univ. of Toronto (Canada) . . . . . [9305-105]

11:00 am: **Characterizing the significance of multiple enzyme-bound formulations of NADH and their role in cerebral metabolism using 2-Photon fluorescence lifetime microscopy**, Mohammad A. Yaseen, Sava Sakadžic, Buyin Fu, Weicheng Wu, David A. Boas, Massachusetts General Hospital (USA) . . . . . [9305-106]

11:20 am: **Birefringence based assessment of neuritic plaques in Alzheimer's disease by polarization sensitive OCT**, Bernhard Baumann, Adelheid Wöhrer, Christian Mitter, Erich Götzinger, Gabor G. Kovacs, Christoph K. Hitzenberger, Medizinische Univ. Wien (Austria) . . . . . [9305-107]

11:40 am: **Spinal cord deformation due to nozzle gas flow effects using optical coherence tomography**, Ronnie Wong, Jamil Jivraj, Barry Vuong, Joel Ramjist, Cuiru Sun, Yize Huang, Victor X. D. Yang M.D., Ryerson Univ. (Canada) . . . . . [9305-108]

Lunch/Exhibition Break . . . . . .Sat 12:00 pm to 1:30 pm

SESSION 3
LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . .SAT 1:30 PM TO 3:10 PM

Operative and Post-op Therapy I
Session Chair: **Henry Hirschberg M.D.,**
Beckman Laser Institute and Medical Clinic (USA)

1:30 pm: **Introduction to the sessions on photonics in the neurosurgical OR and beyond**, Henry Hirschberg M.D., Beckman Laser Institute and Medical Clinic (USA) . . . . . [9305-109]

1:50 pm: **Macrophage mediated PCI enhanced gene-directed enzyme pro-drug therapy**, Catherine E. Christie M.D., Genesis Zamora, Beckman Laser Institute and Medical Clinic (USA); Kristian Berg, The Norwegian Radium Hospital (Norway); Steen J. Madsen, Univ. of Nevada, Las Vegas (USA); Henry Hirschberg M.D., Beckman Laser Institute and Medical Clinic (USA) . . . . . [9305-110]

2:10 pm: **Interstitial photodynamic therapy and glioblastoma: light fractionation study on pre clinical model**, Henri-Arthur Leroy, Lille Univ. Hospital (France) and INSERM U 703 "ONCO THAI" (France); Maximilien Vermandel, INSERM (France); Jean-Paul Lejeune M.D., Univ. des Sciences et Technologies de Lille (France); Serge R. Mordon, INSERM (France); Nicolas Reyns M.D., Lille Univ. Hospital (France) and INSERM (France) . . . . . [9305-111]

2:30 pm: **Efficacy of combined photothermal therapy and chemotherapeutic drugs**, Steen J. Madsen, En-Chung Shih, Univ. of Nevada, Las Vegas (USA); Henry Hirschberg M.D., Beckman Laser Institute and Medical Clinic, Univ. of California, Irvine (USA). . . . . [9305-112]

2:50 pm: **Femtosecond laser-induced attachment of single neurons**, Nir Katchinskiy, Indrani Dutta, Helly R. Goez, Roseline Godbout, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) . . . . . [9305-113]

Coffee Break . . . . . .Sat 3:10 pm to 3:40 pm

SESSION 4
LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . .SAT 3:40 PM TO 5:00 PM

Operative and Post-Op Therapy II
Session Chair: **Frédéric Leblond,**
Ecole Polytechnique de Montréal (Canada)

3:40 pm: **A neurosurgical guidance spectroscopic probe system for combined single-point detection of intrinsic fluorescence, diffuse reflectance and inelastic scattering**, Jeanne Mercier, Ecole Polytechnique de Montréal (Canada); Michael Jermyn, Ecole Polytechnique de Montréal (Canada) and Brain Tumour Research Ctr., Montreal Neurological Institute and Hospital, McGill Univ. (Canada); Kelvin Mok, Brain Tumour Research Ctr., Montreal Neurological Institute and Hospital, McGill Univ. (Canada); Joannie Desroches, McGill Univ. (Canada); Cedric Lemieux-Leduc, Karl St-Arnaud, Julien Pichette, Ecole Polytechnique de Montréal (Canada); Marie-Christine Guiot, McGill Univ. (Canada); Kevin Petrecca, Brain Tumor Research Ctr., Montreal Neurological Institute and Hospital, McGill Univ. (Canada); Frédéric Leblond, Ecole Polytechnique de Montréal (Canada) . . . . . [9305-115]

4:00 pm: **Characterization of a sub-diffuse optical spectroscopy system to guide brain needle biopsies**, Andreanne Goyette, Julien Pichette, Marie-Andrée Tremblay, Audrey Laurence, Ecole Polytechnique de Montréal (Canada); Michael Jermyn, McGill Univ. (Canada); Wendy-Julie Madore, Mathias Strupler, Caroline Boudoux, Ecole Polytechnique de Montréal (Canada); Brian C. Wilson, Ontario Cancer Institute (Canada); Frédéric Leblond, Ecole Polytechnique de Montréal (Canada). . . . . [9305-116]

4:20 pm: **Video rate high definition near infra red (NIR) Intra-operative imaging of brain tumors using BLZ-100**, Pramod V. Butte, Adam Mamelak M.D., David S. Kittle, Cedars-Sinai Medical Ctr. (USA); Stacey Hansen, Julie Novak, Blaze Bioscience, Inc. (USA); Keith L. Black M.D., Cedars-Sinai Medical Ctr. (USA). . . . . [9305-118]

4:40 pm: **Real-time, quantitative fluorescence imaging using single snapshot optical properties imaging for neurosurgical guidance**, Pablo A. Valdes Quevedo, Brigham and Women's Hospital (USA); Joseph Angelo, Sylvain Gioux, Beth Israel Deaconess Medical Ctr. (USA). . . . [9305-119]

BIOS HOT TOPICS
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 5
LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . .SUN 8:00 AM TO 10:00 AM

Optical Spectroscopy and Tomography
Session Chair: **David Abookasis,** Ariel Univ. (Israel)

8:00 am: **Simultaneous imaging of near-infrared diffuse reflectance and blood flow for a rat stroke model: pathophysiology analysis using light scattering signals**, Satoko Kawauchi, Shunichi Sato, National Defense Medical College (Japan); Izumi Nishidate, Tokyo Univ. of Agriculture and Technology (Japan); Hiroshi Nawashiro, Tokorozawa Central Hospital (Japan); Toshiya Takemura, National Defense Medical College (Japan) . . . . . [9305-120]

8:20 am: **Hemodynamic and morphologic responses in intact mouse brain during focal head injury by multispectral imaging based on structured illumination**, David Abookasis, Boris Volkov, Ariel Univ. (Israel); Marlon S. Mathews M.D., Univ. of California, Irvine Medical Ctr. (USA) . . . . . [9305-121]

8:40 am: **In vivo estimation of light scattering and absorption properties of rat brain using single reflectance fiber probe during anoxic depolarization**, Izumi Nishidate, Keiichiro Yoshida, Tokyo Univ. of Agriculture and Technology (Japan); Satoko Kawauchi, Shunichi Sato, National Defense Medical College (Japan); Manabu Sato, Yamagata Univ. (Japan). . . . . [9305-122]

9:00 am: **FNIRS-based evaluation of cortical plasticity in children with cerebral palsy undergoing constraint-induced movement therapy**, Jianwei Cao, Bilal Khan, Nathan Hervey, Fenghua Tian, Hanli Liu, George Alexandrakis, The Univ. of Texas at Arlington (USA); Mauricio R. Delgado, Nancy J. Clegg, Linsley Smith, Dahlia Reid, Kirsten Tulchin-Francis, Angela Shierk, Texas Scottish Rite Hospital for Children (USA); Laura Shagman, Duncan MacFarlane, The Univ. of Texas at Dallas (USA) . . . . . [9305-123]

9:20 am: **Study of gender-related effects of prefrontal cortex connectivity by using functional optical tomography**, Chun-Jung Huang, Chia-Wei Sun, Jung-Chih Chen, Ching-Cheng Chuang, National Chiao Tung Univ. (Taiwan) . . . . . [9305-124]

9:40 am: **Assessment of brain functional connectivity by implementing graph theory analysis to atlas-guided diffuse optical tomography**, Lin Li, The Univ. of Texas at Arlington (USA); Mary Cazzell, Cook Children's Medical Ctr. (USA); Hanli Liu, The Univ. of Texas at Arlington (USA) . . . . . [9305-125]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 6
LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . .SUN 10:30 AM TO 11:50 AM

OCT and Microscopy III
Session Chair: **Pablo A. Valdes,** Dartmouth College (USA)

10:30 am: **Evaluation of hemodynamics changes during interventional stent placement using Doppler optical coherence tomography**, Barry Vuong, Helen Genis, Joel Ramjist, Jamil Jivraj, Ronnie Wong, Cuiru Sun, Victor X. D. Yang M.D., Ryerson Univ. (Canada) . . . . . [9305-126]

10:50 am: **Patient specific intracranial aneurysm flow phantom imaging with optical coherence tomography**, Barry Vuong, Helen Genis, Joel Ramjist, Jamil Jivraj, Ronnie Wong, Raphael Jakubovic, Ryerson Univ. (Canada); Julia Keith M.D., Sunnybrook Health Sciences Ctr. (Canada); Rasmus Kiehl M.D., Univ. Health Network (Canada); Victor X. D. Yang M.D., Ryerson Univ. (Canada) . . . . . [9305-127]

11:10 am: **Label free, real time visualization of tissue histology at subcellular resolution: a study of primary versus secondary human brain cancer tissues**, Carmen Kut, Wenxuan Liang, Gunnstein Hall, Kaisorn Chaichana M.D., Alfredo Quinones-Hinojosa M.D., Xingde Li, The Johns Hopkins Hospital (USA). . . . . [9305-128]

11:30 am: **Optomechanical design of a miniaturized intraoperative fluorescence-guided surgical resection camera system**, David S. Kittle, Adam Mamelak M.D., Cedars-Sinai Medical Ctr. (USA); Julie Novak, Stacey Hansen, Blaze Bioscience, Inc. (USA); Keith L. Black M.D., Pramod V. Butte, Cedars-Sinai Medical Ctr. (USA). . . . . [9305-114]

SESSION 7
LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . SUN 11:50 AM TO 12:10 PM

Operative and Post-Op Therapy III
Session Chair: **Pablo A. Valdes,** Dartmouth College (USA)

11:50 am: **Accuracy of image-guided surgical navigation using NIR optical tracking**, Raphael Jakubovic, Hamza Farooq, Joseph Alarcon, Ryerson Univ. (Canada); Victor X. D. Yang M.D., Ryerson Univ. (Canada) and Div. of Neurosurgery, Sunnybrook Health Sciences Ctr. (Canada) . . . . . [9305-117]

POSTERS-SUNDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

3D surgical microscope based on optical coherence tomography for microsurgery on the brain, Youjin Ahn, Sungwon Shin, Ulsan National Institute of Science and Technology (Korea, Republic of); Pil Un Kim, Oz-tec Co., Ltd. (Korea, Republic of); Hwakyoung Shin, Pusan National Univ. (Korea, Republic of); Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of); Woonggyu Jung, Ulsan National Institute of Science and Technology (Korea, Republic of) . . . . . [9305-129]

BIOS SUNDAY PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their ground-breaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9305B
LOCATION: ROOM 310 (ESPLANADE)

Monday–Tuesday 9–10 February 2015 • Part of Proceedings of SPIE Vol. 9305

BIOS

Neurophotonics

Conference Chairs: **E. Duco Jansen,** Vanderbilt Univ. (USA); **Qingming Luo,** Huazhong Univ. of Science and Technology (China)

Conference Co-Chairs: **Jun Ding,** Stanford School of Medicine (USA); **Anna W. Roe,** Vanderbilt Univ. (USA)

Program Committee: **David A. Boas,** Massachusetts General Hospital (USA); **Yu Chen,** Univ. of Maryland, College Park (USA); **Javier DeFelipe,** Univ. Politécnica de Madrid (Spain); **Hongwei Dong,** Univ. of California, Los Angeles (USA); **Congwu Du,** Stony Brook Univ. (USA); **Beop-Min Kim,** Korea Univ. (Korea, Republic of); **Vesa Kiviniemi,** Univ. of Oulu (Finland); **Pengcheng Li,** Britton Chance Ctr. for Biomedical Photonics (China); **Anita Mahadevan-Jansen,** Vanderbilt Univ. (USA); **Francesco Saverio Pavone,** European Lab. for Non-linear Spectroscopy (Italy); **Kambiz Pourrezaei,** Drexel Univ. (USA); **Claus-Peter Richter,** Northwestern Univ. (USA); **Shy Shoham,** Technion-Israel Institute of Technology (Israel); **Vladislav Toronov,** Ryerson Univ. (Canada); **Shaoqun Zeng,** Britton Chance Ctr. for Biomedical Photonics (China)

MONDAY 9 FEBRUARY

SESSION 1

LOCATION: ROOM 310 (ESPLANADE) . . . . . MON 8:00 AM TO 10:00 AM

Novel Photonic or Optoelectronic Methods

Session Chair: **E. Duco Jansen,** Vanderbilt Univ. (USA)

8:00 am: **Optical inhibition for rapid and reversible block of axonal sub-populations** *(Invited Paper)*, Emilie H. Lothet, Yves T. Wang, Niloy Bhadra, Kevin L. Kilgore, Case Western Reserve Univ. (USA); E. Duco Jansen, Vanderbilt Univ. (USA); Hillel J. Chiel, Michael W. Jenkins, Case Western Reserve Univ. (USA) . . . . . [9305-200]

8:30 am: **Mapping neuronal microcircuits with super-resolution localization microscopy: challenges and our recent progresses** *(Invited Paper)*, Zhen-Li Huang, Shaoqun Zeng, Yina Wang, Zhe Hu, Lingxi Zhao, Yue Du, Britton Chance Ctr. for Biomedical Photonics (China) . . . . . [9305-201]

9:00 am: **Visualization and neuronal cell targeting during electrophysiological recordings facilitated by quantum dots**, Bertalan K. Andrásfalvy, Hungarian Academy of Sciences (Hungary); Gregorio L. Galiñanes, Daniel Huber, Univ. de Genève (Switzerland); Mladen Barbic, Janelia Farm Research Campus (USA); John J. Macklin, Howard Hughes Medical Institute (USA) and Janelia Farm Research Campus (USA); Kimihiro Susumu, James B. Delehanty III, Alan L. Huston, U.S. Naval Research Lab. (USA); Judit K. Makara, Hungarian Academy of Sciences (Hungary); Igor L. Medintz, U.S. Naval Research Lab. (USA) . . . . . [9305-202]

9:20 am: **Abnormal hemodynamic response to forepaw stimulation in cocaine-treated rat reflects impaired brain activation by cocaine**, Wei Chen, Kicheon Park, Jeonghun Choi, Peng Liu, Yingtian Pan, Congwu Du, Stony Brook Univ. (USA) . . . . . [9305-203]

9:40 am: **Optical inhibition in a cardiac developmental model**, Yves T. Wang, Andrew M. Rollins, Michael W. Jenkins, Case Western Reserve Univ. (USA) . . . . . [9305-204]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

SESSION 2

LOCATION: ROOM 310 (ESPLANADE) . . . . . MON 10:30 AM TO 12:10 PM

Neurophotonic Applications I

Session Chair: **Francesco S. Pavone,**
European Lab. for Non-linear Spectroscopy (Italy)

10:30 am: **High-resolution and high-throughput brain connection imaging with chemical activation of GFP fluorescence** *(Invited Paper)*, Hanqing Xiong, Xiaohua Lv, Anan Li, Hui Gong, Huazhong Univ. of Science and Technology (China); Qingming Luo, Huazhong Univ. of Science & Technologhy (China); Shaoqun Zeng, Britton Chance Ctr. for Biomedical Photonics (China) and Huazhong Univ. of Science and Technology (China) . . . . . [9305-205]

11:00 am: **GRIN lens based confocal system for deep brain calcium imaging** *(Invited Paper)*, Qingchun Guo, Britton Chance Ctr. for Biomedical Photonics, Wuhan National Lab. for Optoelectronics (China) and MoE Key Lab. for Biomedical Photonics, Huazhong Univ. of Science and Technology (China); Qian Liu, Britton Chance Ctr. for Biomedical Photonics (China) and MoE Key Lab. for Biomedical Photonics, Huazhong Univ. of Science and Technology (China); Minmin Luo, National Institute of Biological Sciences (China) and Tsinghua Univ. (China); Ling Fu, Britton Chance Ctr. for Biomedical Photonics (China) and MoE Key Lab. for Biomedical Photonics, Huazhong Univ. of Science and Technology (China) . . . . . [9305-206]

11:30 am: **Laser-acupuncture for autism spectrum disorder a randomized sham controlled trial**, Shahzad Anwar M.D., Anwar Shah Trust for Cerebral Palsy & Paralysis (Pakistan). . . . . [9305-207]

11:50 am: **A new versatile clearing method for brain imaging**, Irene Costantini, Antonino Paolo Di Giovanna, Anna Letizia Allegra Mascaro, Ludovico Silvestri, European Lab. for Non-linear Spectroscopy, Univ. degli Studi di Firenze (Italy); Marie Caroline Müllenbroich, European Laboratory for Non-linear Spectroscopy, University of Florence (Italy); Leonardo Sacconi, National Institute of Optics, Consiglio Nazionale delle Ricerche (Italy) and European Lab. for Non-linear Spectroscopy, Univ. degli Studi di Firenze (Italy); Francesco S. Pavone, European Lab. for Non-linear Spectroscopy, Univ. degli Studi di Firenze (Italy) and National Institute of Optics, Consiglio Nazionale delle Ricerche (Italy) and Univ. degli Studi di Firenze (Italy) . . . . . [9305-208]

Lunch Break . . . . . Mon 12:10 pm to 1:40 pm

SESSION 3

LOCATION: ROOM 310 (ESPLANADE) . . . . . MON 2:00 PM TO 3:30 PM

Neurophotonic Applications II

Session Chair: **Beop-Min Kim,**
Korea Univ. College of Health Sciences (Korea, Republic of)

2:00 pm: **Volumetric optical coherence tomography of ex vivo mouse brain** *(Invited Paper)*, Woonggyu Jung, Ulsan National Institute of Science and Technology (Korea, Republic of) . . . . . [9305-209]

2:30 pm: **In vivo live imaging reveal organization of dendritic golgi outposts**, Wei Zhou, Britton Chance Ctr. for Biomedical Photonics, HUST (China) . . . . . [9305-210]

2:50 pm: **Hemodynamic low-frequency oscillation reflects neuronal activity at resting-brain explored by simultaneous measurement of CBF and LFP**, Wei Chen, Peng Liu, James Li, Yingtian Pan, Congwu Du, Stony Brook Univ. (USA) . . . . . [9305-211]

3:10 pm: **Resting-state functional connectivity accessed by spontaneous optical neural, hemodynamic and metabolic signals**, Jinling Lu, Britton Chance Ctr. for Biomedical Photonics (China); Bin Li, Qin Huang, Qin Huang, Dong Wen, Sheng Gui, Britton Chance Ctr for Biomedical Photonics (China); Pengcheng Li, Britton Chance Ctr. for Biomedical Photonics (China) . [9305-213]

Coffee Break . . . . . Mon 3:30 pm to 4:00 pm

SESSION 4

LOCATION: ROOM 310 (ESPLANADE) . . . . . MON 4:00 PM TO 5:20 PM

Diffusive Optical Tomography and Functional Near-Infrared Imaging

Session Chair: **Anita Mahadevan-Jansen,** Vanderbilt Univ. (USA)

4:00 pm: **Ultrahigh-resolution optical coherence microscopy for nondestructive evaluation of neuronal changes in organotypic brain cultures**, Chao Zhou, Lehigh Univ. (USA). . . . . [9305-214]

4:30 pm: **Enhancing motor performance improvement by personalizing non-invasive cortical stimulation with concurrent functional near-infrared spectroscopy and multi-modal motor measurements** *(Invited Paper)*, Bilal Khan, Nathan Hervey, The Univ. of Texas at Arlington (USA); Ann M. Stowe, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); George V. Kondraske, The Univ. of Texas at Arlington (USA); Timea Hodics, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); George Alexandrakis, The Univ. of Texas at Arlington (USA) . . . . . [9305-215]

5:00 pm: **A portable self-contained fNIRS system with eight channels**, Juanning Si, Ruirui Zhao, Yujin Zhang, Nianming Zuo, Xin Zhang, Tianzi Jiang, Chinese Academy of Sciences (China) . . . . . [9305-216]

CONFERENCE 9305B
LOCATION: ROOM 310 (ESPLANADE)

POSTERS-MONDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . MON 5:30 PM TO 7:30 PM

Conference attendees are invited to attend the BiOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Studying neural circuitry plasticity of prefrontal cortex during depression occurrence and following medicine treatment in mice model in vivo, Tonghui Xu, Huazhong Univ. of Science and Technology (China) . . . . [9305-229]

Experimental studies with selected light sources for NIRS of brain tissue: quantifying tissue chromophore concentration, Teemu S. Myllylä, Univ. of Oulu (Finland); Vesa O. Korhonen, Vesa Kiviniemi, Oulu Univ. Hospital (Finland); Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) and Univ. of Oulu (Finland) . . . . . [9305-230]

Automated extraction of mouse brain contour by using resampling-based variational model, Jing Li, Tingwei Quan, Shiwei Li, Hang Zhou, Qingming Luo, Hui Gong, Shaoqun Zeng, Wuhan National Lab. for Optoelectronics (China) . . . . . [9305-231]

Cerebral functional connectivity and vasomotion: phenomena and separability, Jonathan Bumstead, Adam Q. Bauer, Joseph P. Culver, Washington Univ. in St. Louis (USA) . . . . . [9305-232]

Mapping the neural circuit with an automated high-throughput high-resolution imaging system, Tao Yang, Wuhan National Lab. for Optoelectronics (China). . . . . [9305-233]

Spatio-temporal coherence in cortical calcium transients in mice, Patrick W. Wright, Adam Q. Bauer, Joseph P. Culver, Washington Univ. in St. Louis (USA) . . . . . [9305-234]

Improvement of the background optical property reconstruction of the two-layered slab sample based on a region-stepwise-reconstruction method, Ming Liu, Tianjin Univ. (China); Zhuanping Qin, Tianjin University of Technology and Education (China); Mengyu Jia, Huijuan Zhao, Feng Gao, Tianjin Univ. (China). . . . . [9305-235]

Cell-based optical assay for Alzheimer's disease using femtosecond-pulsed laser, Seunghee Lee, Jonghee Yoon, Chulhee Choi, KAIST (Korea, Republic of) . . . . . [9305-236]

NeuroGPS 2, dense and brain-wide reconstruction of single-neuron trees, Tingwei Quan, Hang Zhou, Shiwei Li, Jing Li, Qingming Luo, Hui Gong, Shaoqun Zeng, Wuhan National Lab. for Optoelectronics (China). . . . . [9305-237]

NeuroGPS, automated localization of neurons at the brain-wide scale, Hang Zhou, Wuhan National Lab. for Optoelectronics (China); Tingwei Quan, Wuhan National Lab. for Optoelectronics (China) and School of Mathematics and Economics, Hubei Univ. of Education (China); Shiwei Li, Jing Li, Qingming Luo, Hui Gong, Shaoqun Zeng, Wuhan National Lab. for Optoelectronics (China) . . . . . [9305-238]

Polarization-sensitive optical coherence tomography for cross-sectional imaging of neural activity, Yi-Jou Yeh, Adam J. Black, Univ. of Minnesota, Twin Cities (USA); David Landowne, Univ. of Miami (USA); Taner Akkin, Univ. of Minnesota, Twin Cities (USA) . . . . . [9305-239]

Temporal synchrony within functional brain networks during state transitions, Adam Q. Bauer, Annie R. Bice, Patrick W. Wright, Matthew D. Reisman, Grant Baxter, Ben J. Palanca, Joseph P. Culver, Washington Univ. School of Medicine in St. Louis (USA). . . . . [9305-240]

Photoacoustic imaging for transvascular drug delivery to the rat brain, Ryota Watanabe, Keio Univ. (Japan); Shunichi Sato, National Defense Medical College Research Institute (Japan); Yasuyuki Tsunoi, Keio Univ. (Japan); Satoko Kawauchi, Toshiya Takemura, National Defense Medical College Research Institute (Japan); Mitsuhiro Terakawa, Keio Univ. (Japan) . . . . . [9305-242]

Optical imaging of new protein synthesis in live neurons and brain tissues by stimulated Raman scattering microscopy, Lu Wei, Wei Min, Columbia Univ. (USA) . . . . . [9305-243]

Automated sparse reconstruction of single-neuron tree at the brain-wide scale, Shiwei Li, Wuhan National Lab. for Optoelectronics (China); Tingwei Quan, Wuhan National Lab. for Optoelectronics (China) and School of Mathematics and Economics (China); Hang Zhou, Jing Li, Qingming Luo, Hui Gong, Shaoqun Zeng, Wuhan National Lab. for Optoelectronics (China) . . . . . [9305-244]

Multichannel fiber-based diffuse reflectance spectroscopy for the rat brain exposed to a laser-induced shock wave: comparison between ipsi- and contralateral hemispheres, Mai Miyaki, Tokyo Univ. of Agriculture and Technology (Japan); Satoko Kawauchi, Div. of Biomedical Information Sciences, National Defense Medical College Research Institute (Japan); Wataru Okuda, Tokyo Univ. of Agriculture and Technology (Japan); Hiroshi Nawashiro, Div. of Neurosurgery, Tokorozawa Central Hospital (Japan); Toshiya Takemura, Shunichi Sato, Div. of Biomedical Information Sciences, National Defense Medical College Research Institute (Japan); Izumi Nishidate, Tokyo Univ. of Agriculture and Technology (Japan) . . . . . [9305-245]

Optimized optical clearing method for imaging of central nervous system, Tingting Yu, Yisong Qi, Hui Gong, Qingming Luo, Dan Zhu, Britton Chance Ctr. for Biomedical Photonics (China) . . . . . [9305-246]

Activity analysis and characterization of tissue-engineered 3D neural networks, Erez Shor, Anat Marom, Technion-Israel Institute of Technology (Israel); Sanjeev K. Mahto, Technion-Israel Institute of Technology (Israel) and Indian Institute Of Technology(BHU) (India); Shulamit Levenberg, Shy Shoham, Technion-Israel Institute of Technology (Israel). . . . . [9305-247]

Simultaneous optical measurement of electrical activity on cortical surface and hemodynamic changes in subcortical area during deep brain stimulation, Hyuna Song, Sedef Erdogan, Young-kyu Kim, Beop-Min Kim, Jong J. Kim, Korea Univ. (Korea, Republic of). . . . . [9305-248]

Rapid 3D mapping of whole mouse brain in high resolution using SI-fMOST, Dongli Xu, Bihe Hu, Hui Gong, Qingming Luo, Britton Chance Ctr. for Biomedical Photonics, Huazhong Univ. of Science and Technology (China) . . . . . [9305-249]

System aberration correction in a light sheet microscope compatible with clearing solutions, M. Caroline Müllenbroich, European Lab. for Non-linear Spectroscopy (Italy) and Univ. degli Studi di Firenze (Italy); Ludovico Silvestri, European Lab. for Non-Linear Spectroscopy, Univ. degli Studi di Firenze (Italy); Leonardo Sacconi, European Lab. for Non-Linear Spectroscopy, Univ. degli Studi di Firenze (Italy) and National Institute of Optics (Italy); Francesco S. Pavone, European Lab. for Non-Linear Spectroscopy, Univ. degli Studi di Firenze (Italy) and National Institute of Optics (Italy) and International Ctr. for Computational Neurophotonics (Italy). . . . . [9305-250]

Optical coherence tomography for non-contact detection of action potentials in functionally stimulated Limulus nerve, M. Shahidul Islam, Thorlabs, Inc. (USA); Md. Rezuanul Haque, Christian M. Oh, Univ. of California, Riverside (USA); Yan Wang, Massachusetts General Hospital (USA); Md. Monirul Hasan, B. Hyle Park, Univ. of California, Riverside (USA). . . . . [9305-251]

The evaluation of cerebral autoregulation in patients with obstructive sleep apnea syndrome with near-infrared spectroscopy, Zhongxing Zhang, Marco Laures, Maja Schneider, Gordana Hügli, Ming Qi, Ramin Khatami, Clinic Barmelweid (Switzerland) . . . . . [9305-252]

Decreased optical attenuation detected during cerebral edema in vivo with optical coherence tomography, Carissa L. R. Rodriguez, Jenny I. Szu, Melissa M. Eberle, Mike S. Hsu, Devin K. Binder M.D., B. Hyle Park, Univ. of California, Riverside (USA) . . . . . [9305-253]

Spatially and temporally registered optical coherence tomography and fluorescence microscopy for enhanced detection of neural activity, Md. Rezuanul Haque, Univ. of California, Riverside (USA); M. Shahidul Islam, Thorlabs, Inc. (USA); Christian M. Oh, Michael C. Oliveira, Sang S. Lee, Michael E. Adams, B. Hyle Park, Univ. of California, Riverside (USA) . . . . . [9305-254]

Altered prefrontal connectivity in post-traumatic stress disorder: A functional near infrared spectroscopy study with graph theoretical analysis, Fenghua Tian, Alexa Smith-Osborne, Amarnath S. Yennu, Li Zeng, The Univ. of Texas at Arlington (USA); Carol S. North, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); Hanli Liu, The Univ. of Texas at Arlington (USA) . . . . . [9305-255]

Miniature device for chronic, label-free multi-modal optical imaging of cortical hemodynamics in rats, Raanan Gad, Iliya Sigal, Dene Ringuette, Univ. of Toronto (Canada); Margaret Koletar, Bojana Stefanovic, Sunnybrook Research Institute (Canada); Ofer Levi, Univ. of Toronto (Canada) . . . [9305-256]

Near-infrared spectroscopy assessment of divided visual attention task-invoked cerebral hemodynamics during prolonged true driving, Ting Li, Yue Zhao, Yunlong Sun, Yuan Gao, Yu Su, Univ. of Electronic Science and Technology of China (China) . . . . . [9305-258]

TUESDAY 10 FEBRUARY

SESSION 5

LOCATION: ROOM 310 (ESPLANADE) . . . . . TUE 8:00 AM TO 10:40 AM

High Resolution and Multimodal Imaging

Session Chair: **Shy Shoham,**
Technion-Israel Institute of Technology (Israel)

8:00 am: **Low frequency hemodynamic and calcium oscillations in brain reflect neuronal activity: evidence from optical imaging** *(Invited Paper)*, Congwu Du, Yingtain Pan, Stony Brook Univ. (USA) . . . . . [9305-218]

8:30 am: **Stroke in newborns: important but poor understood problem, new experimental model, priority for optical diagnostics, mechanisms** *(Invited Paper)*, Oxana V. Semyachkina-Glushkovskaya, Vladislav Lichagov, Olga A. Bibikova, Sergey S. Sindeev, Ekaterina Zinchenko, Artem Gekaluyk, Maria V. Ulanova, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Zhang Yang, Huazhong Univ. of Science and Technology, Wuhan National Lab. for Optoelectronics (China); Qin Huang, Huazhong Univ. of Science and Technology (China); Pengcheng Li, Huazhong Univ. of Science and Technology, Wuhan National Lab. for Optoelectronics (China); Dan Zhu, Huazhong Univ. of Science and Technology (China); Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Qingming Luo, Huazhong Univ. of Science and Technology, Wuhan National Lab. for Optoelectronics (China) . . . . . [9305-219]

9:00 am: **Tools for high resolution optical imaging of neuronal, glial, vascular, and metabolic activity for neuroscience studies in vivo** *(Invited Paper)*, Anna Devor, Univ. of California, San Diego (USA) . . . . . [9305-220]

9:30 am: **Non-invasive whole brain monitoring of multiple hemodynamic parameters and fast calcium dynamics using five-dimensional optoacoustic tomography** *(Invited Paper)*, Sven Gottschalk, Gali Sela, Antonella Lauri, Xosé Luis Deán-Ben, Helmholtz Zentrum München GmbH (Germany); Thomas Felix Fehm, Moritz Kneipp, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany); Shy Shoham, Technion-Israel Institute of Technology (Israel); Gil Gegor Westmeyer, Daniel Razansky, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany) . . . . . [9305-221]

10:00 am: **Simultaneous measurement of cerebral and muscle tissue parameters during cardiac arrest and cardiopulmonary resuscitation**, Vladislav Toronov, Ryerson Univ. (Canada); Andrew Ramadeen, Univ. of Toronto (Canada) . . . . . [9305-222]

10:20 am: **Dual-wavelength polarization-sensitive optical coherence tomography for dye contrast detection of neural activity**, Yi-Jou Yeh, Adam J. Black, Hui Wang, Univ. of Minnesota, Twin Cities (USA); David Landowne, Univ. of Miami (USA); Taner Akkin, Univ. of Minnesota, Twin Cities (USA) . . . . . [9305-223]

Coffee Break . . . . . Tue 10:40 am to 11:00 am

SESSION 6

LOCATION: ROOM 310 (ESPLANADE) . . . . . TUE 11:00 AM TO 12:20 PM

Novel Optical Methods for Studying Cortical Function

Session Chair: **Anna Wang Roe,** Vanderbilt Univ. (USA)

11:00 am: **Nanoparticle-assisted-multiphoton microscopy for in vivo brain imaging of mice**, Jun Qian, Zhejiang Univ. (China) . . . . . [9305-259]

11:20 am: **Biological imaging in the second near infrared window**, Hongjie Dai, Stanford Univ. (USA) . . . . . [9305-260]

11:40 am: **In-vivo photoacoustic imaging of 3D neural activity of rat brain**, Lun-De Liao, Nitish V. Thakor, Bin Liu, National Univ. of Singapore (Singapore) . . . . . [9305-261]

12:00 pm: **Serial opto-electrocorticography Investigating functional recovery in brain connectivity after rat cerebral infarction**, Hsin-Yi Lai, Chang Gung Memorial Hospital (Taiwan) and Chang Gung Univ. (Taiwan); Li-Wei Kuo, National Health Research Institutes (Taiwan); Ching-Rao Chang, Chao-Ting Wang, National Yang-Ming Univ. (Taiwan); Lun-De Liao, National Univ. of Singapore (Singapore); You-Yin Chen, National Yang-Ming Univ. (Taiwan) . . . . . [9305-262]

Lunch/Exhibition Break . . . . . Tue 12:20 pm to 2:00 pm

SESSION 7

LOCATION: ROOM 310 (ESPLANADE) . . . . . TUE 2:00 PM TO 3:00 PM

Neurophotonics Plenary Speaker

Session Chair: **Qingming Luo,**
Huazhong Univ. of Science and Technology (China)

PRESENTATION. . . . . 2:00 TO 2:45 PM

The neurexin enigma – from synapse formation to schizophrenia

Thomas C. Südhof
2013 Nobel Prize Winner

Stanford Univ. School of Medicine (USA)

Neurexins and their ligands are trans-synaptic cell-adhesion molecules that are essential for synapse function, and that shape the properties of synapses such as short- and long-term plasticity. Neurexins are presynaptic cell-adhesion molecules that are encoded by three extraordinarily large genes, each of which generates longer α- and shorter β-isoforms that are in turn diversified into thousands of alternatively spliced transcripts. Neurexins bind to multiple postsynaptic ligands, including neuroligins, LRRTMs, and the complex of cerebellins with GluRδ2. The various splice variants of neurexins and the various isoforms of their ligands exhibit strikingly different functional activities and binding affinities; their interactions are likely competitive, and contribute to determining the properties and nature of synapses. Accumulating evidence demonstrates that neurexins and their ligands perform central functions in the assembly and function of neural circuits, but their precise roles and mechanisms of action are only now beginning to emerge. Moreover, many different mutations in neurexin and their ligands have been associated with autism, schizophrenia and intellectual disability, suggesting that the functions of these molecules are relevant for insight into these devastating disorders. In my talk, I will describe our recent studies on how neurexins and their ligands shape synapse properties, and how dysfunction of neurexins and their ligands might predispose to neuropsychiatric disorders.

QUESTIONS AND DISCUSSION . . . . . TUE 2:45 TO 3:00 PM

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 8

LOCATION: ROOM 310 (ESPLANADE) . . . . . TUE 3:30 PM TO 5:10 PM

Visible Brain-Wide Networks

Session Chair: **Yu Chen,** Univ. of Maryland, College Park (USA)

3:30 pm: **Connectomics: from terabytes of pixels to intuitive brain networks**, Hong-Wei Dong, The Univ. of Southern California (USA) . . [9305-225]

3:50 pm: **Whole brain optical imaging** *(Invited Paper)*, Francesco S. Pavone, European Lab. for Non-linear Spectroscopy (Italy) . . . . . [9305-226]

4:20 pm: **Mapping functional corticostriatal and thalamostriatal excitatory synapses on striatal spiny projection neurons**, Jun Ding, Yu-Wei Wu, Stanford School of Medicine (USA). . . . . [9305-227]

4:40 pm: **Advances in visualizing a mouse brain-wide networks at single-neuron resolution** *(Invited Paper)*, Qingming Luo, Britton Chance Ctr. for Biomedical Photonics (China) . . . . . [9305-228]

CONFERENCE 9305C
LOCATION: ROOM 310 (ESPLANADE)

Saturday–Sunday 7–8 February 2015 • Part of Proceedings of SPIE Vol. 9305

Optogenetics and Optical Control of Cells

Conference Chairs: **Samarendra K. Mohanty,** The Univ. of Texas at Arlington (USA); **Nitish V. Thakor,** Johns Hopkins Univ. (USA)

Program Committee: **Antoine Adamantidis,** McGill Univ. (Canada); **George J. Augustine,** Duke-NUS Graduate Medical School (Singapore); **Klaus B. Gerwert,** Ruhr-Univ. Bochum (Germany); **Xue Han,** Boston Univ. (USA); **Elizabeth M. Hillman,** Columbia Univ. (USA); **Richard Kramer,** Univ. of California, Berkeley (USA); **Alfred L. Nuttall,** Oregon Health & Science Univ. (USA); **Anna W. Roe,** Vanderbilt Univ. (USA); **Ulrich T. Schwarz,** Fraunhofer IAF (Germany), IMTEK, Univ. of Freiburg {Germany); **John P. Welsh,** Univ. of Washington (USA); **Rafael Yuste M.D.,** Columbia Univ. (USA)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 310 (ESPLANADE) . . . . . .SAT 8:50 AM TO 12:00 PM

Optogenetics I

Session Chair: **Samarendra K. Mohanty,**
The Univ. of Texas at Arlington (USA)

8:50 am: **Implantable, wireless optoelectronic systems for optogenetics** *(Keynote Presentation)*, John A. Rogers, Univ. of Illinois at Urbana-Champaign (USA). . . . . [9305-300]

9:40 am: **Demonstration of a setup for chronic optogenetic stimulation and recording across cortical areas in non-human primates**, Azadeh Yazdan-Shahmorad, Camilo Diaz-Botia, Timothy Hanson, Univ. of California, San Francisco (USA); Peter Ledochowitsch, UCSF/UCB Joint Graduate Group in Bioengineering (USA); Michel M. Maharabiz, Univ. of California, Berkeley (USA); Philip N. Sabes, Univ. of California, San Francisco (USA) . . . . . [9305-301]

10:00 am: **Ultra-compact multi-channel implantable neural probes for deep brain opto-genetic stimulation**, Eran Segev, Trevor M. Fowler, Andrei Faraon, Michael L. Roukes, California Institute of Technology (USA) . . . . . [9305-302]

Coffee Break . . . . . .Sat 10:20 am to 10:50 am

10:50 am: **Automated laser tracking and optogenetic manipulation system for multiple freely moving Drosophila adults** *(Invited Paper)*, Yen-Yin Lin, Ming-Chin Wu, Po-Yen Hsiao, Li-An Chu, Chih-Wei Hsu, Chien-Chung Fu, Ann-Shyn Chiang, National Tsing Hua Univ. (Taiwan) . . . . . [9305-303]

11:20 am: **Laser-induced perturbation into molecular dynamics localized in neuronal cell**, Chie Hosokawa, National Institute of Advanced Industrial Science and Technology (Japan); Naoko Takeda, National Institute of Advanced Industrial Science and Technology (Japan) and Kwansei Gakuin Univ. (Japan); Suguru N. Kudoh, Kwansei Gakuin Univ. (Japan); Takahisa Taguchi, National Institute of Advanced Industrial Science and Technology (Japan) . . . . [9305-304]

11:40 am: **Micro-machined optical fibers for spatial-selective optogenetic control of neural activity in vivo**, Ferruccio Pisanello, Leonardo Sileo, Istituto Italiano di Tecnologia (Italy); Ian A. Oldenburg, Harvard Medical School (USA) and Howard Hughes Medical Institute (USA); Marco Pisanello, Istituto Italiano di Tecnologia (Italy) and Univ. del Salento (Italy); John A. Assad, Harvard Medical School (USA); Bernardo L. Sabatini, Harvard Medical School (USA) and Howard Hughes Medical Institute (USA); Massimo De Vittorio, Istituto Italiano di Tecnologia (Italy) and Univ. del Salento (Italy). . . . . [9305-305]

Lunch/Exhibition Break . . . . . .Sat 12:00 pm to 1:30 pm

SESSION 2

LOCATION: ROOM 310 (ESPLANADE) . . . . . SAT 1:30 PM TO 5:00 PM

Optogenetics II

Session Chair: **Samarendra K. Mohanty,**
The Univ. of Texas at Arlington (USA)

1:30 pm: **Optical tools for mapping and engineering the brain** *(Keynote Presentation)*, Edward S. Boyden, MIT Media Lab. (USA)[9305-307]

2:20 pm: **In vivo all-optical interrogation of neurons in mice using optogenetics and calcium imaging with two-photon fluorescence microscopy**, James R. Mester, Sunnybrook Research Institute (Canada) and Univ. of Toronto (Canada); Margaret Koletar, Sunnybrook Research Institute (Canada); John G. Sled, Univ. of Toronto (Canada) and Toronto Ctr. for Phenogenomics (Canada); Bojana Stefanovic, Sunnybrook Research Institute (Canada) and Univ. of Toronto (Canada). . . . . [9305-308]

2:40 pm: **Near-infrared (NIR) optogenetics using up-conversion system**, Shoko Hososhima, Graduate School of Life Sciences, Tohoku Univ. (Japan) and JST, CREST (Japan) and Research Fellow of Japan Society for the Promotion of Science (Japan); Hideya Yuasa, Graduate School of Bioscience and Biotechnology, Tokyo Institute of Technology (Japan); Toru Ishizuka, Hiromu Yawo, Graduate School of Life Sciences, Tohoku Univ. (Japan) and JST, CREST (Japan). . . . . [9305-309]

Coffee Break . . . . . .Sat 3:00 pm to 3:30 pm

3:30 pm: **Normalization through local excitation and inhibition in macaque primary visual cortex** *(Invited Paper)*, Jonathan J. Nassi, The Salk Institute for Biological Studies (USA) . . . . . [9305-310]

4:00 pm: **Bringing the light to high throughput screening: use of optogenetics tools for the development of recombinant cellular assays**, Viviana Agus, A. Di Silvio, J.F. Rolland, S. Tremolada, K. Montag, Lia Scarabottolo, L. Radaelli, S. Lohmer, AXXAM S.p.A. (Italy) . . . . . [9305-311]

4:20 pm: **Photonic crystal fiber supercontinuum sources for optogenetics**, Eugene D. Ark, Univ. of Illinois at Urbana-Champaign (USA); Kush Paul, Haohua Tu, Youbo Zhao, Beckman Institute for Advanced Science and Technology (USA); Stephen A. Boppart, Beckman Institute for Advanced Science and Technology (USA) and Univ. of Illinois at Urbana-Champaign (USA) . . [9305-312]

4:40 pm: **Optically controlled delivery of actin-staining molecules and opsin-encoding plasmids into mammalian cells**, Kamal Dhakal, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA). . . . . [9305-313]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 3

LOCATION: ROOM 310 (ESPLANADE) . . . . . SUN 8:30 AM TO 12:00 PM

Optogenetics III

Session Chair: **George J. Augustine,**
Lee Kong Chian Medical School (Singapore)

8:30 am: **Engineering proteins for visualization and control of signaling networks in vivo** *(Keynote Presentation)*, Klaus Hahn, The Univ. of North Carolina at Chapel Hill (USA) . . . . . [9305-314]

9:20 am: **Broad spectral excitation of ReaChR-sensitized cells**, Subrata Batabyal, Sarmishtha Satpathy, Kamal Dhakal, Young-tae Kim, The Univ. of Texas at Arlington (USA); John Y. Lin, Univ. of California, San Diego (USA); Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) . . . . . [9305-315]

9:40 am: **Spatio-angular light control in microscopes using micro mirror arrays**, Florian Rückerl, Institut Pasteur, Imagopole, Plateforme d'Imagerie Dynamique (PFID) (France); Jörg Heber, Dirk Berndt, Michael Wagner, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Spencer L. Shorte, Institut Pasteur, Imagopole, Plateforme d'Imagerie Dynamique (PFID) (France) . . . . . [9305-316]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

10:30 am: **Using optogenetics to map the spatial organization of local circuits** *(Invited Paper)*, George J. Augustine, Duke-NUS Graduate Medical School (Singapore) . . . . . [9305-317]

11:00 am: **Highly compact MEMS-based optrodes with integrated light sources** *(Invited Paper)*, Patrick Ruther, Michael Schwaerzle, Christian Gossler, Ulrich T. Schwarz, Oliver Paul, Univ. of Freiburg (Germany). . . . . [9305-318]

11:20 am: **Metal coated chemically etched fiber probe for single cell culture**, Kozo Taguchi, Ritsumeikan Univ. (Japan). . . . . [9305-319]

11:40 am: **Polarimetric detection of cellular activation by optogenetic excitation**, Sarmishtha Satpathy, Subrata Batabyal, Young-tae Kim, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) . . . . . [9305-320]

Lunch/Exhibition Break . . . . . Sun 12:00 pm to 1:30 pm

SESSION 4

LOCATION: ROOM 310 (ESPLANADE) . . . . . .SUN 1:30 PM TO 4:40 PM

Optogenetics IV

Session Chair: **George J. Augustine,**
Lee Kong Chian Medical School (Singapore)

1:30 pm: **Playing the piano with neural circuits: simultaneous 3D all-optical imaging and activation of neurons in vivo** *(Keynote Presentation)*, Rafael Yuste M.D., Columbia Univ. (USA) . . . . . [9305-321]

2:20 pm: **Optical control of protein activity by fluorescent protein domains**, Xin Zhou, Stanford Univ. (USA); Linlin Fan, Harvard Univ. (USA); Hokyung Chung, Mariya Chavarha, Amy Lam, Michael Lin, Stanford Univ. (USA) . . . . . [9305-322]

2:40 pm: **Multi-opsin construct for effective stimulation of cells by broad-band light**, Gregory M. Cervenka, Subrata Batabyal, Kamal Dhakal, Young-tae Kim, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) . [9305-323]

Coffee Break . . . . . Sun 3:00 pm to 3:30 pm

3:30 pm: **Distributed optogenetic interfacing with retinas, optonets and brains: photonics and potential applications** *(Invited Paper)*, Shy Shoham, Technion-Israel Institute of Technology (Israel). . . . . [9305-324]

3:50 pm: **All-optical control of construction, manipulation, modulation and detection of neural circuit and activities**, Samarendra K. Mohanty, The Univ. of Texas at Arlington (USA) . . . . . [9305-325]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their ground-breaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9306
LOCATION: ROOM 234 (MEZZANINE)

Sunday 8 February 2015 • Proceedings of SPIE Vol. 9306

Lasers in Dentistry XXI

Conference Chairs: **Peter Rechmann,** Univ. of California, San Francisco (USA); **Daniel Fried,** Univ. of California, San Francisco (USA)

Program Committee: **Gregory B. Altshuler,** Palomar Medical Technologies, Inc. (USA); **Tatjána Dostálová M.D.,** Charles Univ. in Prague (Czech Republic); **John D. Featherstone,** Univ. of California, San Francisco (USA); **David M. Harris,** Bio-Medical Consultants, Inc. (USA); **Harvey A. Wigdor D.D.S.,** Advocate Illinois Masonic Medical Ctr. (USA)

SUNDAY 8 FEBRUARY

SESSION 1

LOCATION: ROOM 234 (MEZZANINE) . . . . . SUN 8:30 AM TO 10:10 AM

Lasers in Periodontology, Soft Tissue and Ablation

Session Chair: **Daniel Fried,** Univ. of California, San Francisco (USA)

8:30 am: **Evaluation of three different laser modalities for periodontal therapy**, Neha Yadav, Arundeep K. Lamba, Farrukh Faraz, Shruti Tandon, Maulana Azad Institute of Dental Sciences (India) . . . . . [9306-1]

8:50 am: **Short pulse mid-infrared radiation removal of tooth tissue**, Tatjána Dostálová M.D., Charles Univ. in Prague (Czech Republic); Helena Jelínková, Jan Sulc, Michal Nemec, Czech Technical Univ. in Prague (Czech Republic) . . . . . [9306-2]

9:10 am: **Investigations of the damage mechanisms during ultrashort pulse laser ablation of dental tissue**, Matthias Domke, FH Vorarlberg (Austria); Sebastian Wick, Hochschule für Angewandte Wissenschaften München (Germany); Maike Wahler, LIFE-Zentrum, Klinikum der Univ. München (Germany); Stephan Rapp, Hochschule für Angewandte Wissenschaften München (Germany); Julia Kuznetsova, Christian Homann, LIFE-Zentrum, Klinikum der Univ. München (Germany); Heinz P. Huber, Munich Univ. of Applied Sciences (Germany); Ronald Sroka, LIFE-Zentrum, Klinikum der Univ. München (Germany) . . . . . [9306-3]

9:30 am: **Investigations on the potential of a low power diode pumped Er:YAG laser system for oral surgery**, Karl Stock, Florian Hausladen, Raimund Hibst, Univ. Ulm (Germany) . . . . . [9306-4]

9:50 am: **810 nm, 980 nm, 1470 nm and 1950 nm diode laser comparison: a preliminary ex vivo study on oral soft tissues**, Carlo Fornaini M.D., Elisabetta Merigo, Michele Sozzi, Annamaria Cucinotta, Paolo Vescovi, Stefano Selleri, Univ. degli Studi di Parma (Italy) . . . . . [9306-5]

Coffee Break . . . . . Sun 10:10 am to 10:40 am

SESSION 2

LOCATION: ROOM 234 (MEZZANINE) . . . . . SUN 10:40 AM TO 12:00 PM

Lasers in Prosthodontics, Composites and PDT

Session Chair: **Daniel Fried,** Univ. of California, San Francisco (USA)

10:40 am: **A novel laser-based method for controlled crystallization in dental prosthesis materials**, Peter Cam, Beat Neuenschwander, Patrick Schwaller, Benjamin Köhli, Berner Fachhochschule Technik und Informatik (Switzerland); Beat Lüscher, Florian Senn, Fachhochschule NordWestschweiz (Switzerland); Alain Kounga, Christoph Appert, Institut Straumann AG (Switzerland) . . . . . [9306-6]

11:00 am: **Dental composite polymerization: a three different sources comparison**, Michele Sozzi, Carlo Fornaini M.D., Giuseppe Lagori, Elisabetta Merigo, Annamaria Cucinotta, Paolo Vescovi, Stefano Selleri, Univ. degli Studi di Parma (Italy). . . . . [9306-7]

11:20 am: **All-ceramic crown removal with an Er:YAG laser: a proof-of-principle laboratory study**, Peter Rechmann, Natalie C. H. Buu, Beate M. T. Rechmann, Frederick C. Finzen, Univ. of California, San Francisco (USA) . . . . . [9306-8]

11:40 am: **Photodynamic therapy: a synergy between light and colors**, Elisabetta Merigo, Michele Sozzi, Tecla Ciociola, Stefania Conti, Carlo Fornaini M.D., Stefano Selleri, Paolo Vescovi, Annamaria Cucinotta, Univ. degli Studi di Parma (Italy). . . . . [9306-9]

Lunch/Exhibition Break . . . . . Sun 12:00 pm to 2:00 pm

SESSION 3

LOCATION: ROOM 234 (MEZZANINE) . . . . . SUN 2:00 PM TO 3:20 PM

Lasers in Imaging

Session Chair: **Peter Rechmann,** Univ. of California, San Francisco (USA)

2:00 pm: **Chromatic dispersive confocal technology for intra-oral scanning: first in-vitro results**, Thomas P. Ertl, Dentsply intl. (Germany); Michael Zint, Annelene Konz, Institut für Lasertechnologien in der Medizin und Messtechnik (Germany); Edgar Brauer, Institut für Lasertechnologien in der Medizin und Messtechnik (Germany); Heiner Hörhold, Degudent GmbH (Germany); Raimund Hibst, Institut für Lasertechnologien in der Medizin und Messtechnik (Germany) . . . . . [9306-10]

2:20 pm: **Real time imaging of in vivo caries and gingivitis**, Mari-Alina I. Timoshchuk, Amanda Sams, Jeremy S. Ridge, Leonard Y. Nelson, Eric J. Seibel, Univ. of Washington (USA) . . . . . [9306-11]

2:40 pm: **Analysis of eroded bovine teeth through laser speckle imaging**, Nelson H. Koshoji, Sandra K. Bussadori, Carolina C. Bortoletto, Marcelo T. Oliveira, Renato A. Prates, Alessandro M. Deana, UNINOVE (Brazil) . . . [9306-12]

3:00 pm: **All-optical photoacoustic imaging and detection of early-stage dental caries**, Ashwin Sampathkumar, Riverside Research Institute (USA); David A. Hughes, Univ. of the West of Scotland (United Kingdom); Chris Longbottom, Dental innovation and Translational Ctr., King's College London (United Kingdom); Katherine Kirk, Univ. of the West of Scotland (United Kingdom) . . . . . [9306-13]

Coffee Break . . . . . Sun 3:20 pm to 3:50 pm

SESSION 4

LOCATION: ROOM 234 (MEZZANINE) . . . . . SUN 3:50 PM TO 4:50 PM

Lasers in Diagnostics and Image Guiding

Session Chair: **Peter Rechmann,** Univ. of California, San Francisco (USA)

3:50 pm: **In-vitro near-infrared imaging of natural secondary caries**, Jacob Simon, Michal Staninec, Seth Lucas, Cynthia L. Darling, Robert Lee, Roger Pelzner, Grant Tsuji, Daniel Fried, Univ. of California, San Francisco (USA) . . . . . [9306-14]

4:10 pm: **Assessing near-IR reflectance image-guided removal of natural occlusal caries lesions using PS-OCT**, Kenneth H. Chan, Henry Tom, Cynthia L. Darling, Daniel Fried, Univ. of California, San Francisco (USA) . . . . . [9306-15]

4:30 pm: **Assessment of the remineralization of artificial lesions via dehydration with near-IR reflectance imaging**, Robert Lee, Cynthia L. Darling, Daniel Fried, Univ. of California, San Francisco (USA) . . . . . [9306-16]

POSTERS-SUNDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Observation of the pulp horn by swept source optical coherence tomography and cone beam computed tomography, Yoshiko Iino D.D.S., Toshihiko Yoshioka D.D.S., Takahiro Hanada D.D.S., Arata Ebihara D.D.S., Tokyo Medical and Dental Univ. (Japan); Mitsuhiro Sunakawa D.D.S., Tokyo Medical and Dental Univ. (Japan); Yasunori Sumi D.D.S., National Ctr. for Geriatrics and Gerontology (Japan); Hideaki Suda, Tokyo Medical and Dental Univ. (Japan) . . . . . [9306-17]

Apices of maxillary premolars observed by swept source optical coherence tomography, Arata Ebihara D.D.S., Yoshiko Iino D.D.S., Toshihiko Yoshioka D.D.S., Takahiro Hanada D.D.S., Mitsuhiro Sunakawa D.D.S., Tokyo Medical and Dental Univ. (Japan); Yasunori Sumi D.D.S., National Ctr. for Geriatrics and Gerontology (Japan); Hideaki Suda D.D.S., Tokyo Medical and Dental Univ. (Japan). . . . . [9306-18]

Photowhitening of human dentine under 405nm irradiation, Natalia I. Kazadaeva, Leonid E. Dolotov, Alexander B. Pravdin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Gregory B. Altshuler, Ilya V. Yaroslavsky, Cynosure, Inc. (USA); Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) . . . . . [9306-19]

Biostimulation effect of low level laser on healing proces after third molars surgery based on biochemical markers in saliva, Veronika Kroulikova, Tatjána Dostálová M.D., Petra Hlinakova, Stepan Podzimek, Charles Univ. in Prague (Czech Republic). . . . . [9306-20]

Selective removal of demineralized enamel using a CO_2 laser coupled with near-IR reflectance imaging, Henry Tom, Kenneth H. Chan, Cynthia L. Darling, Daniel Fried, Univ. of California, San Francisco (USA) . . . . . [9306-21]

Use of near-IR transillumination for guiding the selective removal of occlusal caries lesions with a 9.3-µm CO2 laser, Leon Chung, Henry Tom, Kenneth H. Chan, Jacob Simon, Robert Lee, Daniel Fried, Cynthia L. Darling, Univ. of California, San Francisco (USA). . . . . [9306-22]

Selective removal of dental caries with a diode-pumped Er:YAG laser operating at high pulse repetition rates, Jingru Yan, Kenneth H. Chan, Henry Tom, Jacob Simon, Cynthia L. Darling, Daniel Fried, Univ. of California, San Francisco (USA) . . . . . [9306-23]

Automated detection of dentinal lesions in optical coherence tomography, Hobin J. Kang, Univ. of the Pacific (USA); Cynthia L. Darling, Daniel Fried, Univ. of California, San Francisco (USA) . . . . . [9306-24]

Selective photothermolysis of periodontal pathogens, David M. Harris, Bio-Medical Consultants, Inc. (USA); Lou Reinisch, Farmingdale State College (USA); Steven L. Jacques, Oregon Health & Science Univ. (USA); Richard P. Darveau, Univ. of Washington (USA). . . . . [9306-25]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their ground-breaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9307
LOCATION: ROOM 305 (ESPLANADE)

Saturday–Sunday 7–8 February 2015 • Proceedings of SPIE Vol. 9307

Ophthalmic Technologies XXV

Conference Chairs: **Fabrice Manns,** Univ. of Miami (USA); **Per G. Söderberg,** Uppsala Univ. (Sweden); **Arthur Ho,** Brien Holden Vision Institute (Australia)

Program Committee: **Rafat R. Ansari,** NASA Glenn Research Ctr. (USA); **Michael Belkin,** Tel Aviv Univ. (Israel); **Kostadinka Bizheva,** Univ. of Waterloo (Canada); **David Borja,** Alcon Labs., Inc. (USA); **Ralf Brinkmann,** Univ. zu Lübeck (Germany); **Wolfgang Drexler,** Medizinische Univ. Wien (Austria); **Daniel X. Hammer,** U.S. Food and Drug Administration (USA); **Karen M. Joos,** Vanderbilt Univ. (USA); **Kirill V. Larin,** Univ. of Houston (USA); **Ezra Maguen,** American Eye Institute (USA); **Donald T. Miller,** Indiana Univ. (USA); **Daniel V. Palanker,** Stanford Univ. (USA); **Jean-Marie Parel,** Bascom Palmer Eye Institute (USA); **Roberto Pini,** Istituto di Fisica Applicata Nello Carrara (Italy); **Luigi Rovati,** Univ. degli Studi di Modena e Reggio Emilia (Italy); **Georg Schuele,** OptiMedica Corp. (USA); **Jerry Sebag,** VMR Institute (USA); **Peter Soliz,** VisionQuest Biomedical, LLC (USA); **Valery V. Tuchin,** N.G. Chernyshevsky Saratov State Univ. (Russian Federation)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 305 (ESPLANADE) . . . . . SAT 8:30 AM TO 9:30 AM

Ophthalmic Imaging: Image Processing and Analysis

Session Chairs: **Peter Soliz,** VisionQuest Biomedical, LLC (USA); **Kostadinka Bizheva,** Univ. of Waterloo (Canada)

8:30 am: **OCT angiography-based graphing protocol for imaging and characterization of the rat inner retinal vascular network**, Conor Leahy, Harsha Radhakrishnan, Vivek J. Srinivasan, Univ. of California, Davis (USA) . . . . . [9307-1]

8:45 am: **High-resolution retinal imaging: enhancement techniques**, Mircea Mujat, Ankit H. Patel, Nicusor V. Iftimia, Physical Sciences Inc. (USA); James D. Akula, Anne B. Fulton M.D., Boston Children's Hospital (USA) and Harvard Medical School (USA); R. Daniel Ferguson, Physical Sciences Inc. (USA) . . . . . [9307-2]

9:00 am: **Automatic segmentation of fluid and retinal layers on OCT images with severe diabetic macular edema using kernel regression-based classification**, Stephanie J. Chiu, Michael J. Allingham, Priyatham S. Mettu, Scott W. Cousins, Joseph A. Izatt, Sina Farsiu, Duke Univ. (USA) . . . . . [9307-3]

9:15 am: **Fully automated detection of retinal diseases from optical coherence tomography images**, Pratul P. Srinivasan, Duke Univ. (USA); Leo A. Kim, Schepens Eye Research Institute (USA) and Harvard Univ. (USA); Priyatham S. Mettu, Scott W. Cousins, Duke Univ. (USA); Grant M. Comer, Kellogg Eye Ctr., Univ. of Michigan (USA); Joseph A. Izatt, Duke Univ. (USA) and Duke Univ. Medical Ctr. (USA); Sina Farsiu, Duke Univ. Medical Ctr. (USA) and Duke Univ. (USA) . . . . . [9307-4]

SESSION 2

LOCATION: ROOM 305 (ESPLANADE) . . . . . SAT 9:30 AM TO 11:30 AM

Ophthalmic Surgery: Intraoperative Imaging and Monitoring

Session Chairs: **Wolfgang Drexler,** Medizinische Univ. Wien (Austria); **Karen M. Joos M.D.,** Vanderbilt Univ. (USA)

9:30 am: **Novel microscope-integrated stereoscopic display for intrasurgical optical coherence tomography**, Liangbo Shen, Oscar Carrasco-Zevallos, Brenton Keller, Christian Viehland, Gar Waterman, Duke Univ. (USA); Philip Desouza, Paul Hahn M.D., Anthony N. Kuo M.D., Duke Univ. Medical Ctr. (USA); Cynthia A. Toth M.D., Duke Univ. Medical Ctr. (USA) and Duke Univ. (USA); Joseph A. Izatt, Duke Univ. (USA) and Duke Univ. Medical Ctr. (USA) . . . . . [9307-5]

9:45 am: **Automated real-time instrument tracking for microscope-integrated intraoperative OCT imaging of ophthalmic surgical maneuvers**, Mohamed T. El-Haddad, Justis P. Ehlers, Sunil K. Srivastava, Yuankai K. Tao, The Cleveland Clinic (USA) . . . . . [9307-6]

10:00 am: **Image-guided modified deep anterior lamellar keratoplasty (DALK) corneal transplant using intraoperative optical coherence tomography**, Yuankai K. Tao, William J. Dupps Jr., Sunil K. Srivastava, Justis P. Ehlers, The Cleveland Clinic (USA) . . . . . [9307-7]

Coffee Break . . . . . .Sat 10:15 am to 10:45 am

10:45 am: **Swept-source microscope integrated optical coherence tomography for real-time 3D imaging of ophthalmic human surgery**, Oscar Carrasco-Zevallos, Brenton Keller, Christian Viehland, Liangbo Shen, Gar Waterman, Philip Desouza, Paul Hahn M.D., Anthony N. Kuo M.D., Cynthia A. Toth M.D., Joseph A. Izatt, Duke Univ. (USA) . . . . . [9307-8]

11:00 am: **Design and evaluation of an intraocular B-scan OCT-guided 36-gauge needle tip**, Jin H. Shen, Karen M. Joos M.D., Vanderbilt Univ. (USA) . . . . . [9307-9]

11:15 am: **Power-controlled temperature guided retinal photocoagulation**, Alexander Baade, Wadim Schwarzer, Medizinisches Laserzentrum Lübeck GmbH (Germany); Stefan Koinzer, Univ. Schleswig-Holstein (Germany); Kerstin Schlott, Medizinisches Laserzentrum Lübeck GmbH (Germany); Ralf Brinkmann, Medizinisches Laserzentrum Lübeck GmbH (Germany) and Institute of Biomedical Optics, Lübeck (Germany) . . . . . [9307-10]

PASCAL ROL LECTURE

LOCATION: ROOM 305 (ESPLANADE) . . . . .SAT 11:30 AM TO 12:15 PM

Session Chair: **Per G. Söderberg,** Uppsala Univ. (Sweden)

11:30 am: **Implementation of fs cataract surgery in the clinic, needs for further technology?** *(Keynote Presentation)*, Nagy Zoltán, Semmelweis Univ. (Hungary) . . . . . [9307-11]

Lunch/Exhibition Break . . . . . .Sat 12:15 pm to 1:45 pm

SESSION 3

LOCATION: ROOM 305 (ESPLANADE) . . . . . SAT 1:45 PM TO 3:15 PM

Ophthalmic Imaging: Small Animal Models

Session Chairs: **Daniel X. Hammer,** U.S. Food and Drug Administration (USA); **Per G. Söderberg,** Uppsala Univ. (Sweden)

1:45 pm: **Model-based solution for remotely scanned in-vivo mouse retinal imaging**, Adi Schejter, Technion-Israel Institute of Technology (Israel); Nairouz Farah, Technion-Israel Institute of Technology (Israel) and Bar-Ilan Univ. (Israel); Shy Shoham, Technion-Israel Institute of Technology (Israel) . . . . . [9307-12]

2:00 pm: **Morphological and functional changes in the rat retina measured with a combined OCT+ERG system during acute ocular pressure elevation**, Bingyao Tan, Akshay Gurdita, Kirsten Carter, Vivian Choh, Univ. of Waterloo (Canada); Karen M. Joos M.D., Vanderbilt Univ. (USA); Kostadinka Bizheva, Univ. of Waterloo (Canada) . . . . . [9307-13]

2:15 pm: **In vivo functional optical coherence tomography of fast intrinsic optical signals in frog retina**, Qiuxiang Zhang, Rongwen Lu, Benquan Wang, Xincheng Yao, The Univ. of Alabama at Birmingham (USA) . . . . . [9307-14]

2:30 pm: **Reflective afocal adaptive optics scanning laser opthalmoscope for high resolution in vivo mouse retinal imaging: visualization of retinal micro-vasculature**, Robert J. Zawadzki, Pengfei Zhang, Azhar Zam, Ravi S. Jonnal, Sang Hyuck Lee, Univ. of California, Davis (USA); Dae Yu Kim, Beckman Laser Institute-Korea (Korea, Republic of) and Dankook Univ. (Korea, Republic of); John S. Werner, Edward N. Pugh Jr., Univ. of California, Davis (USA) . . . . . [9307-15]

2:45 pm: **Multispectral scanning laser ophthalmoscopy combined with optical coherence tomography for simultaneous in vivo mouse retinal imaging**, Pengfei Zhang, Azhar Zam, Univ. of California, Davis (USA); Yifan Jian, Simon Fraser Univ. (Canada); Xinlei O. Wang, Marie E. Burns, Univ. of California, Davis (USA); Marinko V. Sarunic, Simon Fraser Univ. (Canada); Edward N. Pugh Jr., Robert J. Zawadzki, Univ. of California, Davis (USA) . . . . . [9307-16]

3:00 pm: **In vivo tracking of microglial turnover and vascular integrity in a mouse model of bone marrow transplantation with a multi-color scanning laser ophthalmoscope**, Clemens Alt, Judith M. Runnels, Luke J. Mortensen, Walid Zaher, Charles P. Lin, Wellman Ctr. for Photomedicine (USA) . . . [9307-17]

Coffee Break . . . . . .Sat 3:15 pm to 3:45 pm

SESSION 4

LOCATION: ROOM 305 (ESPLANADE) . . . . . SAT 3:45 PM TO 5:30 PM

Ophthalmic Diagnostics: Polarization

Session Chair: **Donald T. Miller,** Indiana Univ. (USA)

3:45 pm: **Investigation of corneal collagen crosslinking using polarization-sensitive optical coherence tomography**, Myeong Jin Ju, Shuo Tang, The Univ. of British Columbia (Canada) . . . . . [9307-18]

4:00 pm: **Evaluation of filtering blebs using polarization-sensitive optical coherence tomography**, Masahiro Yamanari, Tomey Corp. (Japan); Satoru Tsuda, Tohoku Univ. School of Medicine (Japan); Taiki Kokubun, Tohoku Univ. School of Medicine (Japan) and Iwaki Kyoritsu Hospital (Japan); Yuji Tanaka, Yukihiro Shiga, Yu Yokoyama, Morin Ryu, Shiho Kunimatsu-Sanuki, Hidetoshi Takahashi, Kazuichi Maruyama, Hiroshi Kunikata, Toru Nakazawa, Tohoku Univ. School of Medicine (Japan). . . . . [9307-19]

4:15 pm: **Non-invasive birefringence imaging of anterior eye by PS-OCT: application for glaucoma filtration surgery evaluation**, Deepa K. Kasaragod, Shinichi Fukuda, Sujin Hoshi, Tetsuro Oshika, Yoshiaki Yasuno, Univ. of Tsukuba (Japan) . . . . . [9307-20]

4:30 pm: **Analysis of retardation and birefringence along retinal nerve fiber bundles by polarization sensitive OCT**, Mitsuro Sugita, Medizinische Univ. Wien (Austria) and Canon Inc. (Japan); Stefan Zotter, Michael Pircher, Bernhard Baumann, Clemens Vass M.D., Christoph K. Hitzenberger, Medizinische Univ. Wien (Austria) . . . . . [9307-21]

4:45 pm: **Polarimetric imaging of retinal disease by polarization sensitive SLO**, Masahiro Miura, Tokyo Medical Univ. Ibaraki Medical Ctr. (Japan) and Tokyo Medical Univ. (Japan); Ann E. Elsner, School of Optometry, Indiana Univ. (USA); Takuya Iwasaki, Tokyo Medical Univ. Ibaraki Medical Ctr. (Japan); Hiroshi Goto, Tokyo Medical Univ. (Japan). . . . . [9307-22]

5:00 pm: **Fiber-based Jones-matrix polarization-sensitive OCT of the human retina**, Boy Braaf, Vrije Univ. Amsterdam (Netherlands) and Rotterdam Ophthalmic Institute (Netherlands); Koenraad A. Vermeer, Rotterdam Ophthalmic Institute (Netherlands); Mattijs de Groot, Vrije Univ. Amsterdam (Netherlands) and Rotterdam Ophthalmic Institute (Netherlands); Kari V. Vienola, Rotterdam Ophthalmic Institute (Netherlands); Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands) and Rotterdam Ophthalmic Institute (Netherlands). . . . . [9307-23]

5:15 pm: **Local birefringence imaging of posterior eye by multi-functional Jones matrix optical coherence tomography**, Satoshi Sugiyama, Univ. of Tsukuba (Japan) and Tomey Corp. (Japan); Young-Joo Hong, Deepa K. Kasaragod, Shuichi Makita, Univ. of Tsukuba (Japan); Masahiro Miura, Tokyo Medical Univ. (Japan); Yasushi Ikuno M.D., Osaka Univ. (Japan); Yoshiaki Yasuno, Univ. of Tsukuba (Japan). . . . . [9307-24]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 5

LOCATION: ROOM 305 (ESPLANADE) . . . . . SUN 8:00 AM TO 9:00 AM

Vision: Assessment, Correction, Restoration

Session Chairs: **David Borja,** Alcon Labs., Inc. (USA); **Rafat R. Ansari,** NASA Glenn Research Ctr. (USA)

8:00 am: **The first prototype of chromatic pupillometer for objective perimetry in retinal degeneration patients**, Ygal Rotenstreich, Ron Chibel, Sheba Medical Ctr. (Israel) and Tel Aviv Univ. (Israel); Soad Haj Yahia, Sheba Medical Ctr. (Israel); Mohamad Mahajna, Sheba Medical Ctr. (Israel) and Tel Aviv Univ. (Israel); Anat Achiron M.D., Wolfson Medical Ctr. (Israel); Michael Belkin, Ifat Sher, Sheba Medical Ctr. (Israel) and Tel Aviv Univ. (Israel) . . . . . [9307-25]

8:15 am: **Fast optical measurement of intraocular straylight**, Harilaos Ginis, Univ. de Murcia (Spain); Onurcan Sahin, Institute of Vision & Optics, Univ. of Crete (Greece); Pablo Artal, Univ. de Murcia (Spain) . . . . . [9307-26]

8:30 am: **Clinical trials of interference-based extended depth of focus intra ocular lens design**, Zeev Zalevsky, Bar-Ilan Univ. (Israel); Ido Raveh, Ofer Limon, Shai Ben Yaish, Karen Lahav-Yacouel, Ravid Doron, Alex Zlotnik, Xceed Imaging Ltd. (Israel). . . . . [9307-27]

8:45 am: **Photovoltaic restoration of sight with high visual acuity in rats with retinal degeneration**, Daniel V. Palanker, Georges Goetz, Henri Lorach, Stanford Univ. (USA); Yossi Mandel M.D., Bar-Ilan Univ. (Israel); Richard Smith, Univ. of California, Santa Cruz (USA); David Boinagrov, Xin Lei, Theodore I. Kamins, James S. Harris Jr., Stanford Univ. (USA); Alexander Sher, Univ. of California, Santa Cruz (USA); Keith Mathieson, Univ. of Strathclyde (United Kingdom). . . . . [9307-28]

SESSION 6

LOCATION: ROOM 305 (ESPLANADE) . . . . . SUN 9:00 AM TO 10:15 AM

Retinal and Choroidal Angiography and Blood Flow

Session Chairs: **Ralf Brinkmann,** Medizinisches Laserzentrum Lübeck GmbH (Germany); **Georg Schuele,** Abbott Medical Optics (USA)

9:00 am: **Confidence weighted retinal flow visualization in Doppler optical coherence tomography**, Maximilian G. Graefe, Leah S. Wilk, Vrije Univ. Amsterdam (Netherlands) and Rotterdam Ophthalmic Institute (Netherlands); Boy Braaf, Vrije Univ. Amsterdam (Netherlands); Jan H. de Jong, Rotterdam Ophthalmic Institute (Netherlands); Jelena Novosel, Rotterdam Ophthalmic Institute (Netherlands) and Technische Univ. Delft (Netherlands); Koenraad A. Vermeer, Rotterdam Ophthalmic Institute (Netherlands); Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands). . . . . [9307-29]

9:15 am: **Evaluation of the effect of acutely elevated IOP on retinal capillary bed and total retinal blood flow**, Zhongwei Zhi, Univ. of Washington (USA); William Cepurna, John C. Morrison, Elaine Johnson, Casey Eye Institute (USA); Ruikang K. Wang, Univ. of Washington (USA) . . . . . [9307-30]

9:30 am: **Ultrahigh speed swept source OCT angiography for in vivo imaging of retinal and choriocapillaris vasculature in patients with diabetes mellitus**, Eric M. Moult, WooJhon Choi, Massachusetts Institute of Technology (USA); Mehreen Adhi M.D., Nadia K. Waheed, Tufts Medical Ctr. (USA) and New England Eye Ctr. (USA); Vijaysekhar Jayaraman, Praevium Research, Inc. (USA); ByungKun Lee, Massachusetts Institute of Technology (USA); Benjamin M. Potsaid, Thorlabs, Inc. (USA); Talisa De Carlo, Tufts Medical Ctr. (USA) and New England Eye Ctr. (USA); Alex E. Cable, Thorlabs, Inc. (USA); Jay S. Duker, New England Eye Ctr. (USA) and Tufts Medical Ctr. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA) . . . . . [9307-31]

9:45 am: **Dual beam wide field OCT angiography at 400 kHz using angular compounding**, Laurin Ginner, Cedric Blatter, Daniel Fechtig, Ursula Schmidt-Erfurth, Medizinische Univ. Wien (Austria); Martin Gröschl, Technische Univ. Wien (Austria); Rainer A. Leitgeb, Medizinische Univ. Wien (Austria) . . . [9307-32]

10:00 am: **Investigation of age-related macular eegeneration using optical microangiography**, Qinqin Zhang, Yanping Huang, Univ. of Washington (USA); Utkarsh Sharma, Carl Zeiss Meditec, Inc. (USA); Mariana R. Thorell, Univ. of Miami Miller School of Medicine (USA); Ruikang K. Wang, Univ. of Washington (USA); Lin An, Mary Durbin, Michal Laron, Carl Zeiss Meditec, Inc. (USA); Philip J. Rosenfeld, Univ. of Miami Miller School of Medicine (USA) . . . . . [9307-33]

Coffee Break . . . . . Sun 10:15 am to 10:45 am

CONFERENCE 9307
LOCATION: ROOM 305 (ESPLANADE)

SESSION 7
LOCATION: ROOM 305 (ESPLANADE) . . . . . SUN 10:45 AM TO 12:00 PM

Ophthalmic Imaging: Adaptive Optics

Session Chairs: **Arthur Ho,** Brien Holden Vision Institute (Australia); **Daniel V. Palanker,** Stanford Univ. (USA)

10:45 am: **Concept for image-guided vitreo-retinal fs-laser surgery-adaptive optics and optical coherence tomography for laser beam shaping and positioning**, Ben Matthias, Laser Zentrum Hannover e.V. (Germany); Dorothee Brockmann, Medizinische Hochschule Hannover (Germany); Anja Hansen, Konstanze Horke, Gesche Knoop, Timo Gewohn, Miroslav Zabic, Alexander Krüger, Tammo Ripken, Laser Zentrum Hannover e.V. (Germany) . . . . . [9307-34]

11:00 am: **A computational approach to high-resolution imaging of the living human retina without hardware adaptive optics**, Nathan D. Shemonski, Univ. of Illinois at Urbana-Champaign (USA); Steven G. Adie, Univ. of Illinois at Urbana-Champaign (USA) and Cornell Univ. (USA); Yuan-Zhi Liu, Fredrick A. South, Paul S. Carney, Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9307-35]

11:15 am: **Novel dark field detection methods in adaptive optics imaging of the inner retina**, R. Daniel Ferguson, Mircea Mujat, Ankit H. Patel, Nicusor V. Iftimia, Physical Sciences Inc. (USA); James D. Akula, Anne B. Fulton, Boston Children's Hospital (USA) and Harvard Medical School (USA) . . . . . [9307-36]

11:30 am: **Imaging modal content of cone photoreceptors using adaptive optics optical coherence tomography**, Zhuolin Liu, Omer P. Kocaoglu, Timothy L. Turner, Donald T. Miller, Indiana Univ. (USA) . . . . . [9307-37]

11:45 am: **Adaptive optics optical coherence tomography at 1 MHz**, Omer P. Kocaoglu, Timothy L. Turner, Zhuolin Liu, Donald T. Miller, Indiana Univ. (USA) . . . . . [9307-38]

Lunch/Exhibition Break . . . . . Sun 12:00 pm to 1:30 pm

SESSION 8
LOCATION: ROOM 305 (ESPLANADE) . . . . . SUN 1:30 PM TO 3:00 PM

Ocular Tissue Characterization

Session Chairs: **Roberto Pini,** Istituto di Fisica Applicata Nello Carrara (Italy); **Jean-Marie Parel,** Bascom Palmer Eye Institute (USA)

1:30 pm: **Optical characterization of vitreous structure in health and disease**, Ashwin Sampathkumar, Riverside Research Institute (USA); Jerry Sebag M.D., VMR Institute (USA); Jeffrey A. Ketterling, Riverside Research Institute (USA) . . . . . [9307-39]

1:45 pm: **Determining the optomechanical properties of accommodating gel for lens refilling surgery using finite element analysis and numerical ray-tracing**, Hooman Mohammad Pour, The Univ. of New South Wales (Australia) . . . . . [9307-40]

2:00 pm: **Assessing age-related changes of biomechanical properties of crystalline lens in rabbit eyes using a co-focused ultrasound and optical coherence elastography system**, Chen Wu, Zhaolong Han, Shang Wang, Jiasong Li, Manmohan Singh, Chih Hao Liu, Univ. of Houston (USA); Salavat R. Aglyamov, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA); Fabrice Manns, Bascom Palmer Eye Institute (USA) and Univ. of Miami (USA); Kirill V. Larin, Univ. of Houston (USA) and Baylor College of Medicine (USA) . . . . . [9307-41]

2:15 pm: **Near-infrared radiation damage mechanism in the lens**, Per G. Söderberg, Uppsala Univ. (Sweden) . . . . . [9307-42]

2:30 pm: **Three dimensional mapping of the cornea elasticity using optical coherence elastography**, Manmohan Singh, Jiasong Li, Shang Wang, Srilatha Vantipalli, Michael D. Twa, Univ. of Houston (USA); Kirill V. Larin, Univ. of Houston (USA) and Baylor College of Medicine (USA) . . . . . [9307-43]

2:45 pm: **Quantitative assessment of corneal biomechanical properties using optical coherence elastography and a lamb-frequency model**, Zhaolong Han, Jiasong Li, Manmohan Singh, Shang Wang, Srilatha Vantipalli, Chen Wu, Chih Hao Liu, Rita Idugboe, Thomas T. C. Hsu, Michael D. Twa, Kirill V. Larin, Univ. of Houston (USA) . . . . . [9307-44]

Coffee Break . . . . . Sun 3:00 pm to 3:30 pm

SESSION 9
LOCATION: ROOM 305 (ESPLANADE) . . . . . SUN 3:30 PM TO 5:00 PM

Ophthalmic Imaging: Models, Phantoms, Technology

Session Chair: **Jerry Sebag M.D.,** VMR Institute (USA)

3:30 pm: **New asymmetric optical model of the human eye for the design of wide-field imaging instruments**, James M. Polans, Ryan P. McNabb, Duke Univ. (USA); Bart Jaeken, Pablo Artal, Univ. de Murcia (Spain); Joseph A. Izatt, Duke Univ. (USA) . . . . . [9307-45]

3:45 pm: **Comparison of optical coherence tomography cup-to-disc ratio measurements with an optic nerve head-retina phantom**, Daniel X. Hammer, Jigesh Baxi, William R. Calhoun III, U.S. Food and Drug Administration (USA); Chieh-Li Chen, Hiroshi Ishikawa M.D., Joel S. Schuman M.D., Gadi Wollstein M.D., UPMC Eye Ctr. (USA); Anant Agrawal, U.S. Food and Drug Administration (USA) . . . . . [9307-46]

4:00 pm: **Real-time calibration-free C-scan and B-scan images of the eye fundus using master slave swept source-optical coherence tomography**, Adrian Bradu, Konstantin Kapinchev, Fred Barnes, Univ. of Kent (United Kingdom); David F. Garway-Heath, Ranjan Rajendram, Pearse Keane, NIHR Biomedical Research Ctr., Moorfields Eye Hospital (United Kingdom); Adrian G. Podoleanu, Univ. of Kent (United Kingdom) . . . . . [9307-47]

4:15 pm: **Automatic optimization high-speed high-resolution OCT retinal imaging at 1µm**, Eunice Michelle C. Cua, Yifan Jian, Xiyun Liu, Simon Fraser Univ. (Canada); Stefano Bonora, IFN-CNR LUXOR Lab. (Italy); Robert J. Zawadzki, Univ. of California, Davis (USA); Paul J. Mackenzie, The Univ. of British Columbia (Canada); Marinko V. Sarunic, Simon Fraser Univ. (Canada) . . . . . [9307-48]

4:30 pm: **1050nm handheld optical frequency domain imaging system for pediatric retinoblastoma patients**, Oleg Nadiarnykh, Vrije Univ. Amsterdam (Netherlands); Annette C. Moll, Vrije Univ. Medical Ctr. (Netherlands); Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands) . . . . . [9307-49]

4:45 pm: **Ultra-compact switchable SLO/OCT handheld probe design**, Francesco LaRocca, Derek Nankivil, Theodore B. DuBose, Sina Farsiu, Joseph A. Izatt, Duke Univ. (USA) . . . . . [9307-50]

SESSION 10
LOCATION: ROOM 305 (ESPLANADE) . . . . . SUN 5:00 PM TO 5:30 PM

Special XXVth Edition Session: Ophthalmic Technologies

Session Chairs: **Arthur Ho,** Brien Holden Vision Institute (Australia); **Fabrice Manns,** Univ. of Miami (USA)

PASCAL ROL AWARD PRESENTATION
LOCATION: ROOM 305 (ESPLANADE) . . . . . SUN 5:45 PM TO 6:00 PM

Session Chairs: **Arthur Ho,** Brien Holden Vision Institute (Australia); **Fabrice Manns,** Univ. of Miami (USA)

POSTERS-SUNDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Developing a flammability test system for sunglasses: results, Renan Magri, Liliane Ventura, Univ. de São Paulo (Brazil) . . . . . [9307-51]

Deep stroma investigation by confocal microscopy, Francesca P. Rossi, Francesca Tatini, Roberto Pini, Consiglio Nazionale delle Ricerche (Italy); Paola Valente, Nuovo Ospedale Santo Stefano (Italy); Roberta Ardia, Univ. degli Studi di Roma "Tor Vergata" (Italy); Luca Buzzonetti, Nuovo Ospedale Santo Stefano (Italy); Annalisa Canovetti, Alex Malandrini, Ivo Lenzetti, Luca Menabuoni M.D., Univ. degli Studi di Roma "Tor Vergata" (Italy) . . . . . [9307-52]

Equivalence between solar irradiance and simulators in solarization tests of sunglasses, Mauro Masili, Homero Schiabel, Liliane Ventura, Univ. de São Paulo (Brazil) . . . . . [9307-53]

Progress on the self-service kiosk for testing the UV protection on sunglasses: polynomial and neural network approximation for calculating light transmittance, Liliane Ventura, Marcio M. Makiyama Mello, Univ. de São Paulo (Brazil) . . . . . [9307-54]

Single-photon time-gated fluorescence lifetime microscope for in vivo corneal imaging, Susana F. Silva, IBILI, Univ. de Coimbra (Portugal); Ana Batista, IBILI, Univ. de Coimbra (Portugal) and Univ. des Saarlandes (Germany); Maria João Quadrado, IBILI, Univ. de Coimbra (Portugal) and Ctr. Hospitalar e Univ. de Coimbra (Portugal); António Miguel Morgado, Univ. de Coimbra (Portugal) and IBILI (Portugal). . . . . [9307-55]

Real-time processing and visualization of volumetric adaptive optics optical coherence tomography images, Timothy L. Turner, Indiana Univ. (USA); Jeffrey E. Kriske Jr., Brandon A. Shafer, Indiana Univ.-Purdue Univ. Indianapolis (USA); Omer P. Kocaoglu, Zhuolin Liu, Indiana Univ. (USA); John J. Lee, Indiana Univ.-Purdue Univ. Indianapolis (USA); Donald T. Miller, Indiana Univ. (USA) . . . . . [9307-56]

Dynamic biometric response of the accommodative plant measured with OCT, Marco Ruggeri, Ophthalmic Biophysics Ctr., Bascom Palmer Eye Institute (USA); Victor M. Hernandez, Siobhan Williams, Carolina De Freitas, Ophthalmic Biophysics Ctr., Bascom Palmer Eye Institute (USA) and Univ. of Miami (USA) and Univ. of Miami Miller School of Medicine (USA); Florence A. Cabot, Ophthalmic Biophysics Ctr., Bascom Palmer Eye Institute (USA) and Univ. of Miami Miller School of Medicine (USA); Fabrice Manns, Ophthalmic Biophysics Ctr., Bascom Palmer Eye Institute (USA) and Univ. of Miami (USA) and Univ. of Miami Miller School of Medicine (USA); Jean-Marie Parel, Ophthalmic Biophysics Ctr., Bascom Palmer Eye Institute (USA) and Univ. of Miami (USA) and VisionCRC (Australia) . . . . . [9307-57]

Dynamic refraction and biometry of the anterior segment during accommodation, Victor M. Hernandez, Bascom Palmer Eye Institute (USA) and Univ. of Miami (USA); Marco Ruggeri, Florence A. Cabot, Bascom Palmer Eye Institute (USA); Arthur Ho, Bascom Palmer Eye Institute (USA) and Brien Holden Vision Institute (Australia) and The Univ. of New South Wales (Australia); Fabrice Manns, Bascom Palmer Eye Institute (USA) and Univ. of Miami (USA); Jean-Marie Parel, Bascom Palmer Eye Institute (USA) and Brien Holden Vision Institute (Australia). . . . . [9307-58]

En-face imaging of the ellipsoid zone in the retina from optical coherence tomography B-scans, Tim Holmes, Sean Larkin, Lickenbrock Technologies, LLC (USA); Markie Downing, Karl Csaky, Retina Foundation of the Southwest (USA) . . . . . [9307-60]

High power visible diode laser for the treatment of eye diseases by laser coagulation, Arne Heinrich, Clemens Hagen, Maximilian Harlander, Bernhard Nussbaumer, Pantec Engineering AG (Liechtenstein). . . . . [9307-61]

Two-photon autofluorescence lifetime and shg imaging of healthy and diseased human corneas, Ana Batista, IBILI, Univ. de Coimbra (Portugal) and Univ. des Saarlandes (Germany); Hans Georg Breunig, Univ. des Saarlandes (Germany) and JenLab GmbH (Germany); Aisada Uchugonova, Berthold Seitz M.D., Univ. des Saarlandes (Germany); António Miguel Morgado, IBILI, Univ. de Coimbra (Portugal); Karsten König, Univ. des Saarlandes (Germany) and JenLab GmbH (Germany). . . . . [9307-62]

Axial resolution enhancement of FD-OCT by parametric spectral analysis for ocular imaging, Xinyu Liu, Xiaojun Yu, Dongyao Cui, Linbo Liu, Nanyang Technological Univ. (Singapore) . . . . . [9307-63]

Implementation of a capsular bag model to enable sufficient lens stabilization within a mechanical eye model, Natascha Bayer, Elisabet Rank, Lukas Traxler, Fachhochschule Technikum Wien (Austria); Erik Beckert, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Andreas Drauschke, Fachhochschule Technikum Wien (Austria) . . . . . [9307-64]

Cornea based imaging via its tactile spatial stimulation, Zeev Zalevsky, Yevgeny Beiderman, Bar-Ilan Univ. (Israel); Ygal Rotenstreich, Michael Belkin, Goldschleger Eye Research Institute (Israel). . . . . [9307-65]

In-vivo human corneal nerve imaging using Fourier-domain OCT, Jun Geun Shin, Byeong Ha Lee, Tae Joong Eom, Gwangju Institute of Science and Technology (Korea, Republic of); Ho Sik Hwang, Chuncheon Sacred Heart Hospital (Korea, Republic of). . . . . [9307-66]

Preliminary studies for the diagnosis and treatment of ocular surface squamous neoplasia, Yugyeong Chae, Sang-Seok Hwang, Jaechul Jung, Pukyong National Univ. (Korea, Republic of); Sang-Won Lee, Korea Research Institute of Standards and Science (Korea, Republic of); Sang Joon Lee, Chulho Oak, Kosin Univ. College of Medicine (Korea, Republic of) and Innovative Biomedical Technology Research Ctr. (Korea, Republic of); Rangarirai Masanganise, Univ. of Zimbabwe (Zimbabwe); Yeh-Chan Ahn, Pukyong National Univ. (Korea, Republic of) and Ctr. for Marine-Integrated Biomedical Technology (Korea, Republic of) and Innovative Biomedical Technology Research Ctr. (Korea, Republic of) . . . . . [9307-67]

A new polarization randomness parameter for quantitative pigmented tissue imaging using polarization-sensitive optical coherence tomography, Shuichi Makita, Young-Joo Hong, Univ. of Tsukuba (Japan); Masahiro Miura, Tokyo Medical Univ. (Japan); Yoshiaki Yasuno, Univ. of Tsukuba (Japan). . . . . [9307-68]

A novel platform for minimally invasive delivery of cellular therapy as a thin layer across the subretina for treatment of retinal degeneration, Ygal Rotenstreich, Adi Tzameret, Sapir E. Kalish, Michael Belkin, Tel Aviv Univ. (Israel) and Sheba Medical Ctr. (Israel); Amilia Meir, Avraham J. Treves, Arnon Nagler, Sheba Medical Ctr. (Israel); Ifat Sher, Sheba Medical Ctr. (Israel) and Tel Aviv Univ. (Israel) . . . . . [9307-69]

High precision laser sclerostomy, Wojciech S. Góra, Artur Ulrich, Heriot-Watt Univ. (United Kingdom); Lisa McIntosh, Univ. of Strathclyde (United Kingdom); Richard M. Carter, Heriot-Watt Univ. (United Kingdom); Clive G. Wilson, Univ. of Strathclyde (United Kingdom); Baljean Dhillon, The Univ. of Edinburgh (United Kingdom); Duncan P. Hand, Jonathan D. Shephard, Heriot-Watt Univ. (United Kingdom) . . . . . [9307-70]

Characterization of rat model of acute anterior uveitis using optical coherence tomography angiography, Woo June Choi, Kathryn L. Pepple, Zhongwei Zhi, Ruikang K. Wang, Univ. of Washington (USA) . . . . . [9307-71]

Comparison of confocal microscopy and two-photon microscopy in studying fungal keratitis, Jun Ho Lee, Seunghun Lee, Pohang Univ. of Science and Technology (Korea, Republic of); Jin Hyoung Park, Myoung Joon Kim, Asan Medical Ctr. (Korea, Republic of); Ki Hean Kim, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9307-72]

Dual three-dimensional spectral-domain OCT with interlaced detection for simultaneous imaging of the whole eye, Hyung-Jin Kim, Korea Univ. (Korea, Republic of); Pil Un Kim, Oz-tec Co., Ltd. (Korea, Republic of); Hyun-Woo Jeong, Johns Hopkins Univ. (USA); Min-Gyu Hyeon, Korea Univ. (Korea, Republic of); Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of); Beop-Min Kim, Korea Univ. (Korea, Republic of) . . . . . [9307-73]

Biomechanical properties of corneas as a function of IOP and CXL assessed using optical coherence elastography, Jiasong Li, Manmohan Singh, Srilatha Vantipalli, Zhaolong Han, Kirill V. Larin, Michael D. Twa, Univ. of Houston (USA). . . . . [9307-74]

Multimodal nonlinear imaging of the eye, Oliver Stachs, Univ. Rostock (Germany); Tobias Ehmke, Franck Emmanuel Gounou, Friedrich-Schiller-Univ. Jena (Germany); Stephan Reiss, Univ. Rostock (Germany); Alexander Heisterkamp, Leibniz Univ. Hannover (Germany) and Excellence cluster REBIRTH (Germany) . . . . . [9307-75]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their groundbreaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9308
LOCATION: ROOM 303 (ESPLANADE)

Saturday–Sunday 7–8 February 2015 • Proceedings of SPIE Vol. 9308

Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIV

Conference Chairs: **David H. Kessel,** Wayne State Univ. (USA); **Tayyaba Hasan,** Massachusetts General Hospital (USA)

Program Committee: **Charles J. Gomer,** Children's Hospital Los Angeles (USA); **Nancy L. Oleinick,** Case Western Reserve Univ. (USA); **Ravindra K. Pandey,** Roswell Park Cancer Institute (USA); **Brian W. Pogue,** Thayer School of Engineering at Dartmouth (USA); **Kenneth K. Wang M.D.,** Mayo Clinic (USA)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 303 (ESPLANADE) . . . . . SAT 9:00 AM TO 10:30 AM

Photodynamic Therapy I

Session Chair: **David H. Kessel,**
Wayne State Univ. School of Medicine (USA)

9:00 am: **A strategy for enhancing PDT efficacy** *(Invited Paper)*, David H. Kessel, Neha Aggarwal, Bonnie F. Sloane, Wayne State Univ. School of Medicine (USA) . . . . . [9308-1]

9:30 am: **Exploiting PDT effects in the design of mechanism-based combination treatments** *(Invited Paper)*, Tayyaba Hasan, Huang-Chiao Huang, Imran Rizvi, Srivalleesha Mallidi, Massachusetts General Hospital (USA); Ashish Kalra, Jonathan Fitzgerald, Merrimack Pharmaceuticals, Inc. (USA) . . . . [9308-2]

10:00 am: **Targeting cellular and microenvironmental determinants of tumor heterogeneity for PDT-based combinations** *(Invited Paper)*, Imran Rizvi, Brigham and Women's Hospital (USA) and Massachusetts General Hospital (USA) and Harvard Medical School (USA); Emma Briars, Nan Xu, Heather Gudejko, Sriram R. Anbil, Shazia Khan, Massachusetts General Hospital (USA); Gwendolyn M. Cramer, Jonathan P. Celli, Univ. of Massachusetts Boston (USA); Tayyaba Hasan, Massachusetts General Hospital (USA) . . . . . [9308-3]

Coffee Break . . . . . .Sat 10:30 am to 11:00 am

SESSION 2

LOCATION: ROOM 303 (ESPLANADE) . . . . . SAT 11:00 AM TO 12:00 PM

Photodynamic Therapy II

Session Chair: **Imran Rizvi,** Massachusetts General Hospital (USA)

11:00 am: **Chemoresistant glioblastoma stem-like cells respond to photodynamic therapy**, Bryan Q. Spring, Harvard Medical School (USA); Kohei Watanabe, Canon, Inc. (USA); Tatsuyuki Matsudaira, Health Sciences & Technology, Harvard-MIT (USA); Hiroaki Wakimoto, Massachusetts General Hospital (USA); Srivalleesha Mallidi, Harvard Medical School (USA); Tayyaba Hasan, Harvard Medical School (USA) and Massachusetts General Hospital (USA) . . . . . [9308-4]

11:20 am: **Carbonic Anhydrase-9 (CAIX) expression as a marker to predict response of aminolevulinic acid based photodynamic therapy**, Srivalleesha Mallidi, Imran Rizvi, Zhiming Mai, Harvard Medical School (USA); Jonathan P. Celli, Univ. of Massachusetts Boston (USA); Tayyaba Hasan, Harvard Medical School (USA) . . . . . [9308-5]

11:40 am: **An analytical expression for light fluence rate distribution in semi-infinite medium**, Joseph A. Spano, Timothy C. Zhu, Michele M. Kim, Univ. of Pennsylvania School of Medicine (USA) . . . . . [9308-6]

Lunch/Exhibition Break . . . . . .Sat 12:00 pm to 1:30 pm

SESSION 3

LOCATION: ROOM 303 (ESPLANADE) . . . . . SAT 1:30 PM TO 3:00 PM

Photodynamic Therapy III

Session Chair: **Brian W. Pogue,**
Thayer School of Engineering at Dartmouth (USA)

1:30 pm: **Estimating Verteporfin delivery and light treatment planning for pancreas PDT** *(Invited Paper)*, Brian W. Pogue, Scott C. Davis, Kimberley S. Samkoe, Jonathan T. Elliott, Jason Gunn, Thayer School of Engineering at Dartmouth (USA); Stephen Pereira, Univ. College London Hospital (United Kingdom); Tayyaba Hasan, Harvard Medical School (USA) . . . . . [9308-7]

2:00 pm: **Real-time treatment light dose guidance of Pleural PDT: an update**, Timothy C. Zhu, Michele M. Kim, The Univ. of Pennsylvania Health System (USA); Steven L. Jacques, Oregon Health & Science Univ. (USA); Rozhin Penjweini, Andreea Dimofte, Jarod C. Finlay, Charles B. Simone M.D., The Univ. of Pennsylvania Health System (USA); Keith A. Cengel, Univ. of Pennsylvania School of Medicine (USA); Joseph S. Friedberg, Div. of Thoracic Surgery, Penn Presbyterian Medical Ctr. (USA) . . . . . [9308-8]

2:20 pm: **In vivo outcome study of BPD-mediated PDT using the macroscopic singlet oxygen model**, Michele M. Kim, Timothy C. Zhu, Univ. of Pennsylvania School of Medicine (USA) . . . . . [9308-9]

2:40 pm: **New insights into treatment resistance through microvesicular traffic and its role in PDT**, Akilan Palanisami, Emma Briars, Thais Santos, Tayyaba Hasan, Massachusetts General Hospital (USA) . . . . . [9308-10]

Coffee Break . . . . . .Sat 3:00 pm to 3:30 pm

SESSION 4

LOCATION: ROOM 303 (ESPLANADE) . . . . . SAT 3:30 PM TO 4:30 PM

Photodynamic Therapy IV

Session Chair: **Jonathan P. Celli,** Univ. of Massachusetts Boston (USA)

3:30 pm: **Measuring and modulating tumor hemodynamics during PDT**, Malavika Chandra, Wesley B. Baker, Joann Miller, Arjun G. Yodh, Theresa M. Busch, Univ. of Pennsylvania (USA) . . . . . [9308-11]

3:50 pm: **EtNBS PLGA nanoparticle and integrin-targeted, PEG-enhanced photosensitizer constructs for lysosome-mediated cell death**, Hsin- I Hung, Wellman Ctr. for Photomedicine, Harvard Medical School, Massachusetts General Hospital (USA); Oliver Klein, Wellman Ctr. for Photomedicine, Harvard Medical School, Massachusetts General Hospital (USA); Hushan Yuan, Lee Josephson, Massachusetts General Hospital (USA); Conor L. Evans, Wellman Ctr. for Photomedicine, Harvard Medical School, Massachusetts General Hospital (USA) . . . . . [9308-12]

4:10 pm: **Towards PDT with genetically encoded photosensitizer KillerRed: a comparison of continuous and pulsed laser regimes in 3D and animal tumor models**, Marina V. Shirmanova, Nizhny Novgorod State Medical Academy (Russian Federation) and N.I. Lobachevsky State Univ. of Nizhni Novgorod (Russian Federation); Daria S. Kusnetzova, Nizhny Novgorod State Medical Academy (Russian Federation); Diana V. Yuzhakova, Nizhny Novgorod State Medical Academy (Russian Federation) and N.I. Lobachevsky State Univ. of Nizhni Novgorod (Russian Federation); Vladislav A. Kamensky, Ilya V. Turchin, Institute of Applied Physics (Russian Federation); Ludmila B. Snopova M.D., Nizhny Novgorod State Medical Academy (Russian Federation); Varvara V. Dudenkova, N.I. Lobachevsky State Univ. of Nizhni Novgorod (Russian Federation); Sergey A. Lukyanov, Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry (Russian Federation) and Nizhny Novgorod State Medical Academy (Russian Federation); Elena V. Zagaynova M.D., Nizhny Novgorod State Medical Academy (Russian Federation) . . . . . [9308-13]

SESSION 5
LOCATION: ROOM 303 (ESPLANADE) . . . . . .SAT 4:30 PM TO 5:00 PM

NIH Report

Session Chair: **David H. Kessel,**
Wayne State Univ. School of Medicine (USA)

4:30 pm: **NIH and NCI grant-related changes during fiscal years 2014 and 2015** *(Invited Paper)*, Rosemary S. Wong, National Cancer Institute (USA) . . . . . [9308-14]

BIOS HOT TOPICS
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 6
LOCATION: ROOM 303 (ESPLANADE) . . . . . SUN 8:30 AM TO 10:30 AM

Photodynamic Therapy V

Session Chair: **Keith Cengal,** Univ. of Pennsylvania (USA)

8:30 am: **PDT for Barrett's esophagus in 2015** *(Invited Paper)*, Kenneth K. Wang M.D., Mayo Clinic (USA) . . . . . [9308-15]

9:00 am: **To be announced - Cengal** *(Invited Paper)*, ... [9308-16]

9:30 am: **Clinical potential for vitamin D as a neoadjuvant for photodynamic therapy of nonmelanoma skin cancer** *(Invited Paper)*, Edward V. Maytin M.D., Cleveland Clinic Lerner Research Institute (USA) . . . . . [9308-17]

10:00 am: **Enabling technology for photodynamic therapy in global health settings: battery-powered irradiation and smartphone-based imaging for ALA-PDT** *(Invited Paper)*, Joshua Hempstead, Dustin P. Jones, Gwendolyn M. Cramer, Univ. of Massachusetts Boston (USA); Srivaleesha Mallidi, Imran Rizvi, Zhiming Mai, Massachusetts General Hospital (USA); Abdelali Ziouche, Univ. Paris 13 (France); Stephen Arnason, Univ. of Massachusetts Boston (USA); Tayyaba Hasan, Massachusetts General Hospital (USA); Jonathan P. Celli, Univ. of Massachusetts Boston (USA) . . . . . [9308-18]

Coffee Break . . . . . Sun 10:30 am to 11:00 am

SESSION 7
LOCATION: ROOM 303 (ESPLANADE) . . . . . .SUN 11:00 AM TO 12:00 PM

Photodynamic Therapy VI

Session Chair: **Timothy M. Baran,**
Univ. of Rochester Medical Ctr. (USA)

11:00 am: **Use of cylindrical diffusing fibers as detectors for interstitial tissue spectroscopy**, Timothy M. Baran, Thomas H. Foster, Univ. of Rochester Medical Ctr. (USA). . . . . [9308-19]

11:20 am: **Effects of verteporfin-mediated photodynamic therapy on endothelial cells**, Daniel Kraus, Bin Chen, Univ. of the Sciences in Philadelphia (USA) . . . . . [9308-20]

11:40 am: **Block copolymers encapsulated poly (aryl benzyl ether) dendrimer silicon (IV) phthalocyanine for in vivo and in vitro photodynamic efficacy of choroidal neovascularization**, Yiru Peng, Zheng Huang, Fujian Normal Univ. (China) . . . . . [9308-21]

Lunch/Exhibition Break . . . . . Sun 12:00 pm to 1:30 pm

SESSION 8
LOCATION: ROOM 303 (ESPLANADE) . . . . . .SUN 1:30 PM TO 2:50 PM

Photodynamic Therapy VII

Session Chair: **Srivalleesha Mallidi,** Harvard Medical School (USA)

1:30 pm: **Assessment of singlet oxygen generated by 1268nm infrared laser irradiation**, Scott Palmer, Ilya E. Rafailov, Karina Litvinova, Univ. of Dundee (United Kingdom); Sergei G. Sokolovski, Edik U. Rafailov, Aston Univ. (United Kingdom); Ghulam Nabi, Univ. of Dundee (United Kingdom) . . . . . [9308-22]

1:50 pm: **In-vivo outcome study of HPPH mediated PDT using singlet oxygen explicit dosimetry (SOED)**, Rozhin Penjweini, Michele M. Kim, Timothy C. Zhu, Univ. of Pennsylvania (USA) . . . . . [9308-23]

2:10 pm: **Monte Carlo fluence simulation for prospective evaluation of interstitial photodynamic therapy treatment plans**, Jeffrey Cassidy, Vaughn Betz, Univ. of Toronto (Canada); Lothar D. Lilge, Univ. of Toronto (Canada) and Princess Margaret Cancer Ctr. (Canada) . . . . . [9308-24]

2:30 pm: **Fluorescence time course imaging of healthy and diseased skin for PpIX metabolic maps used in topical PDT and its correlation to the skin and lesions structures**, Olena Kulyk, Univ. of St. Andrews (United Kingdom); James Ferguson, Sally Ibbotson, Harry Moseley, Ronan M. Valentine, Ninewells Hospital and Medical School, Univ. of Dundee (United Kingdom); Ifor D. W. Samuel, Univ. of St. Andrews (United Kingdom). . . . . [9308-25]

Coffee Break . . . . . Sun 2:50 pm to 3:30 pm

SESSION 9
LOCATION: ROOM 303 (ESPLANADE) . . . . . SUN 3:30 PM TO 4:50 PM

Photodynamic Therapy VIII

Session Chair: **Timothy C. Zhu,**
The Univ. of Pennsylvania Health System (USA)

3:30 pm: **Topical calcitriol prior to photodynamic therapy enhances treatment efficacy in non-melanoma skin cancer mouse models**, Kishore Reddy Rollakanti, The Cleveland Clinic (USA) and Cleveland State Univ. (USA); Sanjay Anand, Edward V. Maytin M.D., The Cleveland Clinic (USA) . . . . . [9308-26]

3:50 pm: **Crystalline organic nanoparticles for diagnosis and PDT**, Rudolf W. Steiner, Jasmin Breymayer, Angelika C. Rueck, Univ. Ulm (Germany); Victor B. Loschenov, Anastatsia Ryabova, A. M. Prokhorov General Physics Institute (Russian Federation) . . . . . [9308-27]

4:10 pm: **Low fluence thresholds for photodynamic therapy**, Brad A. Hartl, Univ. of California, Davis (USA); Henry Hirschberg M.D., Univ. of California, Irvine (USA); Laura Marcu, Simon R. Cherry, Univ. of California, Davis (USA) . . . . . [9308-28]

4:30 pm: **An empirical approach to estimate near-infra-red photon propagation and optically induced drug release in brain tissues**, Akshay Prabhu Verleker, Purdue Univ. School of Health Sciences (USA); Qianqian Fang, Martinos Ctr. for Biomedical Imaging, Harvard Medical School (USA); Mi-Ran Choi, Susan Clare, Feinberg School of Medicine, Northwestern Univ. (USA); Keith M. Stantz, Purdue Univ. School of Health Sciences (USA) . . . . . [9308-29]

CONFERENCE 9308
LOCATION: ROOM 303 (ESPLANADE)

POSTERS-SUNDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Photoinduced electron transfer between the dendritic zinc phthalocyanines and anthraquinone, Kuizhi Chen, Fujian Normal Univ. (China); Junri Wen, Jiangsheng Liu, Zhenzhen Chen, Sujuan Pan, Zheng Huang, Yiru Peng, Fujian Normal Univ (China). . . . . [9308-33]

Macroscopic singlet oxygen model incorporating photobleaching as input parameter, Michele M. Kim, Jarod C. Finlay, Timothy C. Zhu, Univ. of Pennsylvania School of Medicine (USA) . . . . . [9308-34]

Silica coated magnetic nanoparticles for photodynamic therapy, Rajesh V. Kanawade, Institute of Photonic Technologies, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany), Erlangen Graduate School in Advanced Optical Technologies (Germany); Lucas Kreiss, Institute of Photonic Technologies, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Stephanie Fanselow, Institute of Particle Technology, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Florian Klämpfl, Institute of Photonic Technologies, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Peukert Wolfgang, Institute of Particle Technology, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Stephan Roth, Bayerisches Laserzentrum GmbH, Konrad-Zuse-Straße 2-6, 91052 Erlangen, Germany (Germany); Michael Schmidt, Institute of Photonic Technologies, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany), Erlangen Graduate School in Advanced Optical Technologies (Germany) [9308-38]

PAMAM modified PpIX generations in experimental photodynamic therapy induce antitumoral effect on stomach cancer cells, Tugba Kiris, Necmi M. Burgucu, Tugba Sagır, Mehmet Senel, Sevim Isik, Fatih Univ. (Turkey); Burcu Tunç Çamlıbel, Boğaziçi Univ. (Turkey); Hasim Özgür Tabakoglu, Fatih Univ. (Turkey) . . . . . [9308-39]

BIOS SUNDAY PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their groundbreaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

MONDAY 9 FEBRUARY

POSTERS-MONDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . MON 5:30 PM TO 7:30 PM

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Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

A brief history of PDT, David H. Kessel, Wayne State Univ. School of Medicine (USA) . . . . . [9308-30]

Comparison of optical properties determined by interstitial and surface contact probes in phantoms, Andreea Dimofte, Jarod C. Finlay, Timothy C. Zhu, The Univ. of Pennsylvania Health System (USA) . . . . . [9308-31]

Early photosensitizer uptake kinetics predict optimum drug-light interval for photodynamic, Lagnojita Sinha, Illinois Institute of Technology (USA); Jonathan T. Elliott, Thayer School of Engineering at Dartmouth (USA); Tayyaba Hasan, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Brian W. Pogue, Kimberley S. Samkoe, Thayer School of Engineering at Dartmouth (USA); Kenneth M. Tichauer, Illinois Institute of Technology (USA) . . . . . [9308-32]

Characterization of rare-earth-doped nanophosphors for photodynamic therapy excited by clinical ionizing radiation beams, Arash Darafsheh, The Univ. of Pennsylvania Health System (USA); Taejong Paik, Stan Najmr, Univ. of Pennsylvania (USA); Michael Tenuto, The Univ. of Pennsylvania Health System (USA); Christopher B. Murray, Univ. of Pennsylvania (USA); Joseph S. Friedberg, Jarod C. Finlay, The Univ. of Pennsylvania Health System (USA) . . . . . [9308-35]

In vivo suppression of solid Ehrlich cancer via chlorophyllin derivative mediated PDT: an albino mouse tumor model, Iman E. Gomaa, Hend O. Saraya, The German Univ. in Cairo (Egypt); Maha Zekri, Cairo Univ. (Egypt); Mahmoud H. Abdelkader, The German Univ. in Cairo (Egypt) . [9308-36]

Photodynamic therapy using hemagglutinating virus of Japan envelope (HVJ-E): a novel therapeutic approach for the treatment of hormone antagonistic prostate cancer, Mizuho Inai, Masaya Yamauchi, Norihiro Honda, Hisanao Hazama, Osaka Univ. (Japan); Shoji Tachikawa, Gakushuin Univ., Tokyo Institute of Technology (Japan); Hiroyuki Nakamura, Tokyo Institute of Technology (Japan); Yasufumi Kaneda, Kunio Awazu, Osaka Univ. (Japan) . . . . . [9308-37]

CONFERENCE 9309
LOCATION: ROOM 274 (MEZZANINE)

Saturday–Sunday 7–8 February 2015 • Proceedings of SPIE Vol. 9309

COSPONSOR:

THOR
THE FUTURE OF MEDICINE

BIOS

Mechanisms for Low-Light Therapy X

Conference Chairs: **Michael R. Hamblin,** Wellman Ctr. for Photomedicine (USA); **James D. Carroll,** THOR Photomedicine Ltd. (United Kingdom); **Praveen Arany,** National Institute of Dental and Craniofacial Research (USA)

Program Committee: **Juanita Anders,** Uniformed Services Univ. of the Health Sciences (USA); **Tomas Hode,** Immunophotonics, Inc. (USA); **Daniel Barolet M.D.,** McGill Univ (Canada)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 274 (MEZZANINE) . . . . . .SAT 8:10 AM TO 10:00 AM

Reviews and Dosimetry

Session Chair: **Michael R. Hamblin,** Wellman Ctr. for Photomedicine (USA)

8:10 am: **Low level light therapy: the path forward** *(Invited Paper)*, Michael R. Hamblin, Wellman Ctr. for Photomedicine (USA) . . . . . [9309-1]

8:40 am: **The roadmap for LLLT to become a mainstream medical procedure** *(Invited Paper)*, James D. Carroll, THOR Photomedicine Ltd. (United Kingdom) . . . . . [9309-2]

9:10 am: **Clinical translation with low light therapies: current barriers and new frontiers** *(Invited Paper)*, Praveen Arany, National Institute of Dental and Craniofacial Research (USA) . . . . . [9309-3]

9:40 am: **Beam profile measurements for dental phototherapy: the effect of distance, wavelength and tissue thickness**, William M. Palin, Mohammed A. Hadis, Michael R. Milward, The Univ. of Birmingham (United Kingdom); J ames D. Carroll, THOR Photomedicine Ltd. (United Kingdom); Paul R. Cooper, The Univ. of Birmingham (United Kingdom) . . . . . [9309-4]

Coffee Break . . . . . .Sat 10:00 am to 10:30 am

SESSION 2

LOCATION: ROOM 274 (MEZZANINE) . . . . . SAT 10:30 AM TO 11:50 AM

In Vitro Studies I

Session Chair: **Praveen Arany,** National Institute of Dental and Craniofacial Research (USA)

10:30 am: **The effect of UV-Vis to near-infrared light on the biological response of human dental pulp cells**, Mohammed A. Hadis, Paul R. Cooper, Michael R. Milward, The Univ. of Birmingham (United Kingdom); Patricia Gorecki, Univ. of Birmingham (United Kingdom); Edward Tarte, James Churm, William M. Palin, The Univ. of Birmingham (United Kingdom) . . . . . [9309-5]

10:50 am: **Impact of blue LED irradiation on proliferation and gene expression of cultured human keratinocytes**, Anja Becker, Carsten Sticht, Harsh Dweep, Ruprecht-Karls-Univ. Heidelberg (Germany); Frank A. van Abeelen, Philips Research (Netherlands); Norbert Gretz, Ruprecht-Karls-Univ. Heidelberg (Germany); Gerrit Oversluizen, Philips Research Nederland B.V. (Netherlands) . . . . . [9309-6]

11:10 am: **Controversial effects of low level laser irradiation on the proliferation of human osteoblasts**, Gamze Bölükbası Ates, Bogaziçi Üniv. (Turkey); Ayse Ak, Erzincan Univ. (Turkey); Bora Garipcan, Sahru Yüksel, Murat Gülsoy, Bogaziçi Üniv. (Turkey). . . . . [9309-7]

11:30 am: **Biomodulatory effects of laser irradiation on dental pulp cells in vitro**, Michael R. Milward, Mohammed A. Hadis, Paul R. Cooper, The Univ. of Birmingham (United Kingdom); Patricia Gorecki, Univ. of Birmingham (United Kingdom); James D. Carroll, THOR Photomedicine Ltd. (United Kingdom); William M. Palin, The Univ. of Birmingham (United Kingdom) . . . . . [9309-8]

Lunch/Exhibition Break . . . . . .Sat 11:50 am to 12:50 pm

SESSION 3

LOCATION: ROOM 274 (MEZZANINE) . . . . . SAT 12:50 PM TO 3:00 PM

Animal Studies I

Session Chair: **James D. Carroll,** THOR Photomedicine Ltd. (United Kingdom)

12:50 pm: **Low level light in combination with metabolic modulators for effective therapy** *(Invited Paper)*, Mei X. Wu M.D., Ting T. Dong, Harvard Medical School (USA) . . . . . [9309-9]

1:20 pm: **Different treatment paradigms of 830 nm photobiomodulation are retinoprotective in a rodent model of retinitis pigmentosa** *(Invited Paper)*, Janis T. Eells, Heather Schmitt, Univ. of Wisconsin-Milwaukee (USA); Phyllis Summerfelt, Medical College of Wisconsin (USA); Adam Dubis, Univ. College London (United Kingdom); Joseph Carroll, Medical College of Wisconsin (USA); Sandeep Gopalakrishnan, Univ. of Wisconsin-Milwaukee (USA) . . . . . [9309-10]

1:50 pm: **Transcranial low-level laser therapy increases memory, learning, neuroprogenitor cells, BDNF and synaptogenesis in mice with traumatic brain injury** *(Invited Paper)*, Michael R. Hamblin, Fatma Vatansever M.D., Weijun Xuan, Liyi Huang, Wellman Ctr. for Photomedicine (USA) . . . . . [9309-11]

2:20 pm: **Optical properties of mice skin for optical therapy relevant wavelengths: influence of gender and pigmentation**, Caetano Padial Sabino, Ctr. for Lasers and Applications, Institute for Nuclear and Energetic Research-CNEN/SP (Brazil); Alessandro M. Deana, Daniela F. Silva, Cristiane M. França, Biophotonics Post Graduation Program, Univ. Nove de Julho (Brazil); Tania M. Yoshimura, Martha S. Ribeiro, Ctr. for Lasers and Applications, Institute for Nuclear and Energetic Research-CNEN/SP (Brazil). . . . . [9309-12]

2:40 pm: **Minimally invasive low level laser therapy for collagen formation in rabbit skin**, Eunkwon Jun, Byungjo Jung, Yonsei Univ. (Korea, Republic of) . . . . . [9309-13]

POSTER SESSION AND COFFEE BREAK

LOCATION: HALL A (WITH BIOS EXPO) . . . . . SAT 3:00 PM TO 4:00 PM

Attendees are invited to view the conference posters, which will be available on Saturday. The poster session, with authors present, will be held from 3:00 to 4:00 PM on Saturday afternoon, in conjunction with the coffee break.

POSTER AUTHORS: Poster setup is scheduled from 12:00 PM (noon) on Saturday in South Hall A. Please plan to stand with your poster during the poster session on Saturday from 3:00 to 4:00 PM. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

Effect of low power laser on wound healing and blood sugar in diabetic rats, Hadi Morshedi, Ali Safary III, Namatoola Gheibi D.D.S., Qazvin Univ. of Medical Sciences (Iran, Islamic Republic of). . . . . [9309-29]

Non-invasive optical monitoring of blood flow with a single-tau software correlator, Detian Wang, Univ. of Pennsylvania (USA) and Institute of Fluid Physics (China); Wesley B. Baker, Univ. of Pennsylvania (USA); Zhe Li, Univ. of Pennsylvania (USA) and Tianjin Univ. (China); Ashwin B. Parthasarathy, Univ. of Pennsylvania (USA); David R. Busch, Univ. of Pennsylvania (USA) and Children's Hospital of Philadelphia (USA); Steven Schenkel, Kenneth Abramson, Arjun G. Yodh, Univ. of Pennsylvania (USA) . . . . . [9309-30]

LLLT on MSCs, Jin-Chul Ahn, Yun-Hee Rhee, Sun-Hyang Choi, Dae Yu Kim, Phil-Sang Chung M.D., Dankook Univ. (Korea, Republic of) . . . . . [9309-31]

Regulation of hypoxia-increased osteoclast formation by low level laser therapy, Man-Seok Bang, Graduate School, Dankook Univ. (Korea, Republic of); Chung-Hun Oh, School of Dentistry, Dankook Univ. (Korea, Republic of) . . . . . [9309-32]

Effectiveness of antimicrobial photodynamic therapy on staphylococcus aureus using phenothiazinium dye with red laser, Juliana S. C. Monteiro, Univ. Estadual de Feira de Santana (Brazil) and Univ. Federal da Bahia (Brazil); Susana Carla P. S. de Oliveira D.D.S., Gustavo M. Pires-Santos, Fernando José P. Sampaio D.D.S., Maria de Fátima M. Gesteira D.D.S., Luiz Guilherme P. Soares, Antônio Luiz B. Pinheiro D.D.S., Univ. Federal da Bahia (Brazil) [9309-33]

Light irradiation associated with photosensitive compounds for disease treatment: a prospective study, Gustavo M. Pires-Santos, Fernando José P. Sampaio D.D.S., Susana Carla P. S. de Oliveira D.D.S., Univ. Federal da Bahia (Brazil); Juliana S. C. Monteiro D.D.S., Univ. Estadual de Feira de Santana (Brazil); Maria de Fátima M. Gesteira D.D.S., Luiz Guilherme P. Soares, Paulo Fernando de Almeida, Antônio Luiz B. Pinheiro D.D.S., Univ. Federal da Bahia (Brazil) . . . . . [9309-34]

Evaluation of the efficacy of photodynamic antimicrobial therapy using a phenothiazine compound and LED (red-orange) on the interface: macrophage vs S. aureus, Fernando José P. Sampaio D.D.S., Susana Carla P. S. de Oliveira D.D.S., Univ. Federal da Bahia (Brazil); Juliana S. C. Monteiro, Univ. Federal da Bahia (Brazil) and Univ. Estadual de Feira de Santana (Brazil); Gustavo M. Pires-Santos, Maria de Fátima M. Gesteira D.D.S., Luiz Guilherme P. Soares, Paulo Fernando de Almeida, Antônio Luiz B. Pinheiro D.D.S., Univ. Federal da Bahia (Brazil) . . . . . [9309-35]

Evaluation of laser photobiomodulation bone defect in the femur of osteoporotic rats: a Raman spectral study, Luiz Guilherme P. Soares, Jouber Mateus S. Aciole, Univ. Federal da Bahia (Brazil); Landulfo Silveira Jr., Camilo Castelo Branco Univ. (Brazil); Antônio Luiz B. Pinheiro D.D.S., Univ. Federal da Bahia (Brazil) . . . . . [9309-36]

SESSION 4

LOCATION: ROOM 274 (MEZZANINE) . . . . . SAT 4:00 PM TO 6:00 PM

Clinical Studies

Session Chair: **Janis T. Eells,** Univ. of Wisconsin-Milwaukee (USA)

4:00 pm: **To evaluate the safety and efficiency of low level laser therapy(LLLT) in treating decubitus ulcers: a review**, Ambereen Ahmed M.D., A&M AssortedTherapy.LLC (USA). . . . . [9309-14]

4:20 pm: **Tri-wave laser therapy for spinal cord injury, neuropathic pain management, and restoration of motor function**, Mark D. Chariff, Therapeutic Laser Applications, LLC (USA); Peter Olszak, GO Advanced Laser Systems (USA) . . . . . [9309-15]

4:40 pm: **Currently available methods for control and assessment of wave technologies in complex treatment of oncology patients with lung cancer**, Lena Sheiko M.D., FBGU Rostov Research Institute of Oncology, Rostov-on-Don (Russian Federation) . . . . . [9309-16]

5:00 pm: **Comparison of clinical effectiveness of laser acupuncture and amitrytyline in diabetic peripheral neuropathy (DPN) a sham controlled randomized clinical trial**, Shahzad Anwar M.D., Iffat Anwar Medical Complex (Pakistan). . . . . [9309-17]

5:20 pm: **Assessment of LED (λ 850 ± 10 nm) phototherapy in the inflammatory process of rat's TMJ induced by carrageenan**, Isabele C. V. de Castro, Cristiane B. Rosa, Carolina M. Carvalho, Luiz Guilherme P. Soares, Maria Cristina T. Cangussu D.D.S., Jean N. dos Santos, Antônio Luiz B. Pinheiro D.D.S., Univ. Federal da Bahia (Brazil) . . . . . [9309-18]

5:40 pm: **LED phototherapy on midpalatal suture after rapid maxilla expansion: a Raman spectroscopic study**, Cristiane B. Rosa, Fernando Antonio L. Habib, Telma M. de Araújo, Jean N. dos Santos, Univ. Federal da Bahia (Brazil); Artur Felipe S. Barbosa M.D., Univ. Federal da Bahia (Brazil) and Univ. Federal de Pernambuco (Brazil); Isabele C. V. de Castro, Luiz Guilherme P. Soares, Antônio Luiz B. Pinheiro D.D.S., Univ. Federal da Bahia (Brazil) [9309-19]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 5

LOCATION: ROOM 274 (MEZZANINE) . . . . . SUN 9:00 AM TO 10:20 AM

In Vitro Studies II

Session Chair: **Tomas Hode,** Immunophotonics, Inc. (USA)

9:00 am: **In vivo low-power laser irradiation activates neutrophils and increases their fungicidal activity**, Felipe F. Sperandio, Giulia M. A. C. Bani, Ana Carolina S. C. Mendes, Maisa R. P. L. Brigagão, Gersika B. Santos, Luiz Cosme C. Malaquias, Jorge K. Chavasco, UNIFAL (Brazil); Liana M. Verinaud, Univ. Estadual de Campinas (Brazil); Eva Burger, UNIFAL (Brazil) . . . . . [9309-28]

9:20 am: **Low-level laser therapy renders mice neutrophils more efficient when rechallenged with the pathogenic fungus paracoccidioides brasiliensis**, Eva Burger, Giulia M. A. C. Bani, Ana Carolina S. C. Mendes, Maisa R. P. L. Brigagão, Gersika B. Santos, Luiz Cosme C. Malaquias, Jorge K. Chavasco, Univ. Federal de Alfenas (Brazil); Liana M. Verinaud, Univ. Estadual de Campinas (Brazil); Felipe F. Sperandio, Univ. Federal de Alfenas (Brazil) . . . . . [9309-20]

9:40 am: **Evaluation of the efficacy of photodynamic antimicrobial therapy using a phenothiazine compound and Laser (l=660hm) on the interface: macrophage vs S. aureus**, Susana Carla P. S. de Oliveira, Univ. Federal da Bahia (Brazil); Juliana S. C. Monteiro D.D.S., Univ. Estadual de Feira de Santana (Brazil) and Univ. Federal da Bahia (Brazil); Gustavo M. Pires-Santos, Fernando José P. Sampaio D.D.S., Maria de Fátima M. Gesteira D.D.S., Luiz Guilherme P. Soares, Antônio Luiz B. Pinheiro D.D.S., Univ. Federal da Bahia (Brazil) [9309-21]

10:00 am: **Enhancement of monoclonal antibody production in CHO cells by exposure to He-Ne laser radiation**, Rana A. Ghaleb, Medical College, Babylon Univ. (Iraq) . . . . . [9309-22]

Coffee Break . . . . . Sat 10:20 am to 10:50 am

SESSION 6

LOCATION: ROOM 274 (MEZZANINE) . . . . . SUN 10:50 AM TO 12:10 PM

Animal Studies II

Session Chair: **Caetano Padial Sabino,** Instituto de Pesquisas Energéticas e Nucleares (Brazil)

10:50 am: **Far red/near infrared light-induced cardioprotection under normal and diabetic conditions**, Agnes Keszler, Shelley Baumgardt, Christopher Hwe, Martin Bienengraeber, Medical College of Wisconsin (USA) . . . . . [9309-23]

11:10 am: **Low power laser irradiation stimulates cell proliferation via proliferating cell nuclear antigen and Ki-67 expression during tissue repair**, Vijendra Prabhu, Manipal Institute of Technology, Manipal Univ. (India) and Biophysics Unit, School of Life Sciences, Manipal Univ. (India); Bola Sadashiva Satish Rao, Krishna Kishore Mahato, School of Life Sciences, Manipal Univ. (India). . . . . [9309-24]

11:30 am: **Biostimulative effects of 809 nm diode laser on cutaneous skin wounds**, Hakan Solmaz, Murat Gülsoy, Yekta Ülgen, Bogaziçi Üniv. (Turkey) . . . . . [9309-26]

11:50 am: **Effects of laser pulsing parameters on cell viability**, Karl Engel, National Institute of Health (USA); Praveen Arany, National Institute of Dental and Craniofacial Research (USA) . . . . . [9309-27]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their groundbreaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9310
LOCATION: ROOM 302 (ESPLANADE)

Saturday 7 February 2015 • Proceedings of SPIE Vol. 9310

Frontiers in Biological Detection: From Nanosensors to Systems

Conference Chairs: **Benjamin L. Miller,** Univ. of Rochester Medical Ctr. (USA); **Philippe M. Fauchet,** Vanderbilt Univ. (USA); **Brian T. Cunningham,** Univ. of Illinois at Urbana-Champaign (USA)

Program Committee: **Xudong Fan,** Univ. of Michigan (USA); **Laura Maria Lechuga,** Catalan Institute of Nanoscience and Nanotechnology (Spain); **Frances S. Ligler,** U.S. Naval Research Lab. (USA); **Michael J. Sailor,** Univ. of California, San Diego (USA); **Oliver G. Schmidt,** Leibniz-Institut für Festkörper- und Werkstoffforschung Dresden (Germany); **Christopher C. Striemer,** Adarza BioSystems, Inc. (USA); **Sharon M. Weiss,** Vanderbilt Univ. (USA)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 302 (ESPLANADE) . . . . . SAT 9:00 AM TO 10:00 AM

Photonic Crystals, Waveguides, and Interferometry I

Session Chair: **Philippe M. Fauchet,** Vanderbilt Univ. (USA)

9:00 am: **Photonic crystal microring resonators for label-free DNA sensing**, Stanley M. Lo, Shuren Hu, Yiorgos Kostoulas, Sharon M. Weiss, Philippe M. Fauchet, Vanderbilt Univ. (USA) . . . . . [9310-3]

9:20 am: **Optical waveguide biosensor based on cascaded Mach-Zehnder interferometer and ring resonator with Vernier effect**, Xianxin Jiang, Longhua Tang, Jinyan Song, Mingyu Li, Jian-Jun He, Zhejiang Univ. (China). . . . . [9310-4]

9:40 am: **An optical biosensor for detection of pathogen biomarkers of Shiga toxin-producing Escherichia coli in ground beef samples**, Loreen R. Lamoureux, The Univ. of New Mexico, Ctr. for Biomedical Engineering (USA) and Los Alamos National Lab., Physical Chemistry and Applied Spectroscopy (USA) and The New Mexico Consortium (USA); Afsheen Banisadr, Los Alamos National Lab., Physical Chemistry and Applied Spectroscopy (USA); Peter Adams, Los Alamos National Lab., Ctr. for Integrated Nanotechnology (USA); Zachary R. Stromberg, Univ. of Nebraska-Lincoln, Ctr. for Veterinary Medicine and Biomedical Sciences (USA); Steven W. Graves, The Univ. of New Mexico, Ctr. for Biomedical Engineering (USA); Rodney Moxley, Univ. of Nebraska-Lincoln, Ctr. for Veterinary Medicine and Biomedical Sciences (USA); Gabriel Montaño, Los Alamos National Lab., Ctr. for Integrated Nanotechnology (USA); Harshini Mukundan, Los Alamos National Lab., Physical Chemistry and Applied Spectroscopy (USA) and The New Mexico Consortium (USA) . . . . . [9310-5]

Coffee Break . . . . . Sat 10:00 am to 10:30 am

SESSION 2

LOCATION: ROOM 302 (ESPLANADE) . . . . . SAT 10:30 AM TO 11:50 AM

Photonic Crystals, Waveguides, and Interferometry II

Session Chair: **Philippe M. Fauchet,** Vanderbilt Univ. (USA)

10:30 am: **Sensitivity enhancement in optofluidic devices using total internal reflection**, Fei Du, Eric J. Mahoney, Huan-Hsuan Hsu, Ponnambalam R. Selvaganapathy, Qiyin Fang M.D., McMaster Univ. (Canada) . . . . . [9310-6]

10:50 am: **Examining small molecule - HIV RNA interactions using arrayed imaging reflectometry**, Wanaruk Chaimayo, Benjamin L. Miller, Univ. of Rochester Medical Ctr. (USA) . . . . . [9310-7]

11:10 am: **A novel antibody immobilization strategy for optical biosensors**, Mark A. Lifson, Univ. of Rochester Medical Ctr. (USA); Jared A. Carter, Adarza BioSystems, Inc. (USA); Benjamin L. Miller, Univ. of Rochester Medical Ctr. (USA). . . . . [9310-8]

11:30 am: **Label-free single molecule detection using microtoroid optical resonators**, Judith Su, California Institute of Technology (USA) . . . . . [9310-16]

Lunch Break . . . . . Sat 11:50 am to 1:20 pm

SESSION 3

LOCATION: ROOM 302 (ESPLANADE) . . . . . SAT 1:20 PM TO 3:00 PM

Raman, Plasmonics, and Fluorescence

Session Chair: **Benjamin L. Miller,**
Univ. of Rochester Medical Ctr. (USA)

1:20 pm: **Cost-effective, high enhancing SERS substrates based on imprinted nanoporous gold** *(Invited Paper)*, Sharon M. Weiss, Vanderbilt Univ. (USA) . . . . . [9310-9]

2:00 pm: **Plasmonic nanoparticle interaction with cell membrane for diagnostic applications**, Sumana Das, Akshata Arikady, Ramakrishna Vasireddi, Krishna Harika, Manish Konnur, Gopalkrishna M. Hegde, D. Roy Mahapatra, Indian Institute of Science (India). . . . . [9310-10]

2:20 pm: **Smartphone fluorescence spectroscopy**, Hojoeng Yu, Yafang Tan, Brian T. Cunningham, Univ. of Illinois at Urbana-Champaign (USA) . . . [9310-13]

2:40 pm: **Non-invasive, label free biophotonic sensing with sensitized glass**, Gin Jose, Tarun Kakkar, Toney T. Fernandez, Matthew Murray, Jayakrishnan Chandrappan, Ramzi Ajjan, Sikha Saha, Billy D. Richards, Animesh Jha, David P. Steenson, Peter J. Grant, Univ. of Leeds (United Kingdom) . . [9310-14]

Coffee Break . . . . . Sat 3:00 pm to 3:30 pm

SESSION 4

LOCATION: ROOM 302 (ESPLANADE) . . . . . SAT 3:30 PM TO 4:30 PM

Other Advanced Techniques

Session Chair: **Benjamin L. Miller,**
Univ. of Rochester Medical Ctr. (USA)

3:30 pm: **Laser cross-linking protein captures for living cells on a biochip**, Chih-Lang Lin, Central Taiwan Univ. of Science and Technology (Taiwan); Che-Kuan Lin, Yi-Jui Liu, Feng Chia Univ. (Taiwan); Hai-Wen Chen, Chung-Han Chiang, Chuen-Fu Lin, Shyang-Guang Wang, Central Taiwan Univ. of Science and Technology (Taiwan); Patrice L. Baldeck, Ctr. National de la Recherche Scientifique (France) . . . . . [9310-2]

3:50 pm: **Magnetic modulation biosensing for rapid and sensitive detection of cardiac troponin I**, Schakked O. Halperin, Paul Olivo, MagBiosense LLC (USA); Amos Danielli, Bar-Ilan Univ. (Israel) . . . . . [9310-12]

4:10 pm: **Quantifying DNA and proteins using laser-induced thermophoresis**, Li-Hsien Yu, Chih-Hsuan Wang, National Cheng Kung Univ. (Taiwan); Yih-Fan Chen, National Yang-Ming Univ. (Taiwan) . . . . . [9310-15]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

CONFERENCE 9311
LOCATION: ROOM 202 (MEZZANINE)

Saturday–Sunday 7–8 February 2015 • Proceedings of SPIE Vol. 9311

COSPONSORS:

Molecular-Guided Surgery: Molecules, Devices, and Applications

New

Conference Chairs: **Brian W. Pogue,** Thayer School of Engineering at Dartmouth (USA); **Sylvain Gioux,** Beth Israel Deaconess Medical Ctr. (USA)

Program Committee: **Hak Soo Choi,** Beth Israel Deaconess Medical Ctr. (USA); **David J. Cuccia,** Modulated Imaging, Inc. (USA); **Daniel R. Draney,** LI-COR Biosciences (USA); **Hisataka Kobayashi,** National Cancer Institute (USA); **Vasilis Ntziachristos,** Helmholtz Zentrum München GmbH (Germany); **Keith D. Paulsen,** Thayer School of Engineering at Dartmouth (USA); **Jonathan M. Sorger,** Intuitive Surgical, Inc. (USA); **Tomasz S. Tkaczyk,** Rice Univ. (USA); **Alex Vahrmeijer,** Leiden Univ. Medical Ctr. (Netherlands); **Thomas D. Wang M.D.,** Univ. of Michigan (USA); **Brian C. Wilson,** Ontario Cancer Institute (Canada); **Siavash Yazdanfar,** GE Global Research (USA)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 202 (MEZZANINE) . . . . . SAT 1:30 PM TO 3:30 PM

Endogenous Molecular Contrast

Session Chairs: **Stephen Chad Kanick,** Thayer School of Engineering at Dartmouth (USA); **David J. Cuccia,** Modulated Imaging, Inc. (USA)

1:30 pm: **What endogenous contrast is accessible from diffuse spectroscopic signals in tissues?** *(Invited Paper)*, Albert E. Cerussi, Beckman Laser Institute and Medical Clinic (USA) . . . . . [9311-1]

2:00 pm: **Multimodal imaging strategies for early cancer diagnostics** *(Invited Paper)*, Tomasz S. Tkaczyk, Rice Univ. (USA). . . . . [9311-2]

2:30 pm: **Non-uniqueness and diagnostic relevance of multispectral measurements of the total diffuse reflectance from biological tissues**, Pilar Beatriz García-Allende, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany); Karin Radrich, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany); Panagiotis Symvoulidis, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany); Jürgen Glatz, Maximilian W. Koch, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany); Jorge Ripoll, Univ. Carlos III de Madrid (Spain); Vasilis Ntziachristos, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany) . . . . . [9311-3]

2:45 pm: **Multispectral reflectance enhancement for breast cancer visualization in the operating room**, Gaspar Fernandez-Barreras, Eusebio Real, Univ. de Cantabria (Spain); Ashley M. Laughney, Cancer Biology and Genetics Program, Memorial Sloan-Kettering Cancer Ctr. (USA); Venkataramanan Krishnaswamy, Keith D. Paulsen, Thayer School of Engineering at Dartmouth (USA); José Miguel López-Higuera, Univ. de Cantabria (Spain); Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA); Olga M. Conde, Univ. de Cantabria (Spain) . . . . . [9311-4]

3:00 pm: **Label-free multimodal multiphoton imaging by adaptively shaping fiber supercontinuum pulses**, Yuan Liu, Haohua Tu, Eric J. Chaney, Sixian You, Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9311-5]

3:15 pm: **Imaging of live cancer cells using molecular imaging needles**, Loretta Scolaro, Louisa A. Ho, Dirk Lorenser, The Univ. of Western Australia (Australia); Elizabeth Thomas, St. John of God Hospital (Australia); David D. Sampson, Rebecca O. Fuller, Robert A. McLaughlin, The Univ. of Western Australia (Australia) . . . . . [9311-6]

Coffee Break . . . . . .Sat 3:30 pm to 4:00 pm

SESSION 2

LOCATION: ROOM 202 (MEZZANINE) . . . . . SAT 4:00 PM TO 6:00 PM

Advanced Molecular Imaging Methods

Session Chairs: **Amaan Mazhar,** Modulated Imaging, Inc. (USA); **Pablo A. Valdes,** Brigham and Women's Hospital (USA)

4:00 pm: **Quantitative wide-field fluorescence imaging in neurosurgery** *(Invited Paper)*, Keith D. Paulsen, Thayer School of Engineering at Dartmouth (USA) and Geisel School of Medicine (USA) and Norris Cotton Cancer Ctr. (USA); Pablo A. Valdes Quevedo M.D., Brigham and Women's Hospital (USA) and Harvard Medical School (USA); Frédéric Leblond, Ecole Polytechnique de Montréal (Canada); Brian C. Wilson, Ontario Cancer Institute (Canada); Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA) and Geisel School of Medicine (USA) and Norris Cotton Cancer Ctr (USA); David W. Roberts M.D., Dartmouth Hitchcock Medical Ctr. (USA) and Geisel School of Medicine (USA) and Norris Cotton Cancer Ctr. (USA) . . . . . [9311-7]

4:30 pm: **Rigid endoscopic polarimetric wide-field imaging** *(Invited Paper)*, Ji Qi, Mohan Singh, Anne Pigula, Neil T. Clancy, Daniel S. Elson, Imperial College London (United Kingdom) . . . . . [9311-8]

5:00 pm: **Quantitative molecular receptor imaging is facilitated by arterial input function acquisition combined with kinetic modeling**, Jonathan T. Elliott, Dartmouth College (USA); Kenneth M. Tichauer, Illinois Institute of Technology (USA); Scott C. Davis, Kimberley S. Samkoe, Jason R. Gunn, Dartmouth College (USA); David W. Roberts M.D., Dartmouth Hitchcock Medical Ctr. (USA); Keith D. Paulsen, Brian W. Pogue, Dartmouth College (USA) . . . . . [9311-9]

5:15 pm: **Quantitative fluorescence imaging enabled by spatial frequency domain imaging in the sub-diffusive regime for image-guided glioma resection**, Mira Sibai, Univ. of Toronto (Canada) and Princess Margaret Cancer Ctr., Universal Health Network (Canada); Israel Veilleux, Princess Margaret Cancer Ctr., Universal Helath Network (Canada); Michael Jermyn, Guillaume Sheehy, Audrey Laurence, Frédéric Leblond, Ecole Polytechnique de Montréal (Canada); Brian C. Wilson, Univ. of Toronto (Canada) and Princess Margaret Hospital, Univ. Health Network (Canada). . . . . [9311-10]

5:30 pm: **Accounting for lymphatic delivery differences during fluorescence imaging of lymph nodes reveals differences between normal and tumor-bearing nodes**, Alisha V. DSouza, Jonathan T. Elliott, Jason R. Gunn, Thayer School of Engineering at Dartmouth (USA); Richard J. Barth M.D., Kimberley S. Samkoe, Geisel School of Medicine (USA); Kenneth M. Tichauer, Illinois Institute of Technology (USA); Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA) . . . . . [9311-11]

5:45 pm: **Development of a spectrally-resolved near-infrared fluorescence imaging system based on a wavelength-swept laser**, Jaedu Cho, Tiffany C. Kwong, Farouk Nouizi, Univ. of California, Irvine (USA); Chang-Seok Kim, Pusan National Univ. (Korea, Republic of); Gultekin Gulsen, Univ. of California, Irvine (USA) . . . . . [9311-12]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 3

LOCATION: ROOM 202 (MEZZANINE) . . . . . .SUN 8:00 AM TO 10:00 AM

Clinical Fluorescence Imaging Systems

Session Chairs: **Martijn Van de Giessen,** Leiden Univ. Medical Ctr. (Netherlands); **Nicholas J. Durr,** Beth Israel Deaconess Medical Ctr. (USA)

8:00 am: **Fluorescence image-guided surgery: from benchtop to bedside** *(Invited Paper)*, Siavash Yazdanfar, Victoria E. Cotero, Tiberiu M. Siclovan, Dmitry V. Dylov, Cristina A. Tan Hehir, GE Global Research (USA) . . . . [9311-13]

8:30 am: **Molecular-guided endoscopic mucosal resection of early neoplasia in Barrett's esophagus** *(Invited Paper)*, Thomas D. Wang M.D., Univ. of Michigan (USA) . . . . . [9311-14]

9:00 am: **Light-weight, concomitant color and NIR fluorescence imaging system for molecular-guided minimal invasive interventions**, Maximilian W. Koch, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany); Pilar Beatriz Garcia Allende, Vasilis Ntziachristos, Technische Univ. München (Germany). . . . . [9311-15]

9:20 am: **Augmented microscopy with near-infrared fluorescence detection**, Jeff Watson, Nikolay Martirosyan, Jesse Skoch M.D., Michael Lemole Jr., Rein Anton M.D., Marek Romanowski, The Univ. of Arizona (USA) . . . . [9311-16]

9:40 am: **The combination design for open and endoscopic surgery using fluorescence molecular imaging technology**, Yamin Mao, Institute of Automation (China); Shixin Jiang, Beijing Jiaotong Univ. (China); Jinzuo Ye, Institute of Automation (China); Yu An, Beijing Jiaotong Univ. (China); Chongwei Chi, Jie Tian, Institute of Automation (China). . . . . [9311-17]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 4

LOCATION: ROOM 202 (MEZZANINE) . . . . . SUN 10:30 AM TO 12:30 PM

Molecular Contrast Agents

Session Chairs: **Hak Soo Choi,** Beth Israel Deaconess Medical Ctr. (USA); **Walter J. Akers,** Washington Univ. School of Medicine in St. Louis (USA)

10:30 am: **Activatable fluorescence probes appropriate for assisting surgical and endoscopic procedures** *(Invited Paper)*, Hisataka Kobayashi, National Cancer Institute (USA). . . . . [9311-18]

11:00 am: **Clinical trials in near Infrared fluorescence imaging with IRDye 800CW** *(Invited Paper)*, Daniel R. Draney, LI-COR Biosciences (USA) . . [9311-19]

11:30 am: **Improving fluorescent contrast for image-guided surgery** *(Invited Paper)*, Summer L. Gibbs, Oregon Health & Science Univ. (USA) . . . . . [9311-20]

12:00 pm: **Novel near-infrared imaging agents targeting prostate cancer**, Xinning Wang, Brian Q. Tsui, Gopolakrishnan Ramamurthy, Case Western Reserve Univ. (USA); Warren D. W. Heston, The Cleveland Clinic (USA); James P. Basilion, Case Western Reserve Univ. (USA) . . . . . [9311-21]

12:15 pm: **Improved tumor identification using dual tracer molecular imaging in fluorescence guided brain surgery**, Xiaochun Xu, Veronica Torres, Illinois Institute of Technology (USA); David Straus, Rush Univ. Medical Ctr. (USA); Eric M Brey, Illinois Institute of Technology (USA); Richard W. Byrne, Rush Univ. Medical Ctr. (USA); Kenneth M. Tichauer, Illinois Institute of Technology (USA) . . . . . [9311-22]

Lunch/Exhibition Break . . . . . Sun 12:30 pm to 1:30 pm

SESSION 5

LOCATION: ROOM 202 (MEZZANINE) . . . . . SUN 1:30 PM TO 3:30 PM

Preclinical Applications and Clinical Translation

Session Chairs: **Kenneth M. Tichauer,** Illinois Institute of Technology (USA); **Takeaki Ishizawa M.D.,** The Univ. of Tokyo (Japan)

1:30 pm: **Fluorescence molecular imaging heads for the clinics: benefits and pitfalls** *(Invited Paper)*, Vasilis Ntziachristos, Technische Univ. München (Germany) and Helmholtz Zentrum (Germany). . . . . [9311-23]

2:00 pm: **The current state of clinical translation of optical imaging agents** *(Invited Paper)*, Jonathan M. Sorger, Intuitive Surgical, Inc. (USA) . . . . . [9311-24]

2:30 pm: **A miniaturized imaging system for optical guided surgery of head and neck cancer**, Ihab Atallah, CHU Grenoble (France); Clément Milet, maxime Henry, INSERM (France); Paul Dorval, Pascal Gayet, Philippe Rizo, Fluoptics (France); Emile Reyt, CHU Grenoble (France); Véronique Josserand, Amandine Hurbin, INSERM (France); Christian A. Righini, CHU Grenoble (France); Jean-Luc Coll, INSERM (France). . . . . [9311-25]

2:50 pm: **Ex-vivo tissue classification of cell surface receptor concentrations using kinetic modeling**, Lagnojita Sinha, Illinois Institute of Technology (USA); Yu Wang, Stony Brook Univ. (USA) and Univ. of Washington (USA); Cynthia S. Yang, Illinois Institute of Technology (USA); Altaz Khan, Jonathan T. C. Liu, Stony Brook Univ. (USA) and Univ. of Washington (USA); Kenneth M. Tichauer, Illinois Institute of Technology (USA) . . . . . [9311-26]

3:10 pm: **Small animal imaging platform for quantitative short-wave infrared emitting contrast agents**, Philip Hu, Marco Mingozzi, Laura M. Higgins, Vidya Ganapathy, Margot Zevon, Rutgers, The State Univ. of New Jersey (USA); Richard E Riman, Rutgers State Univ of New Jersey (USA); Charles M. Roth, Prabhas V. Moghe, Mark C. Pierce, Rutgers, The State Univ. of New Jersey (USA) . . . . . [9311-27]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 6

LOCATION: ROOM 202 (MEZZANINE) . . . . . SUN 4:00 PM TO 6:00 PM

Clinical Applications

Session Chairs: **Summer L. Gibbs,** Oregon Health & Science Univ. (USA); **Brian C. Wilson,** Univ. Health Network (Canada)

4:00 pm: **Image guided surgery using near infrared fluorescent light: from bench to bedside** *(Invited Paper)*, Alexander L. Vahrmeijer M.D., Leiden Univ. Medical Ctr. (Netherlands). . . . . [9311-28]

4:30 pm: **Sentinel lymph node detection in breast cancer patients using surgical navigation system based on fluorescence molecular imaging technology** *(Invited Paper)*, Chongwei Chi, Institute of Automation (China); Deqiang Kou, The General Surgery Ctr., People's Liberation Army General Hospital (China); Jinzuo Ye, Yamin Mao, Institute of Automation (China); Jingdan Qiu, Jiandong Wang, The General Surgery Ctr., People's Liberation Army General Hospital (China); Xin Yang, Institute of Automation, China (China); Jie Tian, Institute of Automation (China) . . . . . [9311-29]

5:00 pm: **Clinical applications of fluorescence imaging for enhancing safety and therapeutic efficacy of hepatobiliary and pancreatic surgery**, Takeaki Ishizawa M.D., The Univ. of Tokyo (Japan) and Cancer Institute Ariake Hospital, Japanese Foundation for Cancer Research (Japan); Yasuteru Urano, Mako Kamiya, Akinori Miyata, Suguru Yamashita M.D., The Univ. of Tokyo (Japan); Yosuke Inoue, Junichi Arita, Yu Takahashi, Akio Saiura, Cancer Institute Ariake Hospital, Japanese Foundation for Cancer Research (Japan); Norihiro Kokudo M.D., The Univ. of Tokyo (Japan) . . . . . [9311-30]

5:20 pm: **Intraoperative imaging of tumors with indo-cyanine green fluorescence with an endoscope**, Ashwin B. Parthasarathy, Sang Hoon Chong, Univ. of Pennsylvania (USA); Frank A. Moscatelli, Swarthmore College (USA); Sunil Singhal, Hospital of the Univ. of Pennsylvania (USA); Arjun G. Yodh, Univ. of Pennsylvania (USA) . . . . . [9311-31]

5:40 pm: **Quantitative assessment of the potential for Cerenkov luminescence imaging guided oncologic surgery**, Justin S. Klein, Gregory S. Mitchell, Simon R. Cherry, Univ. of California, Davis (USA) . [9311-32]

CONFERENCE 9311
LOCATION: ROOM 202 (MEZZANINE)

POSTERS-SUNDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

A miniature wearable optical imaging system for guiding surgeries, Christopher Mela, Carrie Patterson, Yang Liu, The Univ. of Akron (USA) . . . . . [9311-33]

Fluorescently labeled small molecules for pancreatic adenocarcinoma surgical margin assessment in the operating room, Dianmu Zhang, Emily Schultz, Summer L. Gibbs, Oregon Health & Science Univ. (USA)[9311-34]

Local administration of nerve-specific fluorophores to guide nerve-sparing radical prostatectomy, Kayla M. Hackman, Brandon Lei, Oregon Health & Science Univ. (USA); Adam Alani, Oregon State Univ. (USA); Summer L. Gibbs, Oregon Health & Science Univ. (USA). . . . . [9311-35]

Activity and pharmacokinetics testing of anti-EGFR Affibody linked to IRDye 800CW maleimide, Jason R. Gunn, Thayer School of Engineering at Dartmouth (USA); Brian W. Pogue, Thayer School of Engineering at Darmouth (USA); Alisha V. Dsouza, Johnathan T. Elliott, Thayer School of Engineering at Dartmouth (USA); Kimberley S. Samkoe, Dartmouth Hitchcock Medical Ctr. (USA); Keith D. Paulsen, Thayer School of Engineering at Dartmouth (USA); Daniel R. Draney, LI-COR Biosciences (USA); Joachim Feldwisch, Affibody AB (Sweden) . . . . . [9311-36]

Fiber optic quantification of dual-fluorophores to provide both tissue and vascular contrast during resection of brain tumors, Jaime Bravo, Stephen C. Kanick, Thayer School of Engineering at Dartmouth (USA); Pablo A. Valdes Quevedo M.D., Brigham and Women's Hospital (USA); David W. Roberts M.D., Dartmouth Hitchcock Medical Ctr. (USA); Keith D. Paulsen, Thayer School of Engineering at Dartmouth (USA) . . . . . [9311-37]

Radiometric configuration parameters to consider in quantitative clinical fluorescence imaging measurements, Maritoni Litorja, Aaron Urbas, National Institute of Standards and Technology (USA) . . . . . [9311-43]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their ground-breaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9312
LOCATION: ROOM 303 (ESPLANADE)

Monday–Wednesday 9–11 February 2015 • Proceedings of SPIE Vol. 9312

BiOS

Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX

Conference Chairs: **James G. Fujimoto,** Massachusetts Institute of Technology (USA); **Joseph A. Izatt,** Duke Univ. (USA); **Valery V. Tuchin,** N.G. Chernyshevsky Saratov State Univ. (Russian Federation)

Program Committee: **Peter E. Andersen,** Technical Univ. of Denmark (Denmark); **Kostadinka Bizheva,** Univ. of Waterloo (Canada); **Stephen A. Boppart M.D.,** Univ. of Illinois at Urbana-Champaign (USA); **Zhongping Chen,** Beckman Laser Institute and Medical Clinic (USA); **Johannes de Boer,** Vrije Univ. Amsterdam (Netherlands); **Wolfgang Drexler,** Medizinische Univ. Wien (Austria); **Christoph K. Hitzenberger,** Medizinische Univ. Wien (Austria); **Robert A. Huber,** Univ. zu Lübeck (Germany); **Rainer A. Leitgeb,** Medizinische Univ. Wien (Austria); **Xingde Li,** Johns Hopkins Univ. (USA); **Yingtian Pan,** Stony Brook Univ. (USA); **Adrian Gh. Podoleanu,** Univ. of Kent (United Kingdom); **Andrew M. Rollins,** Case Western Reserve Univ. (USA); **Natalia M. Shakhova,** Institute of Applied Physics (Russian Federation); **Guillermo J. Tearney M.D.,** Wellman Ctr. for Photomedicine (USA); **Ruikang K. Wang,** Univ. of Washington (USA); **Maciej Wojtkowski,** Nicolaus Copernicus Univ. (Poland); **Yoshiaki Yasuno,** Univ. of Tsukuba (Japan)

SUNDAY 8 FEBRUARY

POSTERS-SUNDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Lighting, edge, and depth enhanced ray casting for real-time volumetric visualization of intraoperative ophthalmic OCT, Christian Viehland, Oscar Carrasco-Zevallos, Brenton Keller, Derek Nankivil, Joseph A. Izatt, Duke Univ. (USA) . . . . . [9312-85]

Simultaneous optical coherence tomography and lipofuscin autofluorescence imaging of the retina with a single broadband light source at 480nm, Minshan Jiang, Tan Liu, Xiaojing Liu, Shuliang Jiao, Florida International Univ. (USA) . . . . . [9312-86]

Dual-band spectral-domain OCT at 480nm and 830 nm for in vivo imaging the spectral contrasts of the retinal nerve fiber layer, Minshan Jiang, Tan Liu, Xiaojing Liu, Shuliang Jiao, Florida International Univ. (USA). . . . . [9312-87]

Enhancing the visualization of human retina vascular networks by GPU accelerated speckle variance OCT and graph cut retinal layer segmentation, Jing Xu, Kevin S. K. Wong, Vincent Wong, Sieun Lee, Eunice Michelle C. Cua, Yifan Jian, Marinko V. Sarunic, Simon Fraser Univ. (Canada) . . . . . [9312-88]

Progress on developing wavefront sensorless adaptive optics optical coherence tomography for in vivo retinal imaging in mice, Azhar Zam, Pengfei Zhang, Univ. of California, Davis (USA); Yifan Jian, Marinko V. Sarunic, Simon Fraser Univ. (Canada); Stefano Bonora, CNR-Istituto di Fotonica e Nanotecnologie (Italy); Edward N. Pugh Jr., Robert J. Zawadzki, Univ. of California, Davis (USA) . . . . . [9312-89]

A wide angle low coherence interferometry based eye length optometer, Alexander Meadway, John T. Seigwart, The Univ. of Alabama at Birmingham (USA); Christine F. Wildsoet, Univ. of California, Berkeley (USA); Thomas T. Norton, Yuhua Zhang, The Univ. of Alabama at Birmingham (USA). . . . [9312-90]

Fourier domain Optical Coherence Tomography artifact and speckle reduction with autoregressive (AR) spectral estimation without a loss of resolution, Costas Pitris, Evgenia Bousi, Univ. of Cyprus (Cyprus). . . . [9312-91]

Generic frequency-domain method for ultrafast and robust characterization of optical attenuation from OCT images, Wu Yuan, Johns Hopkins Univ. (USA); Carmen Kut, The Johns Hopkins Hospital (USA); Wenxuan Liang, Xingde Li, Johns Hopkins Univ. (USA) . . . . . [9312-92]

CloudOCT: An online data- and code-sharing platform to accelerate research progress, Kristen L. Lurie, Behram F. T. Mistree, Audrey K. Ellerbee, Stanford Univ. (USA) . . . . . [9312-93]

Lateral resolution enhancement via imbricated spectral domain optical coherence tomography in a maximum-a-posterior reconstruction framework, Ameneh Boroomand, Mohammad Javad Shafiee, Alexander Wong, Kostadinka Bizheva, Univ. of Waterloo (Canada) . . . . . [9312-94]

Axial resolution improvement in spectral domain optical coherence tomography using a depth-adaptive maximum-a-posterior framework, Ameneh Boroomand, Bingyao Tan, Alexander Wong, Kostadinka Bizheva, Univ. of Waterloo (Canada). . . . . [9312-95]

Signal simulation and signal processing for multiple reference optical coherence tomography, Kai Neuhaus, Hrebesh Molly Subhash, Roshan I. Dsouza, National Univ. of Ireland, Galway (Ireland); Josh Hogan, Carol J. Wilson, Compact Imaging, Inc. (USA); Martin J. Leahy, National Univ. of Ireland, Galway (Ireland) . . . . . [9312-96]

The drivers of the OCT market growth in healthcare applications, Clémentine Bouyé, Benoît d'Humières, TEMATYS (France). . . . . [9312-97]

Optical coherence photoacoustic microscopy (OC-PAM) for in vivo multimodal retinal imaging, Xiaojing Liu, Tan Liu, Shuliang Jiao, Florida International Univ. (USA) . . . . . [9312-98]

Spectroscopy by joint Spectral and Time domain Optical Coherence Tomography, Maciej Szkulmowski, Szymon Tamborski, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland) . . . . . [9312-99]

Tissue classification of lupus nephritis using OCT and OCE, Kirill V. Larin, Chih Hao Liu, Manmohan Singh, Jiasong Li, Chen Wu, Rita Idugboe, Yong Du, Chandra Mohan, Michael D. Twa, Univ. of Houston (USA). . . . . [9312-100]

Photothermal full field OCT for exogeneous and endogeneous contrast detection, Amir Nahas, Mariana Varna, Emmanuel Fort, Charles-Edouard Leroux, Emmanuel Bossy, A. Claude Boccara, Institut Langevin (France) . . . . . [9312-101]

Optical coherence elastography (OCE) as a method for identifying benign and malignant prostate biopsies, Chunhui Li, Guangying Guan, Yuting Ling, Stephen Lang, Univ. of Dundee (United Kingdom); Ruikang K. Wang, Univ. of Dundee (United Kingdom) and Univ. of Washington (USA); Zhihong Huang, Ghulam Nabi, Univ. of Dundee (United Kingdom). . . . . [9312-102]

A comparison study on capillary vessel imaging with optical micro-angiography and two-photon microscopy, Wan Qin, Utku Baran, Yuandong Li, Univ. of Washington (USA); Hequn Wang, Wellman Ctr. for Photomedicine (USA); Wenbo Wang, Haishan Zeng, The BC Cancer Agency Research Ctr. (Canada); Ruikang K. Wang, Univ. of Washington (USA) . . . . . [9312-103]

Observation of Au nanoring distribution during cancer cell uptake with spectroscopic optical coherence tomography, Ting-Ta Chi, Ming-Jyun Li, Yi-Chou Tu, Shih-Yang Chen, Chih-Ken Chu, Che-Kuan Chu, Yu-Wei Chang, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan). [9312-104]

Dynamic photothermal optical coherence tomography in a blood vessel with Au nanorings: A phantom study, Ting-Ta Chi, Yi-Chou Tu, Ming-Jyun Li, Shih-Yang Chen, Chih-Ken Chu, Yu-Wei Chang, Che-Kuan Chu, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) . . . . . [9312-105]

Optical coherence tomography imaging of tibialis anterial muscle for early diagnosis of sarcopenia in a rat model, Yugyeong Chae, Pukyong National Univ. (Korea, Republic of) and Ctr. for Marine-Integrated Biomedical Technology, Pukyong National Univ. (Korea, Republic of); Young-Sik Kim, Research Institute of Radiation Science and Technology, Pukyong National Univ. (Korea, Republic of); Sang Hoon Kang, Jeong-Eun Park, Pukyong National Univ. (Korea, Republic of); Eun-Kee Park, Kosin Univ. (Korea, Republic of) and Innovative Biomedical Technology Research Ctr. (Korea, Republic of); Byeong-Hwan Jeon, School of Sports and Health, Kyungsung Univ. (Korea, Republic of); Yeh-Chan Ahn, Pukyong National Univ. (Korea, Republic of) and Innovative Biomedical Technology Research Ctr. (Korea, Republic of) and Ctr. for Marine-Integrated Biomedical Technology, Pukyong National Univ. (Korea, Republic of) . . . . . [9312-106]

Nano-particle doped hydroxyapatite material evaluation using Spectroscopic Polarization Sensitive Optical Coherence Tomography, Paulina Strakowska, Michal Trojanowski, Gdansk Univ. of Technology (Poland); Mateusz Gardas, Garocin Labs. (Poland); Maciej J. Glowacki, Maciej Kraszewski, Marcin R. Strakowski, Gdansk Univ. of Technology (Poland) . . . . . [9312-108]

Volumetric Mouse Brain Imaging with Optical Coherence Tomography, Junwon Lee, Eunjung Min, Sunwoo Jung, Andrey Vavilin, Sungwon Shin, Ulsan National Institute of Science and Technology (Korea, Republic of); Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of); Woonggyu Jung, Ulsan National Institute of Science and Technology (Korea, Republic of) . . . . . [9312-109]

Application of optical coherence tomography attenuation imaging for quantification of optical properties in medulloblastoma, Barry Vuong, Patryk Skowron, Ryerson Univ. (Canada); Tim-Rasmus Kiehl M.D., Univ. Health Network (Canada); Matthew J. Kyan, Ryerson Univ. (Canada); Livia Garzia, The Hospital for Sick Children (SickKids) (Canada); Helen Genis, Cuiru Sun, Ryerson Univ. (Canada); Michael Taylor M.D., The Hospital for Sick Children (SickKids) (Canada); Victor X. D. Yang M.D., Ryerson Univ. (Canada) . [9312-110]

Line-Scan Spectral-Domain OCT for Ultrahigh-Speed In-Vivo Imaging of Chicken Embryo, Kalpesh Mehta, Zaineb Al-Qazwini, Nanguang Chen, National Univ. of Singapore (Singapore) . . . . . [9312-111]

Nondestructive germination speed analysis of Capsicum annum seeds under distinct chemical conditions using high-resolution swept source OCT, Ruchire E. Henry Wijesinghe, Nam Hyun Cho, Kibeom Park, Muhammad Faizan Shirazi, Upeksha Muhandiram, Sa-Youl Ghim, Hee-Young Jung, Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of) . . . . . [9312-112]

Motion analysis and removal in intensity variation based OCT microangiography, Xuan Liu, Mitchell Kirby, Feng Zhao, Michigan Technological Univ. (USA) . . . . . [9312-113]

Enhanced delineation of degradation in aortic walls through OCT, Eusebio Real, Univ. de Cantabria (Spain); José Fernando Val-Bernal, Univ. Hospital Marques de Valdecilla (Spain) and Univ. de Cantabria (Spain); José M. Revuelta, Univ. de Cantabria (Spain); Alejandro Pontón, Marta Calvo, Marta Mayorga, Univ. Hospital Marques de Valdecilla (Spain); José Miguel López-Higuera, Olga M. Conde, Univ. de Cantabria (Spain) . . . . . [9312-114]

Usefulness of optical coherence tomography to demonstrate the healing phase of achilles tendon rupture on rats, Young-Sik Kim, Research Institute of Radiation Science and Technology, Pukyong National Univ. (Korea, Republic of); Yugyeong Chae, Pukyong National Univ. (Korea, Republic of) and Ctr. for Marine-Integrated Biomedical Technology, Pukyong National Univ. (Korea, Republic of); Jong-Kyoung Choi, Kosin Univ. (Korea, Republic of); Eun-Kee Park, Kosin Univ. (Korea, Republic of) and Innovative Biomedical Technology Research Ctr. (Korea, Republic of); Dong-Kyu Kim, Kosin Univ. (Korea, Republic of); Yeh-Chan Ahn, Pukyong National Univ. (Korea, Republic of) and Ctr. for Marine-Integrated Biomedical Technology (Korea, Republic of) and Innovative Biomedical Technology Research Ctr. (Korea, Republic of) . . . . . [9312-115]

Precise measurement of instantaneous volume of eccrine sweat gland in mental sweating by optical coherence tomography, Masato Ohmi, Yoshihiko Sugawa, Akihiro Fukuda, Osaka Univ. (Japan) . . . . . [9312-116]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their ground-breaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

MONDAY 9 FEBRUARY

SESSION 1

LOCATION: ROOM 303 (ESPLANADE) . . . . . MON 8:30 AM TO 10:00 AM

Ophthalmology I

Session Chair: **James G. Fujimoto,**
Massachusetts Institute of Technology (USA)

8:30 am: **Full volumetric video rate OCT of the posterior eye with 255x255x450 voxels at 20.8 volumes/s**, Jan Philip Kolb, Univ. zu Lübeck (Germany) and Ludwig-Maximilians-Univ. München (Germany); Thomas Klein, Wolfgang Wieser, Wolfgang Draxinger, Ludwig-Maximilians-Univ. München (Germany); Robert A. Huber, Univ. zu Lübeck (Germany). . . . . [9312-1]

8:45 am: **High-speed, numerically refocused retinal imaging with line-field parallel swept source imaging at 0.6 MHz**, Daniel Fechtig, Abhishek Kumar, Laurin Ginner, Wolfgang Drexler, Rainer A. Leitgeb, Medizinische Univ. Wien (Austria) . . . . . [9312-2]

9:00 am: **First in human swept-source ophthalmic intrasurgical OCT with real time 3D visualization**, Brenton Keller, Oscar Carrasco-Zevallos, Christian Viehland, Liangbo Shen, Gar Waterman, Duke Univ. (USA); Philip Desouza, Paul Hahn M.D., Duke Univ. Medical Ctr. (USA); Anthony N. Kuo M.D., Duke Univ. School of Medicine (USA); Cynthia A. Toth M.D., Duke Univ. Medical Ctr. (USA); Joseph A. Izatt, Duke Univ. (USA). . . . . [9312-3]

9:15 am: **Integrative advances for intraoperative OCT-guided ophthalmic surgery: microscope integration, surgical instrumentation, and heads-up display surgeon feedback**, Yuankai K. Tao, Mohamed T. El-Haddad, Sunil K. Srivastava, Daniel Feiler, The Cleveland Clinic (USA); Amanda I. Noonan, Andrew M. Rollins, Case Western Reserve Univ. (USA); Justis P. Ehlers, The Cleveland Clinic (USA). . . . . [9312-4]

9:30 am: **Imaging of retinal vessels using adaptive optics assisted SLO/OCT** , Michael Pircher, Matthias Rechenmacher, Franz Felberer, Richard Haindl, Bernhard Baumann, Christoph K. Hitzenberger, Medizinische Univ. Wien (Austria) . . . . . [9312-5]

9:45 am: **Ultrahigh speed swept source OCT angiography for imaging retinal and choriocapillaris vasculature in patients with age-related macular degeneration** , WooJhon Choi, Massachusetts Institute of Technology (USA); Eric M. Moult, Harvard-MIT Health Sciences and Technology (USA); Nadia K. Waheed, Mehreen Adhi M.D., New England Eye Ctr., Tufts Medical Ctr. (USA); Benjamin M. Potsaid, Advanced Imaging Group, Thorlabs, Inc. (USA); ByungKun Lee, Massachusetts Institute of Technology (USA); Vijaysekhar Jayaraman, Praevium Research, Inc. (USA); Talisa De Carlo, New England Eye Ctr., Tufts Medical Ctr. (USA); Alex E. Cable, Advanced Imaging Group, Thorlabs, Inc. (USA); Jay S. Duker M.D., New England Eye Ctr., Tufts Medical Ctr. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA) . . . . . [9312-6]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

SESSION 2

LOCATION: ROOM 303 (ESPLANADE) . . . . . MON 10:30 AM TO 12:00 PM

Light Sources and Technology

Session Chair: **Robert A. Huber,** Univ. zu Lübeck (Germany)

10:30 am: **Simplified wavelength-swept lasers for high performance optical frequency domain imaging (OFDI)**, Changsu Jun, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA); Martin L. Villiger, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA); Wang-Yuhl Oh, KAIST (Korea, Republic of); Brett E. Bouma, Wellman Ctr. for Photomedicine (USA) . . . . . [9312-7]

10:45 am: **Stability and performance of a 1.5 MHz electronically controlled self-starting 1310 nm FDML laser**, Wolfgang Wieser, Thomas Klein, Wolfgang Draxinger, Ludwig-Maximilians-Univ. München (Germany); Robert A. Huber, Univ. zu Lübeck (Germany) . . . . . [9312-8]

11:00 am: **200 kHz 1310nm and 400 kHz 1060nm swept lasers for optical coherence tomography**, Brian D. Goldberg, Walid Atia, Mark Kuznetsov, Bart C. Johnson, Vaibhav Mathur, Ranko Galeb, Peter Whitney, AXSUN Technologies Inc. (USA) . . . . . [9312-9]

11:15 am: **A flexible wavelength tuning of active mode locking fiber laser for SS-OCT**, Hwi Don Lee, Myung Yung Jeong, Chang-Seok Kim, Pusan National Univ. (Korea, Republic of); Jun Geun Shin, Byeong Ha Lee, Tae Joong Eom, Gwangju Institute of Science and Technology (Korea, Republic of) . . . . . [9312-10]

11:30 am: **Optimal operational conditions for supercontinuum-based ultrahigh-resolution endoscopic OCT imaging**, Wu Yuan, Jessica Mavadia-Shukla, Jiefeng Xi, Wenxuan Liang, Xiaoyun Yu, Shaoyong Yu, Xingde Li, Johns Hopkins Univ. (USA) . . . . . [9312-11]

11:45 am: **Miniaturized optical coherence tomography system based on silicon photonics**, Juan Sancho-Durá, Kirill E. Zinoviev, Juan Lloret-Soler, Jose L. Rubio-Guivernau, Eduardo Margallo-Balbás, MedLumics S.L. (Spain); Wolfgang Drexler, Medizinische Univ. Wien (Austria) . . . . . [9312-12]

Lunch Break . . . . . Mon 12:00 pm to 1:30 pm

SESSION 3

LOCATION: ROOM 303 (ESPLANADE) . . . . . MON 1:30 PM TO 3:30 PM

Endoscopy / Intravascular I

Session Chair: **Xingde Li,** Johns Hopkins Univ. (USA)

1:30 pm: **Assessing airway smooth muscle with orientation-calibrated PS-OCT**, David C. Adams, Lida P. Hariri M.D., Alyssa J. Miller, Yan Wang, Andrew D. Luster, Benjamin D. Medoff, Melissa J. Suter, Massachusetts General Hospital (USA) . . . . . [9312-13]

1:45 pm: **Endoscopic polarization sensitive optical frequency domain imaging for in vivo lung imaging**, Fabio Feroldi, Jianan Li, Mattijs de Groot, Vrije Univ. Amsterdam (Netherlands); Joop de Langen, Johannes M. A. Daniels, Katrien Grunberg, Tom Gani Sutedja M.D., Vrije Univ. Medical Ctr. (Netherlands); Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands) . . . . . [9312-14]

2:00 pm: **Endoscopic and ophthalmic swept source polarization sensitive OCT**, Zhao Wang, Hsiang-Chieh Lee, Osman O. Ahsen, ByungKun Lee, WooJhon Choi, Massachusetts Institute of Technology (USA); Benjamin Potsaid, Massachusetts Institute of Technology (USA) and Thorlabs Inc. (USA); Vijaysekhar Jayaraman, Praevium Research, Inc. (USA); Alex E. Cable, Thorlabs, Inc. (USA); Kaicheng Liang, James G. Fujimoto, Massachusetts Institute of Technology (USA) . . . . . [9312-15]

2:15 pm: **In vivo micro-OCT of airway cilia**, Kengyeh K. Chu, Massachusetts General Hospital (USA); Carolin I. Unglert, Massachusetts General Hospital (USA) and Massachusetts Institute of Technology (USA); Tim N. Ford, Robert W. Carruth, Kanwarpal Singh, Massachusetts General Hospital (USA); Susan E. Birket, George M. Solomon, Steven M. Rowe, The Univ. of Alabama at Birmingham (USA); Guillermo J. Tearney M.D., Massachusetts General Hospital (USA) . . . . . [9312-16]

2:30 pm: **OCT imaging of the upper airway using a VCSEL source**, Joseph C. Jing, Univ. of California, Irvine (USA); Li-dek Chou, Giriraj K. Sharma M.D., Beckman Laser Institute and Medical Clinic (USA); Brian J. F. Wong M.D., Zhongping Chen, Univ. of California, Irvine (USA) . . . . . [9312-17]

2:45 pm: **Ultra-thin OCT endoscopy probe without focusing optics**, Jangbeom Lee, Kookmin Univ. (Korea, Republic of); Yugyeong Chae, Yeh-Chan Ahn, Pukyong National Univ. (Korea, Republic of); Sucbei Moon, Kookmin Univ. (Korea, Republic of) . . . . . [9312-18]

3:00 pm: **A combined swept source optical coherence tomography and fluorescence lifetime imaging system for morphological and biochemical investigations of atherosclerosis**, Sebina Shrestha, Brian E. Applegate, Javier A. Jo, Texas A&M Univ. (USA); Brial L. Walton, Siquin Zhaorigetu, The Texas Heart Institute (USA); Xi Chen, Jesung Park, Jesus Rico-Jimenez, Michael J. Serafino, Texas A&M Univ. (USA) . . . . . [9312-19]

3:15 pm: **Portable, ultrahigh-resolution, distal end scanning endoscopic SD-OCT system at 800 nm**, Jessica Mavadia-Shukla, Wu Yuan, Jiefeng Xi, Xingde Li, Johns Hopkins Univ. (USA) . . . . . [9312-20]

Coffee Break . . . . . Mon 3:30 pm to 4:00 pm

SESSION 4

LOCATION: ROOM 303 (ESPLANADE) . . . . . MON 4:00 PM TO 6:00 PM

Ophthalmology II

Session Chair: **Adrian Gh. Podoleanu,** Univ. of Kent (United Kingdom)

4:00 pm: **Handheld, rapidly switchable, full depth anterior/posterior swept source ophthalmic optical coherence tomography using coherence revival**

, Derek Nankivil, Gar Waterman, Brenton Keller, Christian Viehland, Duke Univ. (USA); Anthony N. Kuo M.D., Duke Univ. School of Medicine (USA) and Duke Univ. (USA); Joseph A. Izatt, Duke Univ. (USA). . . . . [9312-21]

4:15 pm: **3D-spectral imaging system for anterior chamber metrology**, Trevor B. Anderson, Armin Segref, Grant Frisken, Steven Frisken, Cylite Pty Ltd. (Australia). . . . . [9312-22]

4:30 pm: **Modal analysis of sound-induced corneal vibration by phase-sensitive optical coherence tomography**, Imran B. Akca, Ernest W. Chang, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Sabine Kling, Consejo Superior de Investigaciones Científicas (Spain); Giuliano Scarcelli, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Susana Marcos, Consejo Superior de Investigaciones Científicas (Spain); Seok-Hyun Yun, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA). . . . . [9312-23]

4:45 pm: **Off-axis full-field optical coherence tomography for in-vivo retinal imaging**, Hendrik Spahr, Institut für Biomedizinische Optik, Univ. zu Lübeck (Germany); Dierck Hillmann, Thorlabs GmbH (Germany); Carola Hain, Helge M. Sudkamp, Gesa L. Franke, Gereon Hüttmann, Institut für Biomedizinische Optik, Univ. zu Lübeck (Germany) . . . . . [9312-24]

5:00 pm: **Velocity vector field reconstruction in retinal vessels via dual-beam bidirectional Doppler optical coherence tomography**, Gerold Aschinger, Medizinische Univ. Wien (Austria) and Technische Univ. Wien (Austria); Leopold Schmetterer, Medizinische Univ. Wien (Austria); Veronika Doblhoff-Dier, Medizinische Univ. Wien (Austria) and Technische Univ. Wien (Austria); Rainer A. Leitgeb, René M. Werkmeister, Medizinische Univ. Wien (Austria) . . . . . [9312-25]

5:15 pm: **Pupil tracking optical coherence tomography for precise control of pupil entry position**, Oscar Carrasco-Zevallos, Derek Nankivil, Brenton Keller, Liangbo Shen, Duke Univ. (USA); Bhavna J. Antony, Brandon J. Lujan, Univ. of California, Berkeley (USA); Joseph A. Izatt, Duke Univ. (USA) . [9312-26]

5:30 pm: **Detection of retinal degeneration in an animal model using two dimensional angle-resolved low coherence interferometry combined with optical coherence tomography**, Sanghoon Kim, Stephanie Heflin, Derek Ho, Sina Farsiu, Vadim Y. Arshavsky, William J. Brown, Adam Wax, Duke Univ. (USA) . . . . . [9312-27]

5:45 pm: **High resolution polarization sensitive OCT for ocular imaging in rodents**, Stanislava Fialová, Sabine Rauscher, Marion Gröger, Christoph K. Hitzenberger, Michael Pircher, Bernhard Baumann, Medizinische Univ. Wien (Austria) . . . . . [9312-28]

POSTERS-MONDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . MON 5:30 PM TO 7:30 PM

Conference attendees are invited to attend the BiOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Assessment of setting behavior of biocements using intensity correlation based multiple reference optical coherence tomography, Roshan I. Dsouza, Hrebesh Molly Subhash, Kai Neuhaus, National Univ. of Ireland, Galway (Ireland); Josh Hogan, Carol J. Wilson, Compact Imaging, Inc. (USA); Martin J. Leahy, National Univ. of Ireland, Galway (Ireland) . . . . . [9312-13]

Low cost, high resolution optical coherence tomography utilizing a narrowband laser diode, Kentaro Osawa, Naoko Senda, Hiroyuki Minemura, Koichi Watanabe, Hitachi, Ltd. (Japan); Jun Hato, Daisuke Tomita, Hitachi-LG Data Storage, Inc. (Japan). . . . . [9312-118]

Akinetic swept source with adjustable coherence length for SS-OCT, Radu F. Stancu, David A. Jackson, Adrian G. Podoleanu, Univ. of Kent (United Kingdom) . . . . . [9312-119]

The mid-infrared swept-laser: life beyond OCT?, Stephen J. Matcher, David T. D. Childs, Richard A. Hogg, Dmitry G. Revin, Ihtesham U. Rehman, John W. Cockburn, The Univ. of Sheffield (United Kingdom) . . . . . [9312-120]

Phase evolution and instantaneous linewidth of a Fourier Domain Mode Locked laser, Bryan Kelleher, Svetlana Slepneva, Ben O'Shaughnessy, David Goulding, Tyndall National Institute (Ireland); Andrei G. Vladimirov, Weierstrass-Institut für Angewandte Analysis und Stochastik (Germany); Stephen P. Hegarty, Tyndall National Institute (Ireland); Guillaume Huyet, Tyndall National Institute (Ireland) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9312-121]

Tunable semiconductor laser at 1025-1095 nm range for OCT applications with an extended imaging depth, Mikhail V. Shramenko, Alexander Chamorovskiy, Superlum (Ireland); Hong Chou Lyu, Nicolaus Copernicus Univ. (Poland); Andrei Lobintsov, Superlum (Ireland); Karol Karnowski, Nicolaus Copernicus Univ. (Poland); Sergei D. Yakubovich, Moscow State Technical Univ. of Radioengineering, Electronics and Automation (Russian Federation) and Superlum (Ireland); Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland) . . . . . [9312-122]

Dynamics, instantaneous linewidth and device optimization for a short cavity swept-source OCT laser, Bryan Kelleher, Svetlana Slepneva, Ben O'Shaughnessy, Tyndall National Institute (Ireland); Hong Chou Lyu, Nicolaus Copernicus Univ. (Poland); Thomas P. Butler, David Goulding, Stephen P. Hegarty, Tyndall National Institute (Ireland); Andrei G. Vladimirov, Weierstrass-Institut für Angewandte Analysis und Stochastik (Germany); Karol Karnowski, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland); Guillaume Huyet, Tyndall National Institute (Ireland) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9312-123]

Supercontinuum noise in low coherence interferometry systems, William J. Brown, Sanghoon Kim, Adam Wax, Duke Univ. (USA). . . . . [9312-124]

Simple and inexpensive long range swept source for optical coherence tomography applications, Bastian Braeuer, Norman Lippok, Stuart G. Murdoch, Frédérique Vanholsbeeck, The Univ. of Auckland (New Zealand). . . . . [9312-125]

Compact OCT system designed for portability and easy clinical deployment, Nate J. Kemp, Brian D. Goldberg, Bob Jenner, Noble Larson, Bart C. Johnson, AXSUN Technologies Inc. (USA). . . . . [9312-126]

Dual parametric compounding approach for speckle reduction in OCT, Jan Philip Kolb, Univ. zu Lübeck (Germany) and Ludwig-Maximilians-Univ. München (Germany); Philipp Schwarz, Thomas Klein, Wolfgang Wieser, Ludwig-Maximilians-Univ. München (Germany); Robert A. Huber, Univ. zu Lübeck (Germany) . . . . . [9312-127]

A comparison of OCT techniques for blood velocimetry, Conrad W. Merkle, Univ. of California, Davis (USA); Aaron C. Chan, The Univ. of Hong Kong (Hong Kong, China) and Univ. of California, Davis (USA); Vivek J. Srinivasan, Univ. of California, Davis (USA) . . . . . [9312-128]

Master-slave optical coherence tomography for parallel processing, calibration free and dispersion tolerance operation, Adrian Bradu, Adrian G. Podoleanu, Univ. of Kent (United Kingdom) . . . . . [9312-129]

Balanced spectral domain optical coherence tomography with single camera and a time delay fiber, Min-Gyu Hyeon, Hyung-Jin Kim, Beop-Min Kim, Korea Univ. (Korea, Republic of); Tae Joong Eom, Advanced Photonics Research Institute (Korea, Republic of). . . . . [9312-130]

Advances in high resolution holoscopy, Gesa L. Franke, Institut für Biomedizinische Optik, Univ. zu Lübeck (Germany); Dierck Hillmann, Thorlabs GmbH (Germany); Sabrina Lohmann, Institut für Biomedizinische Optik, Univ. zu Lübeck (Germany); Christian Winter, Jörn Wollenzin, Thorlabs GmbH (Germany); Hinnerk Schulz-Hildebrandt, Institut für Biomedizinische Optik, Univ. zu Lübeck (Germany); Gereon Hüttmann, Institut für Biomedizinische Optik, Univ. zu Lübeck (Germany) and Medizinisches Laserzentrum Lübeck GmbH (Germany) . . . . . [9312-131]

Wavelength to pixel calibration for FdOCT, Maciej Szkulmowski, Szymon Tamborski, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland) . . . . . [9312-132]

Real time FPGA resampling for swept source OCT, Bart C. Johnson, Noble Larson, Brian D. Goldberg, Mark Kuznetsov, AXSUN Technologies Inc. (USA) . . . . . [9312-133]

2 µm axial resolution, fiber-optic SD-OCT operating at ~1300 nm for cellular resolution imaging of biological tissue, Kostadinka Bizheva, Univ. of Waterloo (Canada). . . . . [9312-135]

Sub-micrometer axial resolution, fiber-optic SD-OCT operating at ~800 nm for cellular resolution imaging of biological tissue, Mojtaba Hajialamdari, Michal Vymyslicky, Kostadinka Bizheva, Univ. of Waterloo (Canada) . [9312-136]

A comparison of techniques for full 3D field deformation tracking with optical coherence tomography, Sam P. Richardson, Amir HajiRassouliha, Matthew Parker, Norman Lippok, Frédérique Vanholsbeeck, Martyn Nash, Andrew Taberner, Poul F. Nielsen, The Univ. of Auckland (New Zealand). . . . . [9312-137]

Enhance resolution on OCT profilometry measurements using harmonic artifacts, Marcus Paulo Raele, Lucas De Pretto, Anderson Z. de Freitas, Instituto de Pesquisas Energéticas e Nucleares (Brazil) . . . . . [9312-138]

One-micron resolution optical coherence tomography (OCT) in vivo for cellular level imaging, Dongyao Cui, Xinyu Liu, Xiaojun Yu, Ding Sun, Yuemei Luo, Jun Gu, Perry Ping Shum, Linbo Liu, Nanyang Technological Univ. (Singapore); Jing Zhang, Nanyang Technological Univ (Singapore) . . . [9312-139]

Large area full field optical coherence tomography based on swept source for morphological investigation of samples, Muhammad Faizan Shirazi, Nam Hyun Cho, Kibeom Park, Ruchire E. Henry Wijesinghe, Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of) . . . . . [9312-140]

Alternative Optical Design Form For Optical Coherence Tomography Probes, Daniel Staloff, Klaus Hartkorn, Venkata A. Bhagavatula, Corning Incorporated (USA) . . . . . [9312-141]

Quantitative measurement of tissue birefringence by single mode fiber based PS-OCT with a single input polarization state using Muller matrix, Zhenyang Ding, Chia-Pin Liang, Qinggong Tang, Yu Chen, Univ. of Maryland, College Park (USA) . . . . . [9312-142]

Single shot single mode fiber based polarization sensitive optical coherence tomography, Bastian Braeuer, Norman Lippok, Frédérique Vanholsbeeck, The Univ. of Auckland (New Zealand). . . . . [9312-143]

Coherent signal composition in signal multiplexed polarization sensitive Optical Coherence Tomography, Jianan Li, Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands) . . . . . [9312-144]

Polarization Sensitive Spectroscopic Optical Coherence Tomography for multimodal imaging, Marcin R. Strakowski, Maciej Kraszewski, Paulina Strakowska, Michal Trojanowski, Gdansk Univ. of Technology (Poland) . . . . . [9312-145]

Tooth structure analysis by using Jones-matrix optical coherence tomography, Cheng-Han Huang, Ching-Cheng Chuang, Chia-Wei Sun, National Chiao Tung Univ. (Taiwan) . . . . . [9312-146]

TUESDAY 10 FEBRUARY

SESSION 5

LOCATION: ROOM 303 (ESPLANADE) . . . . . TUE 8:30 AM TO 10:00 AM

Endoscopy / Intravascular II

Session Chair: **Yingtian Pan,** Stony Brook Univ. (USA)

8:30 am: **Heartbeat OCT: motion-free three-dimensional in vivo coronary artery microscopy**, Tianshi Wang, Thoraxcenter, Erasmus MC (Netherlands); Tom Pfeiffer, Ludwig-Maximilians-Univ. München (Germany); Evelyn Regar M.D., Thoraxcenter, Erasmus MC (Netherlands); Wolfgang Wieser, Ludwig-Maximilians-Univ. München (Germany); Heleen M. M. van Beusekom, Charles T. Lancée, Geert Springeling, Ilona Peters, Thoraxcenter, Erasmus MC (Netherlands); Antonius F. W. van der Steen, Thoraxcenter, Erasmus MC (Netherlands) and Shenzhen Institute of Advanced Technology (China) and Technische Univ. Delft (Netherlands); Robert A. Huber, Ludwig-Maximilians-Univ. München (Germany); Gijs van Soest, Thoraxcenter, Erasmus MC (Netherlands) . . . . . [9312-29]

8:45 am: **First-in-human dual-modality optical coherence tomography (OCT) and near-infrared autofluorescence (NIRAF) molecular imaging of coronary arteries**, Giovanni Jacopo J. Ughi, Hao Wang, Wellman Ctr. for Photomedicine (USA); Eric Osborne, Harvard Medical School (USA) and Massachusetts General Hospital (USA); Joseph Gardeki, Michalina J. Gora, Ali M. Fard, Ehsan Hamidi, Paulino Vacas-Jacques, Wellman Ctr. for Photomedicine (USA); Farouc A. Jaffer M.D., Harvard Medical School (USA) and Massachusetts General Hospital (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) . . . . . [9312-30]

9:00 am: **Multimodality intravascular endoscope for diagnosis of vulnerable plaques**, Shanshan Liang, Beckman Laser Institute and Medical Clinic (USA); Teng Ma, The Univ. of Southern California (USA); Joseph Jing, Beckman Laser Institute and Medical Clinic (USA); Xiang Li, The Univ. of Southern California (USA); Jiawen Li, Beckman Laser Institute and Medical Clinic (USA); Qifa Zhou, K. Kirk Shung, The Univ. of Southern California (USA); Jun Zhang, Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) . . . . . [9312-31]

9:15 am: **Ultrahigh speed endoscopic structural and angiographic OCT imaging**, Hsiang-Chieh Lee, Osman O. Ahsen, Kaicheng Liang, Michael G. Giacomelli, Zhao Wang, Massachusetts Institute of Technology (USA); Benjamin M. Potsaid, Massachusetts Institute of Technology (USA) and Thorlabs Inc. (USA); Vijaysekhar Jayaraman, Praevium Research, Inc. (USA); Marisa Figueiredo, Qin Huang, VA Boston Healthcare System (USA) and Harvard Medical School (USA); Alex E. Cable, Thorlabs, Inc. (USA); Hiroshi Mashimo M.D., VA Boston Healthcare System (USA) and Harvard Medical School (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA) . . . . . [9312-32]

9:30 am: **Clinical experience with tethered capsule OCT endomicroscopy for screening for Barrett's esophagues**, Michalina J. Gora, Amna R. Soomro, Robert W. Carruth, Weina Lu, Mireille Rosenberg, Wellman Ctr. for Photomedicine (USA); Norman S. Nishioka M.D., Wellman Ctr. for Photomedicine (USA) and Massachusetts General Hospital (USA); Guillermo J. Tearney M.D., Wellman Ctr. for Photomedicine (USA) . . . . [9312-33]

9:45 am: **Endoscopic system for high-efficiency autofluorescence imaging and co-registered Doppler optical coherence tomography**, Hamid Pahlevaninezhad, Anthony Lee M.D., Stephen Lam M.D., Geoffrey Hohert, Lucas Cahill, Tawimas Shaipanich, Alexander J. Ritchie M.D., Wei Zhang M.D., Calum E. MacAulay, Pierre M. Lane, The BC Cancer Agency Research Ctr. (Canada). . . . . [9312-34]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 6

LOCATION: ROOM 303 (ESPLANADE) . . . . . .TUE 10:30 AM TO 12:00 PM

Ophthalmology III

Session Chair: **Wolfgang Drexler,** Medizinische Univ. Wien (Austria)

10:30 am: **Measurement of multiple-capillary RBC flux in the retina with optical coherence tomography**, Zhongwei Zhi, Ruikang K. Wang, Univ. of Washington (USA) . . . . . [9312-35]

10:45 am: **Total retinal blood flow measurement by 3-beam Doppler optical coherence tomography**, Richard Haindl, Wolfgang Trasischker, Bernhard Baumann, Michael Pircher, Christoph K. Hitzenberger, Medizinische Univ. Wien (Austria) and Medical Imaging Cluster (Austria) . . . . . [9312-36]

11:00 am: **Wavefront sensorless adaptive optics optical coherence tomography for in vivo imaging of human photoreceptors** , Yifan Jian, Kevin S. K. Wong, Eunice Michelle C. Cua, Jing Xu, Simon Fraser Univ. (Canada); Stefano Bonora, CNR-Istituto di Fotonica e Nanotecnologie (Italy); Robert J. Zawadzki, Univ. of California, Davis (USA); Marinko V. Sarunic, Simon Fraser Univ. (Canada). . . . . [9312-37]

11:15 am: **Fiber-based polarization-sensitive OCT of the human retina with correction of system polarization distortions**, Boy Braaf, Vrije Univ. Amsterdam (Netherlands) and Rotterdam Ophthalmic Institute (Netherlands); Koenraad A. Vermeer, Rotterdam Ophthalmic Institute (Netherlands); Mattijs de Groot, Vrije Univ. Amsterdam (Netherlands) and Rotterdam Ophthalmic Institute (Netherlands); Kari V. Vienola, Rotterdam Ophthalmic Institute (Netherlands); Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands) and Rotterdam Ophthalmic Institute (Netherlands) . . . . . [9312-38]

11:30 am: **Polarization mode dispersion correction for optically buffered Jones matrix based multi-functional optical coherence tomography**, Young-Joo Hong, Shuichi Makita, Yoshiaki Yasuno, Univ. of Tsukuba (Japan). . . . . [9312-39]

11:45 am: **Polarization-sensitive swept-source optical coherence tomography for imaging of the anterior eye segment**, Masahiro Yamanari, Tomey Corp. (Japan); Satoru Tsuda, Tohoku Univ. School of Medicine (Japan); Taiki Kokubun, Tohoku Univ. School of Medicine (Japan) and Iwaki Kyoritsu Hospital (Japan); Yuji Tanaka, Yukihiro Shiga, Yu Yokoyama, Morin Ryu, Shiho Kunimatsu-Sanuki, Hidetoshi Takahashi, Kazuichi Maruyama, Hiroshi Kunikata, Toru Nakazawa, Tohoku Univ. School of Medicine (Japan) . . . . . [9312-40]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:30 pm

SESSION 7

LOCATION: ROOM 303 (ESPLANADE) . . . . . TUE 1:30 PM TO 3:30 PM

Angiography and Vascular Imaging

Session Chair: **Yoshiaki Yasuno,** Univ. of Tsukuba (Japan)

1:30 pm: **Wide dynamic range high-speed three-dimensional quantitative microangiographic OCT**, Taejin Park, Sun-Joo Jang, KAIST (Korea, Republic of); Benjamin J. Vakoc, Massachusetts General Hospital (USA); Wang-Yuhl Oh, KAIST (Korea, Republic of) . . . . . [9312-41]

1:45 pm: **Single-shot axial and transverse flow measurements using intensity-based dynamic light scattering in optical coherence tomography**, Néstor Uribe-Patarroyo, Yoon Jinoh Jung, Brett E. Bouma, Wellman Ctr. for Photomedicine (USA) . . . . . [9312-42]

2:00 pm: **Ultrasensitive quantification of 3D cerebral capillary blood flow network dynamics**, Jiang You, Stony Brook Univ. (USA); Nora D. Volkow, National Institute on Drug Abuse, National Institutes of Health (USA); Kicheon Park, Congwu Du, Yingtian Pan, Stony Brook Univ. (USA). . . . . [9312-43]

2:15 pm: **Oxygenation mapping with visible wavelength spectroscopic OCT**, Shau Poh Chong, Conrad W. Merkle, Harsha Radhakrishnan, Conor Leahy, Vivek J. Srinivasan, Univ. of California, Davis (USA). . . . . [9312-44]

2:30 pm: **Optical microangiography reveals collateral blood perfusion dynamics in mouse cerebral cortex after focal stroke**, Utku Baran, Yuandong Li, Ruikang K. Wang, Univ. of Washington (USA) . . . . . [9312-45]

2:45 pm: **Doppler optical coherence tomography imaging reveals the blood flow profile of the adult rodent cortex during ischemia stroke**, Jiang Zhu, Gangjun Liu, Yongzhao Du, Beckman Laser Institute and Medical Clinic (USA); Aneeka M. Hancock, Melissa F. Davis, Ron D. Frostig, Univ. of California, Irvine (USA); Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA) . . . . . [9312-46]

3:00 pm: **In vivo microvascular imaging of human oral and nasal cavities using swept-source optical coherence tomography with a single forward/side viewing probe**, Woo June Choi, Ruikang K. Wang, Univ. of Washington (USA) . . . . . [9312-47]

3:15 pm: **Improved contrast for OCT angiography using speckle variance with angular compounding**, Laurin Ginner, Daniel Fechtig, Cedric Blatter, Medizinische Univ. Wien (Austria); Martin Gröschl, Technische Univ. Wien (Austria); Rainer A. Leitgeb, Medizinische Univ. Wien (Austria). . . . . [9312-48]

Coffee Break . . . . . Tue 3:30 pm to 4:00 pm

SESSION 8

LOCATION: ROOM 303 (ESPLANADE) . . . . . TUE 4:00 PM TO 6:00 PM

Functional OCT I

Session Chair: **Kostadinka Bizheva,** Univ. of Waterloo (Canada)

4:00 pm: **High-resolution mapping of Young's modulus using optical coherence micro-elastography and a compliant stress sensor**, Kelsey M. Kennedy, Robert A. McLaughlin, David D. Sampson, Brendan F. Kennedy, The Univ. of Western Australia (Australia) . . . . . [9312-49]

4:15 pm: **Volumetric optical coherence tomography: vibrometry for in vivo measurement of traveling waves in the mouse inner ear with picometer sensitivity**, Hee Yoon Lee, Patrick D. Raphael, Stanford Univ. (USA); Jesung Park, Texas A&M Univ. (USA); Audrey K. Ellerbee, John S. Oghalai M.D., Stanford Univ. (USA); Brian E. Applegate, Texas A&M Univ. (USA) . . . . [9312-50]

4:30 pm: **High speed imaging of remotely induced shear waves using phase-sensitive optical coherence tomography**, Shaozhen Song, Nhan Minh Le, Zhihong Huang, Univ. of Dundee (United Kingdom); Ruikang K. Wang, Univ. of Washington (USA) . . . . . [9312-51]

4:45 pm: **In-plane bidirectional micro-displacement measurement using correlation coefficients of OCT signals**, Kazuhiro Kurokawa, Shuichi Makita, Young-Joo Hong, Yoshiaki Yasuno, Univ. of Tsukuba (Japan) . . . . . [9312-52]

5:00 pm: **Simultaneous measurement of flow and diffusion using optical coherence tomography**, Nicolas Weiss, Ton G. van Leeuwen, Academisch Medisch Centrum (Netherlands); Jeroen Kalkman, Technische Univ. Delft (Netherlands) . . . . . [9312-53]

5:15 pm: **Localization and visualization of depth-resolved changes in attenuation coefficient during focal seizure propagation with optical coherence tomography**, Melissa M. Eberle, Mike S. Hsu, Carissa L. R. Rodriguez, Jenny I. Szu, Michael C. Oliveira, Devin K. Binder, B. Hyle Park, Univ. of California, Riverside (USA) . . . . . [9312-54]

5:30 pm: **Real time photothermal OCT of fluorophores in tissue**, Jason M. Tucker-Schwartz, Maryse Lapierre-Landry, Melissa C. Skala, Vanderbilt Univ. (USA) . . . . . [9312-55]

5:45 pm: **In vivo photothermal optical coherence tomography for non-invasive endogenous absorption agent imaging**, Shuichi Makita, Young-Joo Hong, Yoshiaki Yasuno, Univ. of Tsukuba (Japan) . . . . . [9312-56]

WEDNESDAY 11 FEBRUARY

SESSION 9

LOCATION: ROOM 303 (ESPLANADE) . . . . . WED 8:30 AM TO 10:00 AM

Computational and AO OCT

Session Chair: **Stephen A. Boppart M.D.,**
Univ. of Illinois at Urbana-Champaign (USA)

8:30 am: **Three-dimensional in vivo motion correction for high-resolution computed optical interferometric tomography**, Nathan D. Shemonski, Shawn S. Ahn, Yuan-Zhi Liu, Fredrick A. South, Paul S. Carney, Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9312-57]

8:45 am: **Anisotropic aberration correction in Fourier domain OCT using region of interest based digital adaptive optics**, Abhishek Kumar, Tschackad Kamali, René Platzer, Angelika Unterhuber, Wolfgang Drexler, Rainer A. Leitgeb, Medizinische Univ. Wien (Austria) . . . . . [9312-58]

9:00 am: **Polarization-sensitive interferometric synthetic aperture microscopy**, Fredrick A. South, Nathan D. Shemonski, Yuan-Zhi Liu, Yang Xu, Paul S. Carney, Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9312-59]

9:15 am: **Analysis of beam shaping in optical coherence tomography in the presence of sample-induced aberrations and scattering**, Andrea Curatolo, Dirk Lorenser, Peter R. T. Munro, Parvathy Sreekumar, C. Christian Singe, The Univ. of Western Australia (Australia) . . . . . [9312-60]

CONFERENCE 9312
LOCATION: ROOM 303 (ESPLANADE)

9:30 am: **Numerical aberration correction in optical coherence tomography and holoscopy by optimization of image quality**, Dierck Hillmann, Thorlabs GmbH (Germany); Hendrik Spahr, Univ. zu Lübeck (Germany); Gesa L. Franke, Carola Hain, Hinnerk Schulz-Hildebrandt, Sabrina Lohmann, Helge M. Sudkamp, Institut für Biomedizinische Optik, Univ. zu Lübeck (Germany); Gereon Hüttmann, Institut für Biomedizinische Optik, Univ. zu Lübeck (Germany) and Medizinisches Laserzentrum Lübeck GmbH (Germany) . . . . . [9312-61]

9:45 am: **Demonstration of depth-resolved wavefront sensing using a swept-source coherence-gated Shack-Hartmann wavefront sensor**, Jingyu Wang, Adrian G. Podoleanu, Univ. of Kent (United Kingdom). . . [9312-62]

Coffee Break . . . . . .Wed 10:00 am to 10:30 am

SESSION 10

LOCATION: ROOM 303 (ESPLANADE) . . . . . WED 10:30 AM TO 12:00 PM

OCT Technology

Session Chair: **Johannes F. de Boer,** Vrije Univ. Amsterdam (Netherlands)

10:30 am: **OCT imaging with dynamic focus using active ultrahigh speed acousto-optic tunable lens**, Ireneusz Grulkowski, Krzysztof Szulzycki, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland) . . . . . [9312-63]

10:45 am: **Simultaneous optical coherence tomography and fluorescence imaging utilizing a single illumination source**, Ryan P. McNabb, Tomas Blanco, Howard M. Bomze, Henry C. Tseng, Daniel R. Saban, Duke Univ. School of Medicine (USA); Joseph A. Izatt, Duke Univ. (USA) and Duke Univ. School of Medicine (USA); Anthony N. Kuo M.D., Duke Univ. School of Medicine (USA) . . . . . [9312-64]

11:00 am: **Fast volumetric imaging with subcellular resolution by Fourier domain optical coherence microscopy with numerical refocusing**, Hinnerk Schulz-Hildebrandt, Gereon Hüttmann, Helge M. Sudkamp, Mario Pieper, Peter König, Gesa L. Franke, Univ. zu Lübeck (Germany); Dierck Hillmann, Thorlabs GmbH (Germany); Sabrina Lohmann, Univ. zu Lübeck (Germany). . . . . [9312-65]

11:15 am: **Imaging capabilities with the use of spatiotemporal optical coherence (STOC) control method**, Maciej Nowakowski, Dawid Borycki, Blazej Ruszczycki, Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland) . . . . . [9312-66]

11:30 am: **Common-path OCT with 0.5mm forward-viewing probe**, Xiaoyong Fu, Yves T. Wang, Michael W. Jenkins, Andrew M. Rollins, Case Western Reserve Univ. (USA) . . . . . [9312-67]

11:45 am: **Single-shot speckle noise reduction using interleaved optical coherence tomography**, Lian Duan, Hee Yoon Lee, Gary C. F. Lee, Tahereh Marvdashti, Gennifer T. Smith, Audrey K. Ellerbee, Stanford Univ. (USA) . . . . . [9312-68]

Lunch/Exhibition Break . . . . . .Wed 12:00 pm to 1:30 pm

SESSION 11

LOCATION: ROOM 303 (ESPLANADE) . . . . . WED 1:30 PM TO 3:30 PM

Functional OCT II

Session Chair: **Peter E. Andersen,** Technical Univ. of Denmark (Denmark)

1:30 pm: **OCT imaging to determine whether ethanol-induced congenital heart defects arise through impact on cardiac neural crest cells**, Lindsy M. Peterson, Pei Ma, Ganga Karunamuni, Shi Gu, Yves T. Wang, Michiko Watanabe, Michael W. Jenkins, Andrew M. Rollins, Case Western Reserve Univ. (USA) . . . . . [9312-69]

1:45 pm: **Probing myocardium biomechanics using quantitative optical coherence elastography**, Shang Wang, Baylor College of Medicine (USA) and Univ. of Houston (USA); Andrew L. Lopez III, Yuka Morikawa, Ge Tao, Baylor College of Medicine (USA); Jiasong Li, Univ. of Houston (USA); Irina V. Larina, Baylor College of Medicine (USA); James F. Martin, Baylor College of Medicine (USA) and The Texas Heart Institute (USA); Kirill V. Larin, Univ. of Houston (USA) and Baylor College of Medicine (USA) . . . . . [9312-70]

2:00 pm: **Evaluation of the functional role of a circadian gene, cryptochrome, on Drosophila heart development using ultrahigh resolution optical coherence microscopy**, Aneesh Alex, Lehigh Univ. (USA); Airong Li, Genetics and Aging Research Unit, Harvard Medical School (USA); Xianxu Zeng, Zhan Zhang, Third Affiliated Hospital of Zhengzhou Univ. (China); Rudolph E. Tanzi, Genetics and Aging Research Unit, Harvard Medical School (USA); Chao Zhou, Lehigh Univ. (USA). . . . . [9312-71]

2:15 pm: **Monitoring the vascular response to biomaterials with speckle variance OCT**, Kristin M. Poole, Devin R. McCormack, Christopher E. Nelson, Craig L. Duvall, Melissa C. Skala, Vanderbilt Univ. (USA). . . . . [9312-72]

2:30 pm: **Local depolarization in polarization sensitive optical coherence tomography**, Norman Lippok, Martin L. Villiger, Brett E. Bouma, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA) . . . . . [9312-73]

2:45 pm: **Molecular imaging needles combining OCT with fluorescence for identification of cell-specific antibodies in deep tissue**, Loretta Scolaro, Dirk Lorenser, Anne Kramer, George C. Yeoh, David D. Sampson, Robert A. McLaughlin, The Univ. of Western Australia (Australia). . . . . [9312-74]

3:00 pm: **Correlation between polarization sensitive optical coherence tomography and second harmonic generation microscopy in skin**, Hoan Viet Le, Seunghun Lee, Bumju Kim, Yeoreum Yoon, Ki Hean Kim, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9312-75]

3:15 pm: **Analysis of multidimensional scanning dynamic light scattering-based optical coherence tomography for diffusion-independent, sub-500 µm/s in vivo transverse velocimetry**, Brendan K. Huang, Kevin C. Zhou, Yale Univ. (USA); Mustafa K. Khokha, Hemant D. Tagare, Yale School of Medicine (USA); Michael A. Choma M.D., Yale Univ. (USA) and Yale School of Medicine (USA) . . . . . [9312-76]

Coffee Break . . . . . .Wed 3:30 pm to 4:00 pm

SESSION 12

LOCATION: ROOM 303 (ESPLANADE) . . . . . WED 4:00 PM TO 6:00 PM

OCT Applications

Session Chairs: **Joseph A. Izatt,** Duke Univ. (USA); **Joseph A. Izatt,** Duke Univ. (USA)

4:00 pm: **Real-time, label-free optical property mapping for detecting glioma invasion with SSOCT for potential guidance of surgical intervention**, Carmen Kut, Jiefeng Xi, Kaisorn Chaichana M.D., Jordina Rincon-Torroella, Fausto Rodriguez, Elliot McVeigh, Alfredo Quinones-Hinojosa M.D., Xingde Li, The Johns Hopkins Hospital (USA) . . . . . [9312-77]

4:15 pm: **Light scattering from myelinated axons in optical coherence microscopy imaging of the cerebral cortex**, Dawid Borycki, Univ. of California, Davis (USA) and Nicolaus Copernicus Univ. (Poland); Conor Leahy, Vivek J. Srinivasan, Univ. of California, Davis (USA). . . . . [9312-78]

4:30 pm: **Three-dimensional ultrastructure study of cervical collagen fibers using optical coherence tomography** , Yu Gan, Wang Yao, Kristin M. Myers, Joy Y. Vink, Ronald J. Wapner, Christine P. Hendon, Columbia Univ. (USA) . . . . . [9312-79]

4:45 pm: **Long-range memory in OCT fluctuations reveals stromal-epithelial interactions in 3D co-culture**, Amy L. Oldenburg, Thomas Gilliss, Oluwafemi S. Alabi, Russell M. Taylor II, Melissa A. Troester, The Univ. of North Carolina at Chapel Hill (USA) . . . . . [9312-80]

5:00 pm: **Differentiation of morphotic elements in the human blood using optical coherence tomography with microfluidic setup**, Pawel Ossowski, Nicolaus Copernicus Univ. (Poland) and AM2M LLC-LP (Poland); Anna Raiter, Anna Szkulmowska, AM2M LLC-LP (Poland); Maciej Wojtkowski, Nicolaus Copernicus Univ. (Poland) and AM2M LLC-LP (Poland). . . . . [9312-81]

5:15 pm: **Optical coherence tomography of discrete random media**, Dirk J. Faber, Mitra Almasian, Nienke Bosschaart, Ton G. van Leeuwen, Academisch Medisch Centrum (Netherlands). . . . . [9312-82]

5:30 pm: **Image quality assessment in speckle variance optical coherence angiography**, Andrea Lozzi, Anant Agrawal, Noah Greenbaum, Erkinay Abliz, Cristin G. Welle, Daniel X. Hammer, U.S. Food and Drug Administration (USA) . . . . . [9312-83]

5:45 pm: **In-vivo visualization of skin inflammation by optical coherence tomography and two-photon microscopy**, Bumju Kim, Seong Hun Lee, Ki Hean Kim, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9312-84]

CONFERENCE 9313
LOCATION: ROOM 250 (MEZZANINE)

Sunday–Tuesday 8–10 February 2015 • Proceedings of SPIE Vol. 9313

Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII

Conference Chairs: **Anita Mahadevan-Jansen,** Vanderbilt Univ. (USA); **Tuan Vo-Dinh,** Fitzpatrick Institute for Photonics, Duke Univ. (USA); **Warren S. Grundfest M.D.,** Univ. of California, Los Angeles (USA)

Program Committee: **Maurice C. Aalders,** Forensic Technical Solutions (Netherlands); **Francesco Baldini,** Istituto di Fisica Applicata Nello Carrara (Italy); **Jennifer K. Barton,** The Univ. of Arizona (USA); **Stephen A. Boppart M.D.,** Univ. of Illinois at Urbana-Champaign (USA); **Gerald Grant,** Duke Univ. (USA); **Hong Liu,** The Univ. of Oklahoma (USA); **Quan Liu,** Nanyang Technological Univ. (Singapore); **Laura Marcu,** Univ. of California, Davis (USA); **Jianan Y. Qu,** Hong Kong Univ. of Science and Technology (Hong Kong, China); **Urs Utzinger,** The Univ. of Arizona (USA)

SUNDAY 8 FEBRUARY

SESSION 1

ROOM: ROOM 250 (MEZZANINE) . . . . . SUN 8:45 AM TO 10:05 AM

Surgical Guidance I

Session Chair: **Anita Mahadevan-Jansen,** Vanderbilt Univ. (USA)

8:45 am: **Human thyroid imaging using optical coherence tomography**, Sarah J. Erickson-Bhatt, Ryan M. Nolan, Fredrick A. South, Nathan D. Shemonski, Adeel Ahmad, Eric J. Chaney, Marina Marjanovic, Univ. of Illinois at Urbana-Champaign (USA); Andrew J. Cittadine, Adam M. Zysk, Diagnostic Photonics, Inc. (USA); Daniel T. McCormick, AdvancedMEMS (USA); Jeffrey Putney, Donald Darga, Diagnostic Photonics, Inc. (USA); Steven G. Adie, Univ. of Illinois Urbana-Champaign (USA); Paul S. Carney, Univ. of Illinois at Urbana-Champaign (USA); John Brockenbrough M.D., Zheng G. Liu M.D., Kelly Cunningham M.D., Carle Foundation Hospital (USA); Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9313-1]

9:05 am: **Real-time intraoperative auto-fluorescence imaging for parathyroid detection**, Melanie A. McWade, Vanderbilt Univ. (USA); James T. Broome, St. Thomas Hospital (USA); Carmen C. Solorzano, Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) . . . . . [9313-2]

9:25 am: **Performance comparison of different compact NIR fluorescent imaging systems with goggle display for intraoperative limage-guidance**, Shengkui Gao, Suman B. Mondal, Washington Univ. in St. Louis (USA); Nan Zhu, Rongguang Liang, College of Optical Sciences, The Univ. of Arizona (USA); Samuel Achilefu, Washington Univ. School of Medicine in St. Louis (USA); Viktor Gruev, Washington Univ. in St. Louis (USA) . . . . . [9313-3]

9:45 am: **Real-time fluorescence-guided tumor visualization for intraoperative surgical resection**, David S. Kittle, Adam Mamelak M.D., Cedars-Sinai Medical Ctr. (USA); Julie Novak, Stacey Hansen, Blaze Bioscience, Inc. (USA); Keith L. Black M.D., Pramod V. Butte, Cedars-Sinai Medical Ctr. (USA) . . . . . [9313-4]

Coffee Break . . . . . Sun 10:05 am to 10:35 am

SESSION 2

ROOM: ROOM 250 (MEZZANINE) . . . . . SUN 10:35 AM TO 11:55 AM

Surgical Guidance II

Session Chair: **Stephen A. Boppart M.D.,**
Univ. of Illinois at Urbana-Champaign (USA)

10:35 am: **In-vivo tumor bed assessment after soft tissue sarcoma excision using Raman and fluorescence spectroscopy**, John Quan M. Nguyen, Vanderbilt Univ. (USA); Zain S. Gowani, Vanderbilt Univ. Medical Ctr. (USA) and Vanderbilt Medical Scholars Program (USA); Maggie E. O'Connor, Vanderbilt Univ. (USA); The-Quyen Nguyen, Northwestern Univ. (USA); Ginger E. Holt, Vanderbilt Univ. Medical Ctr. (USA); Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) . . . . . [9313-5]

10:55 am: **Smart surgical tools: real-time time-resolved fluorescence spectroscopy integration with surgical tools for intra-operative tumor detection**, Pramod V. Butte, Cedars-Sinai Medical Ctr. (USA); Fartash Vasefi, Cedars-Sinai Medical Ctr (USA); David S. Kittle, Cedars-Sinai Medical Ctr. (USA); Chirag Patil M.D., Cedars-Sinai Medical Ctr (USA); Ray Chu M.D., Keith L. Black M.D., Cedars-Sinai Medical Ctr. (USA) . . . . . [9313-6]

11:15 am: **High spatial frequency structured light imaging for intraoperative breast tumor margin assessment**, David M McClatchy III, Venkataramanan Krishnaswamy, Stephen C. Kanick, Jonathan T. Elliott, Thayer School of Engineering at Dartmouth (USA); Wendy A. Wells M.D., Richard J. Barth M.D., Dartmouth Hitchcock Medical Ctr. (USA); Keith D. Paulsen, Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA) . . . . . [9313-7]

11:35 am: **Molecular imaging for the detection of kidney tumor margins**, Shona D. Stewart, Patrick J. Treado, Heather Kirschner, Jeffrey Horn, ChemImage Corp. (USA); Amonu Opong, Jeffrey K. Cohen M.D., Allegheny General Hospital (USA) . . . . . [9313-8]

Lunch/Exhibition Break . . . . . Sun 11:55 am to 1:30 pm

SESSION 3

ROOM: ROOM 250 (MEZZANINE) . . . . . SUN 1:30 PM TO 3:10 PM

Cancer Detection: Methods I

Session Chair: **Laura Marcu,** Univ. of California, Davis (USA)

1:30 pm: **A 360 degree view endoscope using miniaturized panomorph optics for 3-D colon mapping**, Qiyin Fang M.D., McMaster Univ. (Canada); Simon Thibault, Univ. Laval (Canada); Samir Sahli, McMaster Univ. (Canada); Pierre Desaulniers, Univ. Laval (Canada); Brendan Kaas, Ian Phillips, McMaster Univ. (Canada); Patrice Roulet, ImmerVision (Canada); Jocelyn Parent, ImmerVision (Canada); Hu Zhang, ImmerVision (Canada); David Armstrong, Frances Tse, Shawn Petrik, McMaster Univ. (Canada) . . . . . [9313-9]

1:50 pm: **Technique for real-time tissue diagnosis based on multi-spectral time-resolved fluorescence spectroscopy**, Dinglong M. Ma, Julien Bec, Dimitris S. Gorpas, Diego R. Yankelevich, Laura Marcu, Univ. of California, Davis (USA) . . . . . [9313-10]

2:10 pm: **In-situ photopolymerization and monitoring device for controlled shaping of tissue fillers, replacements, and implants**, Andreas Schmocker, Azadeh Khoushabi, Dominique Pioletti, Pierre-Etienne Bourban, Christophe Moser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9313-11]

2:30 pm: **Imaging spinal structures with polarization-sensitive optical coherence tomography**, Zhenyang Ding, Chia-Pin Liang, Univ. of Maryland, College Park (USA); Qinggong Tang, Univ of Maryland, College Park (USA); Kyle Wu, Anthony Sandler, Sheikh Zayed Institute for Pediatric Surgical Innovation, Children's National Medical Ctr. (USA); Yu Chen, Univ. of Maryland, College Park (USA) . . . . . [9313-12]

2:50 pm: **Tissue identification during Pneumoperitoneum in laparoscopy**, Yin Chang, Chi-Yang Tzang, National Yang-Ming Univ. (Taiwan) . . . . . [9313-13]

Coffee Break . . . . . Sun 3:10 pm to 3:40 pm

SESSION 4

ROOM: ROOM 250 (MEZZANINE) . . . . . SUN 3:40 PM TO 5:20 PM

Cancer Detection: Methods II

Session Chair: **Quan Liu,** Nanyang Technological Univ. (Singapore)

3:40 pm: **Pump-probe imaging of pigmented cutaneous melanoma gives insight into lesions' metastatic potential**, Francisco E. Robles, Warren S. Warren, Duke Univ. (USA) . . . . . [9313-14]

4:00 pm: **High-area-throughput automated gigapixel imaging of whole prostate tumor resection surfaces using structured illumination microscopy**, J. Quincy Brown, Tyler Schlichenmeyer, Mei Wang, Tulane Univ. (USA); Hillary Z. Kimbrell, Tulane Univ., School of Medicine (USA); David Tulman, Carola Wenk, Tulane Univ. (USA); Benjamin R. Lee, Tulane Univ., School of Medicine (USA) . . . . . [9313-15]

4:20 pm: **Compact handheld multispectral fluorescence lifetime imaging (FLIM) system for in vivo imaging of the oral mucosa**, Shuna Cheng, Rodrigo Cuenca, Bilal H. Malik, Joey M. Jabbour, Texas A&M Univ. (USA); Yi-Shing Lisa Cheng D.D.S., John Wright D.D.S., Texas A&M Health Science Ctr. (USA); Rock Rickel, Brian E. Applegate, Kristen C. Maitland, Javier A. Jo, Texas A&M Univ. (USA). . . . . [9313-16]

4:40 pm: **A broadband confocal Raman endoscopy for *in vivo* diagnosis of intestinal metaplasia in the stomach,** Kan Lin, Mads Sylvest Bergholt, Jianfeng Wang, Wei Zheng, National Univ. of Singapore (Singapore); Hongzhi Xu, Institute of Digestive Disease, Zhongshan Hospital (China); Zhiwei Huang, National Univ. of Singapore (Singapore) . . . . . [9313-17]

5:00 pm: **An Advanced Design of Non-radioactive Image Capturing and Management System for Applications in Non-invasive Skin Disorder Diagnosis**, Carol Y. B. Liu, Hong Kong Productivity Council (Hong Kong, China); Kany ZHOU, Bryan SO, Derek LOUIE, Hong Kong Productivity Council (Hong Kong, China); David C. K. Luk M.D., United Christian Hospital (Hong Kong, China) . . . . . [9313-18]

MONDAY 9 FEBRUARY

SESSION 5

ROOM: ROOM 250 (MEZZANINE) . . . . . .MON 8:45 AM TO 10:05 AM

Cancer Detection: Characterization

Session Chairs: **Quan Liu,** Nanyang Technological Univ. (Singapore); **Urs Utzinger,** The Univ. of Arizona (USA)

8:45 am: **Characterization of oral cancer with multispectral fluorescence lifetime imaging in the hamster model of oral carcinogenesis in vivo**, Bilal H. Malik, Joohyung Lee, Shuna Cheng, Rodrigo Cuenca, Joey M. Jabbour, Texas A&M Univ. (USA); Yi-Shing Lisa Cheng D.D.S., John Wright D.D.S., Texas A&M Univ., Baylor College of Dentistry (USA); Beena Ahmed, Texas A&M Univ. (Qatar); Kristen C. Maitland, Javier A. Jo, Texas A&M Univ. (USA). . . . . [9313-19]

9:05 am: **Multispectral fluorescence imaging of human ovarian and fallopian tube tissue for early stage cancer detection**, Tyler Tate, Brenda Baggett, Jennifer M. Watson, Gabriel V. Orsinger, Molly Keenan, Kenneth D. Hatch M.D., Setsuko K. Chambers, The Univ. of Arizona (USA); John F. Black, Glannaventa Inc. (USA); Jennifer K. Barton, Urs Utzinger, The Univ. of Arizona (USA) . . . . . [9313-20]

9:25 am: **Light reflectance spectroscopy for prostate cancer identification: cost-effective tool for intraoperative positive margin detection**, Xinlong Wang, Li Zeng, The Univ. of Texas at Arlington (USA); Monica Morgan, Payal Kapur, Jeffrey A. Cadeddu, Claus R. Roehrborn, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); Hanli Liu, The Univ. of Texas at Arlington (USA) . . . . . [9313-21]

9:45 am: **Detection of colorectal cancer in blood serum using Raman molecular imaging**, Patrick J. Treado, ChemImage Corp. (USA); Bergein F. Overholt M.D., Gastrointestinal Associates, P.C. (USA); Shona D. Stewart, Aaron Smith, Heather Kirschner, Chris Post, ChemImage Corp. (USA) . [9313-22]

Coffee Break . . . . . .Mon 10:05 am to 10:35 am

SESSION 6

ROOM: ROOM 250 (MEZZANINE) . . . . . MON 10:35 AM TO 11:55 AM

Non-cancer Methods

Session Chair: **Francesco Baldini,** Istituto di Fisica Applicata Nello Carrara (Italy)

10:35 am: **Fluorescence lifetime imaging to differentiate bound from unbound ICG-cRGD both** *in vitro* and *in vivo* , Paulien L. Stegehuis, Martin C. Boonstra, Leiden Univ. Medical Ctr. (Netherlands); Karien E. de Rooij, Percuros BV (Netherlands) and Leiden Univ. Medical Ctr. (Netherlands); François E. Powolny, Riccardo Sinisi, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Harald Homulle, Technische Univ. Delft (Netherlands); Claudio E. Bruschini, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Edoardo Charbon, Technische Univ. Delft (Netherlands) and École Polytechnique Fédérale de Lausanne (Switzerland); Cornelis JH van de Velde, Leiden University Medical Center (Netherlands); Boudewijn P. F. Lelieveldt M.D., Leiden Univ. Medical Ctr. (Netherlands) and Technische Univ. Delft (Netherlands); Alexander L. Vahrmeijer M.D., Jouke Dijkstra, Leiden Univ. Medical Ctr. (Netherlands); Martijn van de Giessen, Leiden Univ. Medical Ctr. (Netherlands) and Technische Univ. Delft (Netherlands) . . . . . [9313-23]

10:55 am: **Real-time endoscopic optical properties imaging using single snapshot of optical properties (SSOP) imaging**, Joseph P. Angelo Jr., Boston Univ. (USA); Martjin van de Giessen, Leiden Univ. Medical Ctr. (Netherlands); Sylvain Gioux, Beth Israel Deaconess Medical Ctr. (USA) . . . . . [9313-24]

11:15 am: **Analysis of feature stability for laser-based determination of tissue thickness**, Floris Ernst, Achim Schweikard, Patrick Stüber, Ralf Bruder, Benjamin Wagner, Tobias Wissel, Univ. zu Lübeck (Germany). . . . . [9313-25]

11:35 am: **Label-free IgG/anti-IgG biosensing based on long period fiber gratings: a comprehensive feasibility study**, Francesco Baldini, Francesco Chiavaioli, Cosimo Trono, Ambra Giannetti, Istituto di Fisica Applicata Nello Carrara, IFAC-CNR (Italy); Palas Biswas, CSIR-CGCRI, Central Glass and Ceramic Research Institute (India); Sara Tombelli, Istituto di Fisica Applicata Nello Carrara (Italy); Somnath Bandyopadhyay, Sunirmal Jana, Susanta Bera, Aparajita Mallick, CSIR-CGCRI, Central Glass and Ceramic Research Institute (India). . . . . [9313-26]

Lunch Break . . . . . .Mon 11:55 am to 1:30 pm

SESSION 7

ROOM: ROOM 250 (MEZZANINE) . . . . . MON 1:30 PM TO 2:50 PM

Imaging Methods I

Session Chair: **Zhiwei Huang,** National Univ. of Singapore (Singapore)

1:30 pm: **Thermal Imaging: (re)discovering the potentials for diagnostics and treatment evaluation in the clinical procedures (review)**, Rudolf M. Verdaasdonk, John H. Klaessens, Albert J. van der Veen, Vrije Univ. Medical Ctr. (Netherlands) . . . . . [9313-27]

1:50 pm: **A high-speed OCT needle probe for rapid volumetric scanning**, Bryden C. Quirk, Rodney W. Kirk, David D. Sampson, Robert A. McLaughlin, The Univ. of Western Australia (Australia) . . . . . [9313-28]

2:10 pm: **Development and verification of a novel device for dental intra-oral 3D scanning using chromatic confocal technology**, Michael Zint, Karl Stock, ILM, Univ. Ulm (Germany); Rainer Graser, Cubert GmbH (Germany); Edgar Brauer, ILM, Univ. Ulm (Germany); Jan Heyninck, Joris Vanbiervliet, Stefaan Dhondt, Pieter De Ceuninck, Dentsply International (Belgium); Thomas P. Ertl, Dentsply International (Germany); Raimund Hibst, ILM, Univ. Ulm (Germany) . . . . . [9313-29]

2:30 pm: **Needle tip tissue identification: Raman spectroscopy for epidural space**, Jeon Woong Kang, Massachusetts Institute of Technology (USA); Thomas A. Anderson, Massachusetts General Hospital (USA); Ramachandra R. Dasari, Peter T. C. So, Massachusetts Institute of Technology (USA) . . [9313-30]

Coffee Break . . . . . .Mon 2:50 pm to 3:30 pm

SESSION 8

ROOM: ROOM 250 (MEZZANINE) . . . . . MON 3:30 PM TO 5:10 PM

Imaging Methods II

Session Chair: **Jianan Qu,** Hong Kong Univ. of Science and Technology (Hong Kong, China)

3:30 pm: **Optical heterogeneous bioassay for the detection of suPAR as prognostic biomarker for inflammatory diseases**, Francesco Baldini, Sara Tombelli, Barbara Adinolfi, Francesco Chiavaioli, Ambra Giannetti, Cosimo Trono, Istituto di Fisica Applicata Nello Carrara, IFAC-CNR (Italy); Romeo Bernini, Immacolata A. Grimaldi, Gianluca Persichetti, Genni Testa, IREA-CNR, Institute for Electromagnetic Sensing of the Environment (Italy); Jesper Eugen-Olsen, Clinical Research Ctr., Hvidovre Hospital (Denmark) and Virogates A/S (Denmark) . . . . . [9313-31]

3:50 pm: **Direct ultrasound to video registration using photoacoustic markers from a single image pose**, Alexis Cheng, Xiaoyu Guo, Johns Hopkins Univ. (USA); Michael A. Choti M.D., The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); Jin U. Kang, Russell H. Taylor, Emad M. Boctor, Johns Hopkins Univ. (USA) . . . . . [9313-32]

4:10 pm: **Shifted excitation Raman difference spectroscopy using a dual-wavelength DBR diode laser at 785 nm**, Martin Maiwald, Bernd Eppich, Jörg Fricke, Arnim Ginolas, Franck Bugge, Andreas Klehr, Bernd Sumpf, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany) . . . . [9313-33]

4:30 pm: **Real-time quantitative lifetime unmixing of fluorophore mixtures using time resolved fluorescence spectroscopy**, Fartash Vasefi, David S. Kittle, Keith L. Black M.D., Pramod V. Butte, Cedars-Sinai Medical Ctr. (USA) . . . . . [9313-34]

4:50 pm: **A surgical microscope combining real-time surface reconstruction and spectroscopic fluorescence imaging with a light transport model to quantify visible and near-infrared fluorescent molecular markers**, Leticia M. Angulo-Rodríguez, Ecole Polytechnique de Montréal (Canada); Michael Jermyn, Ecole Polytechnique de Montréal (Canada) and Montreal Neurological Institute and Hospital (Canada); Kolbein Kolste, Thayer School of Engineering at Dartmouth (USA); Pablo A. Valdes Quevedo, Geisel School of Medicine, Dartmouth College (USA); Julien Pichette, Guillaume Sheehy, Yoann Gosselin, Ecole Polytechnique de Montréal (Canada); Mira Sibai, Princess Margaret Cancer Ctr., Univ. of Toronto (Canada); Kelvin Mok, Kevin Petrecca, Montreal Neurological Hospital and Institute (Canada); David W. Roberts M.D., Dartmouth Hitchcock Medical Ctr. (Canada); Keith D. Paulsen, Thayer School of Engineering at Dartmouth (USA); Brian C. Wilson, Princess Margaret Cancer Ctr., Univ. of Toronto (Canada); Frédéric Leblond, Ecole Polytechnique de Montréal (Canada) . . . . . [9313-44]

POSTERS-MONDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . MON 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Fluorescence detection of lymph node metastasis using 5-aminolevulinic acid in human colorectal cancer, Yoshinori Harada, Takeo Minamikawa, Hisataka Matsuo, Yoshihisa Yamaoka, Ping Dai, Tetsuro Takamatsu, Kyoto Prefectural Univ. of Medicine (Japan) . . . . . [9313-45]

Label-free evaluation of myocardial infarction by spontaneous Raman spectroscopy, Takeo Minamikawa, Yoshinori Harada, Tetsuro Takamatsu, Kyoto Prefectural Univ. of Medicine (Japan). . . . . [9313-46]

Principal component analysis of indocyanine green fluorescence dynamics for diagnosis of vascular diseases, Jihye Seo, Yuri An, Jungsul Lee, Chulhee Choi, KAIST (Korea, Republic of) . . . . . [9313-47]

New diagnostic and therapeutic systems for total management of neonatal hyperbilirubinemia using laser diodes, LEDs and OLEDs, Mostafa Hamza, Mansoura Univ. (Egypt); Mohammed H. sayed El-Ahl, Military Medical Academy (Egypt); Ahmad Mohmmad Hamza, National Research Ctr. (Egypt); Aya M. Hamza, Yahya Mohammad Hamza, Tabarak Children's Hospital (Egypt) . . . . . [9313-48]

Towards characterization of ductal carcinoma in situ using optical coherence tomography, Syed A. Bin Amir, Yu Gan, Fatih L. Balci, Hanina Hibshoosh, Sheldon Feldman, Christine P. Hendon, Columbia Univ. (USA) . . . . . [9313-49]

A study on the quantitative evaluation of skin barrier function, Tomomi Maruyama, Yasuhiro KABETANI, Michiko Kido, Kenji Yamada, Hieyong Jeong, Osaka Univ. Graduate School of Medicine (Japan); Yuko Ohno, Osaka Univ, Graduate School of Medicine (Japan); Hirotoshi OIKAZE, Yohei TAKECHI, Tomotaka FURUTA, Shoichi ISHII, Panasonic Corporation (Japan); Haruna KATAYAMA, Osaka Univ. Graduate School of Medicine (Japan); Hieyong Jeong, Yuko Ohno, Osaka Univ. (Japan). . . [9313-50]

Optical characteristics of prostate tissues and the key chromophores and fluorophores within tissues related to carcinogenesis, Kenneth J. Zhou, Stony Brook Univ. (USA); Jun Chen, Department of Cardiology, Tianjin Medical University General Hospital (China). . . . . [9313-51]

Surgical Doppler OCT microscope using augmented reality, Kanghae Kim, Nam Hyun Cho, Kibeom Park, Deokmin Jeon, Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of) . . . . . [9313-52]

Gastrointestinal tract volume measurement method using a compound eye type endoscope, Kayo Yoshimoto, Osaka City Univ. (Japan); Kenji Yamada, Kenji Watabe, Michiko Kido, Osaka Univ. (Japan); Toshiaki Nagakura, Osaka Electro-Communication Univ. (Japan); Hideya Takahashi, Osaka City Univ. (Japan); Tsutomu Nishida, Hideki Iijima, Masahiko Tsujii, Tetsuo Takehara, Yuko Ohno, Osaka Univ. (Japan) . . . . . [9313-53]

The gender differences of extremities microcirculation: far-infrared illumination test, Wei-Long Kao, Chia-Wei Sun, Ching-Cheng Chuang, National Chiao Tung Univ. (Taiwan). . . . . [9313-54]

Detection of paroxysmal migraine without aura by using near-infrared spectroscopy, Chao-Che Lee, Chia-Wei Sun, Ching-Cheng Chuang, National Chiao Tung Univ. (Taiwan); Wei-Ta Chen, Taipei Veterans General Hospital (Taiwan) and National Yang-Ming Univ. (Taiwan) . . . . . [9313-55]

Monitoring anticoagulation status using optical thromboelastography (OTEG), Diane M. Tshikudi, Markandey M. Tripathi, Zeinab Hajjarian Kashany, Seemantini K. Nadkarni, Massachusetts General Hospital (USA). . . . . [9313-56]

Changes of absorption and reduced scattering coefficients during vessel occlusion test: time-resolved diffuse optical signal study, Chen-Wun Ciou, Ching-Cheng Chuang, National Chiao Tung Univ. (Taiwan); Chung-Ming Chen, National Taiwan Univ. (Taiwan); Chia-Wei Sun, National Chiao Tung Univ. (Taiwan) . . . . . [9313-57]

Forensic application of Raman spectroscopy for blood age analysis, Kiana Jansen, Univ. School of Nashville (USA); Maggie E. O'Connor, Vanderbilt Univ. (USA); Maurice C. Aalders, Academisch Medisch Centrum (Netherlands); Isaac J. Pence, Anita Mahadevan-Jansen, Vanderbilt Univ. (USA). . . . . [9313-58]

TUESDAY 10 FEBRUARY

SESSION 9

ROOM: ROOM 250 (MEZZANINE) . . . . . TUE 8:30 AM TO 10:10 AM

Vascular Methods I

Session Chair: **Maurice C. Aalders,**
Academisch Medisch Centrum (Netherlands)

8:30 am: **Characterization of a hybrid diffuse correlation spectroscopy and time-resolved near-infrared spectroscopy system for real-time monitoring of cerebral blood flow and oxygenation**, Kyle Verdecchia, Mamadou Diop, Lawson Health Research Institute (Canada) and Western Univ. (Canada); Albert Lee, Western Univ. (Canada); Keith St. Lawrence, Lawson Health Research Institute (Canada) and Western Univ. (Canada) . . . . . [9313-35]

8:50 am: **Handheld MEMS based swept-source optical coherence tomography for microvascular anastomosis in murine model**, Yong Huang, Johns Hopkins Univ. (USA); Georg J. Furtmuller, Johns Hopkins Univ., School of Medicine (USA); Dedi Tong, Johns Hopkins Univ., School of Medicine (USA) and Beijing Jishuitan Hospital (China); Shan Zhu, Johns Hopkins Univ., School of Medicine (USA) and Peking Union Medical College Hospital (China); W. P. Andrew Lee M.D., Gerald Brandacher M.D., Johns Hopkins Univ., School of Medicine (USA); Jin U. Kang, Johns Hopkins Univ. (USA) . . . . . [9313-36]

9:10 am: **Non-contact continuous-wave diffuse optical tomographic system to capture vascular dynamics in the foot**, Jennifer W. Hoi, Hyun-Keol Kim, Alessandro Marone, Michael A. Khalil, Columbia Univ. (USA); Gautam Shrikhande M.D., New York-Presbyterian Hospital (USA) and Columbia Univ. (USA); Andreas H. Hielscher, Columbia Univ. (USA). . . . . [9313-37]

9:30 am: **Highly portable and clinic-friendly instrument for monitoring peripheral perfusion in a point of care setting**, Sean M. White, Bruce Yang, Tyler B. Rice, Laser Associated Sciences (USA). . . . . [9313-38]

9:50 am: **Noninvasive submilligram level quantification of in vivo blood components with slitless high-sensitivity spectrometer and noncooled NIR detector**, Ryosuke Kuribayashi, Hiromitsu Furukawa, National Institute of Advanced Industrial Science and Technology (Japan) . . . . . [9313-39]

Coffee Break . . . . . Tue 10:10 am to 10:40 am

SESSION 10

ROOM: ROOM 250 (MEZZANINE) . . . . . TUE 10:40 AM TO 12:00 PM

Vascular Methods II

Session Chair: **Hong Liu,** The Univ. of Oklahoma (USA)

10:40 am: **In vivo performance comparison study of wide-field oxygenation imaging methods**, Martijn van de Giessen, Leiden Univ. Medical Ctr. (Netherlands) and Technische Univ. Delft (Netherlands); Joseph P. Angelo Jr., Boston Univ. (USA) and Beth Israel Deaconess Medical Ctr. (USA); Christina Vargas M.D., Beth Israel Deaconess Medical Ctr. (USA); Sylvain Gioux, Harvard Medical School (USA) and Beth Israel Deaconess Medical Ctr. (USA). . [9313-40]

11:00 am: **Clinical evaluation of blood coagulation status in patients using optical thromboelastography (OTEG)**, Markandey M. Tripathi, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Diane M. Tshikudi, Massachusetts General Hospital (USA); Zeinab Hajjarian Kashany, Elizabeth M. Van Cott, Seemantini K. Nadkarni, Massachusetts General Hospital (USA) and Harvard Medical School (USA) . . . . . [9313-41]

11:20 am: **Study on migraine signal of prefrontal cortex with gender difference based on NIRS method**, Chen Yu Lin, National Chiao Tung Univ. (Taiwan); Chia-Wei Sun, Biomedical Optical Imaging Lab., National Chiao Tung Univ. (Taiwan); Ching Cheng Chuang, National Chiao Tung Univ. (Taiwan) . . . . . [9313-42]

11:40 am: **Noninvasive diagnosis and continuous monitoring of thrombosis in clinics by near-infrared spectroscopy**, Ting Li, Yunglong Sun, Xiao Chen, Yue Zhao, Univ. of Electronic Science and Technology of China (China); Rongrong Ren, Department of Anesthesiology and Surgical Intensive Care Unit, Xinhua Hospital (China); Mushuang Liu, Univ of Electronic Science and Technology of China (China) . . . . . [9313-43]

CONFERENCE 9314
LOCATION: ROOM 220 (MEZZANINE)

Saturday–Sunday 7–8 February 2015 • Proceedings of SPIE Vol. 9314

New

Optics and Biophotonics in Low-Resource Settings

Conference Chairs: **David Levitz,** MobileOCT (Israel); **Aydogan Ozcan,** Univ. of California, Los Angeles (USA); **David Erickson,** Cornell Univ. (USA)

Program Committee: **Gerard L. Coté,** Texas A&M Univ. (USA); **Frances S. Ligler,** North Carolina State Univ. (USA); **Anita Mahadevan-Jansen,** Vanderbilt Univ. (USA); **Nirmala Ramanujam,** Duke Univ. (USA); **Avi Rasooly,** National Institutes of Health (USA); **Eric A. Swanson,** OCT News (USA); **Sebastian Wachsmann-Hogiu,** NSF Ctr. for Biophotonics Science and Technology (USA); **Ian M. White,** Univ. of Maryland, College Park (USA)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 220 (MEZZANINE) . . . . . SAT 8:50 AM TO 10:30 AM

Mobile-Phone Enabled Cost-Effective Imaging, Sensing and Diagnostics Technologies

Session Chair: **Aydogan Ozcan,** Univ. of California, Los Angeles (USA)

8:50 am: **Point-of-care diagnostics using smartphone based endoscope system**, Jung Kweon Bae, Sungwon Shin, Andrey Vavilin, Ulsan National Institute of Science and Technology (Korea, Republic of); Taeho Kim, FuturIST (Korea, Republic of) and Ulsan National Institute of Science and Technology (Korea, Republic of); Joon S. You, Praxis BioSciences (USA) and Ulsan National Institute of Science and Technology (Korea, Republic of); Jeong Hun Jang, Kyungpook National Univ. Hospital (Korea, Republic of); Woonggyu Jung, Ulsan National Institute of Science and Technology (Korea, Republic of) . . . . . [9314-1]

9:10 am: **Mobile polarized imaging platform towards point-of-care malaria diagnostics**, Casey W. Pirnstill, Gerard L. Coté, Texas A&M Univ. (USA)[9314-2]

9:30 am: **FPscope: a 3D-printed high-resolution microscope using a cellphone lens**, Siyuan Dong, Kaikai Guo, Pariksheet Nanda, Guoan Zheng, Univ. of Connecticut (USA) . . . . . [9314-3]

9:50 am: **Field quantification of plant chlorophyll content using Google Glass**, Bingen Cortazar, Hatice Ceylan Koydemir, Derek Tseng, Steve W. Feng, Aydogan Ozcan, Univ. of California, Los Angeles (USA). . . . . [9314-4]

10:10 am: **Field-portable and cost-effective holographic device for label-free nanoparticle and virus imaging and sizing**, Euan R. McLeod, T. Umut Dincer, Muhammed Veli, Yavuz N. Ertas, Chau Nguyen, Wei Luo, Aydogan Ozcan, Univ. of California, Los Angeles (USA) . . . . . [9314-5]

Coffee Break . . . . . .Sat 10:30 am to 11:00 am

SESSION 2

LOCATION: ROOM 220 (MEZZANINE) . . . . . SAT 11:00 AM TO 12:00 PM

Mobile-Phone Enabled Skin Imaging Technologies

Session Chair: **David Erickson,** Cornell Univ. (USA)

11:00 am: **Feasibility of mobile phone based transcutaneous billirubinometry**, Chetan A. Patil, Nishant Ganesh Kumar, Vanderbilt Univ. (USA); Zachary T. McCormick, Trailblazing Technology, Inc. (USA); The-Quyen Nguyen, Northwestern Univ. (USA); Michael Maggart, E. Duco Jansen, Vanderbilt Univ. (USA). . . . . [9314-6]

11:20 am: **A mobile medical application for imaging and analysis of hand arthritis: (I) characterizing the reproducibility**, Fartash Vasefi, Nicholas B. MacKinnon, Shanil Gunasekara, eTreat Medical Diagnostics, Inc. (Canada) . . . . . [9314-7]

11:40 am: **A mobile medical application for imaging and analysis of hand arthritis: (II) quantitative osteoarthritis scoring**, Nicholas B. MacKinnon, Shanil Gunasekara, Fartash Vasefi, eTreat Medical Diagnostics, Inc. (Canada) . . . . . [9314-8]

Lunch/Exhibition Break . . . . . .Sat 12:00 pm to 1:40 pm

SESSION 3

LOCATION: ROOM 220 (MEZZANINE) . . . . . SAT 1:40 PM TO 3:00 PM

Mobile-Phone Enabled Cervical and ENT Imaging

Session Chair: **Anita Mahadevan-Jansen,** Vanderbilt Univ. (USA)

1:40 pm: **Remote quality assurance in cervical cancer screening in low resource settings using a handheld smartphone-based colposcope**, Christophe Millien, Michelle Morse, Meredith Jean-Baptiste, Hôpital Univ. de Mirebalais (Haiti); David Levitz, MobileOCT (Israel). . . . . [9314-9]

2:00 pm: **Optical design of low cost imaging systems for mobile medical applications**, Alexander J. Kass, Ronit Slyper, David Levitz, MobileOCT (Israel) . . . . . [9314-10]

2:20 pm: **Cellphone based mobile colposcope for the evaluation of women with abnormal cervical cancer screening**, Bruce Kahn M.D., Meredith McMullen, Scripps Clinic Carmel Valley (USA); David Levitz, Mobile OCT (Israel) . . . . . [9314-11]

2:40 pm: **Near-infrared imaging for management of chronic maxillary sinusitis**, Joon S. You, Praxis BioSciences (USA); Albert E. Cerussi, Beckman Laser Institute and Medical Clinic (USA); James H. Kim, Praxis BioSciences (USA); Naveen Bhandarkar M.D., Univ. of California, Irvine (USA); Brian J. F. Wong M.D., Beckman Laser Institute and Medical Clinic (USA) and Univ. of California, Irvine (USA). . . . . [9314-12]

POSTER SESSION AND COFFEE BREAK

LOCATION: HALL A (WITH BIOS EXPO) . . . . . SAT 3:00 PM TO 4:00 PM

Attendees are invited to view the conference posters, which will be available on Saturday. The poster session, with authors present, will be held from 3:00 to 4:00 PM on Saturday afternoon, in conjunction with the coffee break.

POSTER AUTHORS: Poster setup is scheduled from 12:00 PM (noon) on Saturday in South Hall A. Please plan to stand with your poster during the poster session on Saturday from 3:00 to 4:00 PM. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

Spoilage of foods monitored by native fluorescence spectroscopy with selective excitation wavelength, Yang Pu, Wubao Wang, Robert R. Alfano, The City College of New York (USA) . . . . . [9314-33]

A software-based autocorrelation system using a Raspberry Pi mini computer for diffuse correlation spectroscopy, Matthew Tivnan, Northeastern Univ. (USA); Rajan S. Gurjar, Radiation Monitoring Devices, Inc. (USA); David E. Wolf, Pendar Medical (USA); Karthik Vishwanath, Miami Univ. (USA) and Radiation Monitoring Devices, Inc. (USA) . . . . . [9314-35]

SESSION 4

LOCATION: ROOM 220 (MEZZANINE) . . . . . SAT 4:00 PM TO 5:00 PM

Optical Coherence Tomography Systems on a Mobile Phone

Session Chair: **Aydogan Ozcan,** Univ. of California, Los Angeles (USA)

4:00 pm: **A novel low cost 3-D nondestructive testing system based on multiple reference optical coherence tomography**, Roshan I. Dsouza, Hrebesh Molly Subhash, Kai Neuhaus, National Univ. of Ireland, Galway (Ireland); Josh Hogan, Carol J. Wilson, Compact Imaging, Inc. (USA); Martin J. Leahy, National Univ. of Ireland, Galway (Ireland). . . . . [9314-134]

4:20 pm: **Characterization of light distribution and optimization of detector position for multiple reference optical coherence tomography**, Kai Neuhaus, Hrebesh Molly Subhash, Roshan I. Dsouza, National Univ. of Ireland, Galway (Ireland); Josh Hogan, Carol J. Wilson, Compact Imaging, Inc. (USA); Martin J. Leahy, National Univ. of Ireland, Galway (Ireland). . . . . [9314-14]

4:40 pm: **Towards affordable compact optical coherence tomography technologies**, Hrebesh Molly Subhash, National Univ. of Ireland, Galway (Ireland) . . . . . [9314-15]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 5

LOCATION: ROOM 220 (MEZZANINE) . . . . . SUN 8:30 AM TO 10:00 AM

Mobile Microscopy, Sensing and Diagnostics I

Session Chair: **David Erickson,** Cornell Univ. (USA)

8:30 am: **Point-of-surgery diagnostic for parathyroid hormone** *(Invited Paper)*, Brian M. Cummins, The Univ. of North Carolina at Chapel Hill (USA) and North Carolina State Univ. (USA); Michael J. Lochhead, MBio Diagnostics, Inc. (USA); Catherine Hammett-Stabler, Kirk Caddell, Jen Jen Yeh, The Univ. of North Carolina at Chapel Hill (USA); Frances S. Ligler, Glenn M. Walker, The Univ. of North Carolina at Chapel Hill (USA) and North Carolina State Univ. (USA) . . . . . [9314-17]

9:00 am: **Smartphone based spatiotemporal mapping of mercury(II) ions using a colorimetric gold nanoparticle assay**, Qingshan Wei, Richie S. Nagi, Kayvon Sadeghi, Steve W. Feng, Eddie Yan, So Jung Ki, Romain Caire, Derek Tseng, Aydogan Ozcan, Univ. of California, Los Angeles (USA). . . . . [9314-18]

9:20 am: **A game-based platform for crowd-sourcing biomedical image diagnosis and standardized remote training and education of diagnosticians**, Steve W. Feng, Minjae Woo, Krithika Chandramouli, Aydogan Ozcan, Univ. of California, Los Angeles (USA). . . . . [9314-19]

9:40 am: **Pathology slide imaging using wide-field lensfree microscopy**, Yibo Zhang, Alon Greenbaum, Alborz Feizi, Aydogan Ozcan, Univ. of California, Los Angeles (USA). . . . . [9314-20]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 6

LOCATION: ROOM 220 (MEZZANINE) . . . . . SUN 10:30 AM TO 11:30 AM

Mobile Microscopy, Sensing and Diagnostics II

Session Chair: **David Levitz,** MobileOCT (Israel)

10:30 am: **Single-step sample preparation and image-based counting of minute volumes of human blood**, Zachary J. Smith, Tingjuan Gao, Kaiqin Chu, Stephen M. Lane, Dennis L. Matthews, Denis M. Dwyre M.D., Univ. of California, Davis (USA); James Hood, Keith Tatsukawa M.D., Laurence Heifetz M.D., Tahoe Institute for Rural Health Research (USA); Sebastian Wachsmann-Hogiu, Univ. of California, Davis (USA) . . . . . [9314-21]

10:50 am: **A portable light scattering device for field diagnosis of microcytic anemia**, Zachary J. Smith, Josef Kauer, Kaiqin Chu, Sebastian Wachsmann-Hogiu, Univ. of California, Davis (USA) . . . . . [9314-22]

11:10 am: **A smartphone platform for quantitative lab-on-a-chip diagnostics**, Dakota O'Dell, Seoho Lee, Matthew Mancuso, David Erickson, Cornell Univ. (USA) . . . . . [9314-23]

Lunch/Exhibition Break . . . . . Sun 11:30 am to 2:10 pm

SESSION 7

LOCATION: ROOM 220 (MEZZANINE) . . . . . SUN 2:10 PM TO 3:30 PM

Spectroscopy and Spectral Imaging

Session Chair: **Euan McLeod,** Univ. of California, Los Angeles (USA)

2:10 pm: **Proposal of AAA-battery-size one-shot ATR Fourier spectroscopic imager for on-site analysis: sSimultaneous measurement of multi-components with high accuracy**, Satsuki Hosono, Wei Qi, Yo Suzuki, Masaru Fujiwara, Hiroyuki Hiramatsu, Akira Nishiyama, Kenji Wada, Satoru Suzuki, Pradeep Abeygunawardhana, Ichiro Ishimaru, Kagawa Univ. (Japan) . . [9314-24]

2:30 pm: **Proposal of snapshot line-imaging Fourier spectroscopy for smartphone**, Ichiro Ishimaru, Natsumi Kawashima, Shun Sato, Akane Ishida, Daichi Inohara, Naotaka Tanaka, Kenji Wada, Akira Nishiyama, Masaru Fujiwara, Kagawa Univ. (Japan) . . . . . [9314-25]

2:50 pm: **Palm-size wide-field Fourier spectroscopic imager with uncooled infrared microbolometer arrays for smartphone**, Ichiro Ishimaru, Natsumi Kawashima, Yo Suzuki, Wei Qi, Satsuki Hosono, Tsubasa Saito, Satoru Ogawa, Shun Sato, Masaru Fujiwara, Akira Nishiyama, Kenji Wada, Naotaka Tanaka, Kagawa Univ. (Japan) . . . . . [9314-26]

3:10 pm: **Inkjet-fabricated surface enhanced Raman spectroscopy (SERS) sensors on paper for biosensing**, Stephen Restaino, Ian M. White, Univ. of Maryland, College Park (USA) . . . . . [9314-27]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 8

LOCATION: ROOM 220 (MEZZANINE) . . . . . SUN 4:00 PM TO 5:00 PM

Mobile-Phone Enabled Fluorescence Imaging and Measurements

Session Chair: **David Erickson,** Cornell Univ. (USA)

4:00 pm: **Field portable fluorescence microscopy for detection of Giardia lamblia cysts in water samples**, Hatice Ceylan Koydemir, Zoltán S. Göröcs, Euan R. McLeod, Derek Tseng, Aydogan Ozcan, Univ. of California, Los Angeles (USA) . . . . . [9314-28]

4:20 pm: **Low cost integrating cavity for monitoring of environmental toxins**, Joel N. Bixler, Vladislav V. Yakovlev, Texas A&M Univ. (USA) . . [9314-30]

4:40 pm: **Smartphone-enabled filterless fluorescence assay utilizing the pyrene excimer**, John P. Goertz, Ian M. White, Univ. of Maryland, College Park (USA) . . . . . [9314-31]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their ground-breaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9315
LOCATION: ROOM 238 (MEZZANINE)

Saturday–Sunday 7–8 February 2015 • Proceedings of SPIE Vol. 9315

Design and Quality for Biomedical Technologies VIII

Conference Chairs: **Ramesh Raghavachari,** U.S. Food and Drug Administration (USA); **Rongguang Liang,** College of Optical Sciences, The Univ. of Arizona (USA)

Conference Co-Chair: **T. Joshua Pfefer,** U.S. Food and Drug Administration (USA)

Program Committee: **Anthony J. Durkin,** Beckman Laser Institute and Medical Clinic (USA); **Kenji Taira,** Olympus Corp. (USA); **Jeeseong Hwang,** National Institute of Standards and Technology (USA); **Stephen P. Morgan,** The Univ. of Nottingham (United Kingdom); **Robert J. Nordstrom,** National Institutes of Health (USA); **Jannick P. Rolland,** Univ. of Rochester (USA); **Eric J. Seibel,** Univ. of Washington (USA); **Tomasz S. Tkaczyk,** Rice Univ. (USA); **Gracie Vargas,** The Univ. of Texas Medical Branch (USA); **Rudolf M. Verdaasdonk,** Vrije Univ. Medical Ctr. (Netherlands); **David W. Allen,** National Institute of Standards and Technology (USA)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 238 (MEZZANINE) . . . . . .SAT 2:10 PM TO 3:10 PM

Standards and Phantoms in Biophotonics

Joint Session with Conferences 9315 and 9325

Session Chairs: **David W. Allen,** National Institute of Standards and Technology (USA); **Rongguang Liang,** College of Optical Sciences, The Univ. of Arizona (USA)

2:10 pm: **Making digital phantoms with spectral and spatial light modulators for quantitative applications of hyperspectral optical medical imaging devices**, Jeeseong C. Hwang, David W. Allen, Bonghwan Chon, Aniruddha Ray, National Institute of Standards and Technology (USA); David M. McClatchy III, Stephen C. Kanick, Brian W. Pogue, Dartmouth College (USA) . . . . . [9325-12]

2:30 pm: **Design and phantom-based validation of a bimodal ultrasound-photoacoustic imaging system for spectral detection of optical biomarkers**, William C. Vogt, Congxian Jia, Keith A. Wear, Brian S. Garra, T. Joshua Pfefer, U.S. Food and Drug Administration (USA) . . . . . [9315-1]

2:50 pm: **Oximetry system performance assessment with POM phantoms incorporating hemoglobin calibration standards and customized saturation levels**, Hyounguk Jang, Karam Singh, Univ. of Maryland, College Park (USA); T. Joshua Pfefer, U.S. Food and Drug Administration (USA); Yu Chen, Univ. of Maryland, College Park (USA) . . . . . [9315-2]

Coffee Break . . . . . .Sat 3:10 pm to 3:30 pm

SESSION 2

LOCATION: ROOM 238 (MEZZANINE) . . . . . SAT 3:30 PM TO 5:10 PM

Quality and Standardization

Session Chair: **Rudolf M. Verdaasdonk,** Vrije Univ. Medical Ctr. (Netherlands)

3:30 pm: **Shack-Hartmann sensor based optical quality testing of whole slide imaging systems for digital pathology**, S. Mojtaba Shakeri, Technische Univ. Delft (Netherlands); Bas Hulsken, Philips Digital Pathology (Netherlands); Lucas J. van Vliet, Sjoerd Stallinga, Technische Univ. Delft (Netherlands)[9315-4]

3:50 pm: **A dynamic opto-physiological model to effectively interpret retinal microvascular circulation**, Harnani Hassan, Sijung Hu, Vincent Dwyer, Loughborough Univ. (United Kingdom). . . . . [9315-5]

4:10 pm: **Quantitative light scattering of single sub-micron particles for flow cytometry standardization**, Frank Coumans, Edwin van der Pol, Anita N. Böing, Academic Medical Ctr., Amsterdam (Netherlands); Guus Sturk, Rienk Nieuwland, Academic Medical Ctr. Amsterdam (Netherlands); Ton G. van Leeuwen, Academic Medical Ctr., Amsterdam (Netherlands) . . . . . [9315-6]

4:30 pm: **Standardized cell samples for midIR technology development**, Jürgen Schnekenburger, Lena Kastl, Christina E. Rommel, Björn Kemper, Westfälische Wilhelms-Univ. Münster (Germany) . . . . . [9315-7]

4:50 pm: **Calibration of NIRS-measured hemodynamics with best-matched hemoglobin extinction coefficients and group statics on human-blood-model data**, Ting Li, Yue Zhao, Univ. of Electronic Science and Technology of China (China); Yunlong Sun, Kai Li, Wenjie Li, Chi Zhang, Junpeng Liu, Univ of Electronic Science and Technology of China (China) . . . . . [9315-8]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 3

LOCATION: ROOM 238 (MEZZANINE) . . . . . .SUN 8:30 AM TO 9:00 AM

Keynote Session

Session Chairs: **Ramesh Raghavachari,** U.S. Food and Drug Administration (USA); **Rongguang Liang,** College of Optical Sciences, The Univ. of Arizona (USA); **T. Joshua Pfefer,** U.S. Food and Drug Administration (USA)

8:30 am: **Photoacoustic tomography: ultrasonically beating optical diffusion and diffraction** *(Keynote Presentation)*, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9315-9]

SESSION 4

LOCATION: ROOM 238 (MEZZANINE) . . . . . SUN 9:00 AM TO 10:10 AM

Imaging Technologies for Clinical Application

Session Chair: **T. Joshua Pfefer,** U.S. Food and Drug Administration (USA)

9:00 am: **Bridging the gap in colonoscopy with optical and engineering solutions** *(Invited Paper)*, Bhaskar Banerjee, The Univ. of Arizona (USA) . . . . . [9315-10]

9:30 am: **All plastic fluorescence image guided goggle system**, Nan Zhu, The Univ. of Arizona (USA); Shengkui Gao, Suman B. Mondal, Samuel Achilefu, Viktor Gruev, Washington Univ. in St. Louis (United Kingdom); Rongguang Liang, The Univ. of Arizona (USA) . . . . . [9315-11]

9:50 am: **Optical design of a dual-view endoscope**, Rajender Katkam, Bhaskar Banerjee, Rongguang Liang, The Univ. of Arizona (USA) . . . . . [9315-12]

Coffee Break . . . . . Sun 10:10 am to 10:40 am

SESSION 5

LOCATION: ROOM 238 (MEZZANINE) . . . . . SUN 10:40 AM TO 12:40 PM

Imaging Technologies I

Session Chair: **Jeeseong C. Hwang,**
National Institute of Standards and Technology (USA)

10:40 am: **Spatial frequency domain imaging (SFDI): evolution of a translational system** *(Invited Paper)*, Amaan Mazhar, Pierre Khoury, Steve Saggese, Modulated Imaging, Inc. (USA); Anthony J. Durkin, Univ. of California, Irvine (USA); David Cuccia, Modulated Imaging, Inc. (USA) . . . . . [9315-13]

11:10 am: **Multifocal confocal spectral microscope**, Shaun Pacheco, Rongguang Liang, The Univ. of Arizona (USA) . . . . . [9315-14]

11:30 am: **Application of maximum-likelihood estimation in optical coherence tomography for nanometer-class thickness estimation**, Jinxin Huang, Univ. of Rochester (USA); Qun Yuan, Nanjing Univ. of Science and Technology (China); Patrice Tankam, Univ. of Rochester (USA); Eric W. Clarkson, Matthew A. Kupinski, The Univ. of Arizona (USA); Holly B. Hindman, James V. Aquavella, Jannick P. Rolland, Univ. of Rochester (USA) . . . . [9315-15]

11:50 am: **A high-throughput automated confocal imaging system for three-dimensional examination of neuronal regeneration of C. elegans post-injury axons**, Ki Hyun Kim, Evan Hegarty, Sertan K. Gokce, Adela Ben-Yakar, The Univ. of Texas at Austin (USA) . . . . . [9315-16]

12:10 pm: **Standardizing flow cytometric assays in long-term population-based studies** *(Invited Paper)*, Attila Tarnok, Univ. Leipzig (Germany) and Univ. Leipzig, Pediatric Cardiology, Heart Ctr. Leipzig GmbH (Germany); Jozsef Bocsi, Univ. Leipzig, Pediatric Cardiology, Heart Ctr. Leipzig GmbH (Germany); Silke Zachariae, Christoph Engel, Markus Löffler, Univ. Leipzig, Institute for Medical Informatics, Statistics and Epidemiology (Germany); Ingo Dähnert, Susanne Melzer, Univ. Leipzig, Pediatric Cardiology, Heart Ctr. Leipzig GmbH (Germany) . . . . . [9315-3]

Lunch/Exhibition Break . . . . . Sun 12:40 pm to 1:40 pm

SESSION 6

LOCATION: ROOM 238 (MEZZANINE) . . . . . SUN 1:40 PM TO 3:30 PM

Design of Biomedical Imaging Technologies

Session Chair: **Anthony J. Durkin,**
Beckman Laser Institute and Medical Clinic (USA)

1:40 pm: **FPGA-based real-time multiplexed fluorescence lifetime imaging by Fourier multiplexed FLIM** *(Invited Paper)*, Ming Zhao, Yu Li, Leilei Peng, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9315-17]

2:10 pm: **Effective duty cycle of galvanometer-based scanners: impact on OCT imaging**, Virgil-Florin Duma, Aurel Vlaicu Univ. of Arad (Romania) and West Univ. of Timisoara (Romania) and Polytechnics Univ. of Timisoara (Romania); Patrice Tankam, Jinxin Huang, Jannick P. Rolland, The Institute of Optics, Univ. of Rochester (USA) . . . . . [9315-18]

2:30 pm: **Optimization of Whispering Gallery Mode sensor design for applications in biosensing**, Tess Reynolds, Matthew R. Henderson, Alexandre François, The Univ. of Adelaide (Australia); Stephen J. Nicholls, South Australian Health & Medical Research Institute (SAHMRI) (Australia); Tanya M. Monro, The Univ. of Adelaide (Australia) . . . . . [9315-19]

2:50 pm: **Optimal selection of cut-on wavelength in soliton self-frequency shift for nonlinear optical microscopy**, Ke Wang, Ping Qiu, Shenzhen Univ. (China) . . . . . [9315-20]

3:10 pm: **A new engineering approach to reveal correlation of physiological change and spontaneous expression from video images**, Fenglei Yang, Shanghai Univ. (China); Sijung Hu, Loughborough Univ. (United Kingdom); Xiaoyun Ma, Shanghai Univ. (China); Harnani Hassan, Loughborough Univ. (United Kingdom); Dongqing Wei, Shanghai Jiao Tong Univ. (China). . . [9315-21]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 7

LOCATION: ROOM 238 (MEZZANINE) . . . . . SUN 4:00 PM TO 5:40 PM

Imaging Technologies II

Session Chair: **Rongguang Liang,** College of Optical Sciences, The Univ. of Arizona (USA)

4:00 pm: **From astronomy and telecommunications to biomedicine** *(Invited Paper)*, Bradford B. Behr, Tornado Spectral Systems (USA); Scott A. Baker, Yusuf Bismilla, Andrew T. Cenko, Brandon DesRoches, Tornado Spectral Systems (Canada); Arsen R. Hajian, Tornado Spectral Systems (USA); Jeffrey T. Meade, Tornado Spectral Systems (Canada); Arthur Nitkowski, Kyle J. Preston, Tornado Spectral Systems (USA); Bradley S. Schmidt, Tornado Spectral Systems (Canada); Nicolás Sherwood-Droz, Tornado Spectral Systems (USA); Jared Slaa, Tornado Spectral Systems (Canada) . . . . . [9315-22]

4:20 pm: **Enhancement of absorption and resistance of motion utilizing a multi-channel opto-electronic sensor to effectively monitor physiological signs during sport exercise**, Sijung Hu, Abdullah Alzahrani, Vicente Azorin-Peris, Dale Esliger, Laura Barrett, Loughborough Univ. (United Kingdom); Matthew Hayes, Cambridge Consultants Ltd. (United Kingdom); Shafique Akbare, Univ. Paris-Sud (France); Jerome Achart, Sylvain Kuoch, Université Paris-sud (France) . . . . . [9315-23]

4:40 pm: **Ultrasensitive detection allows for singlet oxygen phosphorescence detection, an important prerequisite for photodynamic therapy**, Uwe Ortmann, Christian Litwinski, Manoel Veiga, Sebastian Tannert, Felix Koberling, Volker Buschmann, Matthias Patting, Marcus Sackrow, Michael Wahl, Rainer Erdmann, PicoQuant GmbH (Germany); Peter Kapusta, J. Heyrovsk? Institute of Physical Chemistry of the ASCR, v.v.i. (Czech Republic); Christian Wolf, Humberto Rodriguez-Alvarez, PVcomB, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) . . . . . [9315-24]

5:00 pm: **Separation of Cerenkov radiation in irradiated optical fibers by optical spectroscopy**, Arash Darafsheh, Haoyang Liu, The Univ. of Pennsylvania Health System (USA); Rongxiao Zhang, Stephen C. Kanick, Brian W. Pogue, Dartmouth College (USA); Timothy C. Zhu, Jarod C. Finlay, The Univ. of Pennsylvania Health System (USA). . . . . [9315-25]

5:20 pm: **Evaluation of the optical interference in a combined measurement system used for assessment of tissue blood flow**, Zahra Abdollahi, Panicos Kyriacou, Justin Phillips, City Univ. London (United Kingdom). . . . . [9315-26]

POSTERS-SUNDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

A novel optical biopsy probe design combining elastic scattering spectroscopy and optical coherence tomography, Abel Swaan, Paul R. Bloemen, Anouk L. Post, Xu Zhang, Daniel M. de Bruin, M. Pilar Laguna Pes, Henricus J. C. M. Sterenborg, Dirk J. Faber, Jean J. de la Rosette, Ton G. van Leeuwen, Academisch Medisch Centrum (Netherlands) . . . [9315-30]

A simple analysis of extinction spectra of cancerous and normal prostate tissues in near infrared range using a size discrete particle distribution and Mie scattering model, Kenneth J. Zhou, Stony Brook Univ. (USA); Jun Chen, Tianjin Medical Univ. General Hospital (China) . . . . . [9315-31]

Blood flow measurement by 320 multi-detectors CT: A phantom study, Jun Chen, Xuefang Yu, Department of Cardiology, Tianjin Medical University General Hospital (China); Shaopeng Xu, Tianjin Medical Univ. General Hospital (China); Kenneth J. Zhou, Stony Brook Univ. (USA). . . . . [9315-32]

Quantitative assessment of myocardial perfusion by first-pass technique: animal study, Jun Chen, Department of Cardiology, Tianjin Medical University General Hospital (China); Zhang Zhang, Xuefang Yu, Tianjin Medical Univ. General Hospital (China); Kenneth J. Zhou, Stony Brook Univ. (USA) . . [9315-33]

Characteristics of photo-acoustic probe having light source inner the ultrasound transducer, Yong-Jae Lee, Eun-Ju Jeong, Hyun-Woo Song, Chang-Geun Ahn, Hyung-Wook Noh, Electronics and Telecommunications Research Institute (Korea, Republic of); Min Yong Jeon, Chungnam National Univ. (Korea, Republic of); Susung Lee, ALPINION Medical Systems (Korea, Republic of); Bong Kyu Kim, Electronics and Telecommunications Research Institute (Korea, Republic of); Hee-Won Kim, ALPINION Medical Systems (Korea, Republic of). . . . . [9315-34]

CONFERENCE 9316
LOCATION: ROOM 125 (EXHIBIT LEVEL)

Saturday 7 February 2015 • Proceedings of SPIE Vol. 9316

Multimodal Biomedical Imaging X

Conference Chairs: **Fred S. Azar,** Philips Medical Systems (USA); **Xavier Intes,** Rensselaer Polytechnic Institute (USA)

Program Committee: **Caroline Boudoux,** Ecole Polytechnique de Montréal (Canada); **Christophe Chefd'hotel,** Ventana Medical Systems, Inc. (USA); **Yu Chen,** Univ. of Maryland, College Park (USA); **Qianqian Fang,** Massachusetts General Hospital (USA); **Sergio Fantini,** Tufts Univ. (USA); **Gultekin Gulsen,** Univ. of California, Irvine (USA); **Theodore J. Huppert,** Univ. of Pittsburgh (USA); **Tim Nielsen,** Philips Research (Germany); **Vasilis Ntziachristos,** Helmholtz Zentrum München GmbH (Germany); **Brian W. Pogue,** Thayer School of Engineering at Dartmouth (USA); **Siavash Yazdanfar,** GE Global Research (USA); **Arjun G. Yodh,** Univ. of Pennsylvania (USA)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . . SAT 8:00 AM TO 9:20 AM

Image Processing Techniques

Session Chair: **Fred S. Azar,** Philips Healthcare (USA)

8:00 am: **Mammogram incorporated diffuse optical imaging with transmission and reflection parallel scanning**, Jhao-Ming Yu, Liang-Yu Chen, National Central Univ. (Taiwan); Min-Cheng Pan, Tungnan Univ. (Taiwan); Shen-Yih Sun, Chia-Cheng Chou, Taoyuan General Hospital (Taiwan); Min-Chun Pan, National Central Univ. (Taiwan) . . . . . [9316-1]

8:20 am: **Dense motion analysis and segmentation of ultrasound images**, Ryo Yokoyama, Kota Aoki, Hiroshi Nagahashi, Tokyo Institute of Technology (Japan) . . . . . [9316-2]

8:40 am: **Tomographic fluorescence reconstruction by a spectral projected gradient pursuit method**, Jinzuo Ye, Institute of Automation (China); Yu An, Beijing Jiaotong Univ. (China); Yamin Mao, Institute of Automation, Chinese Academy of Sciences (China); Shixin Jiang, The Department of Biomedical Engineering,School of Computer and Information Technology (China); Xin Yang, Institute of Automation, Chinese Academy of Sciences (China); Chongwei Chi, Jie Tian, Institute of Automation (China) . . . . . [9316-3]

9:00 am: **Clinical implementation of L-curve based reconstruction in MRI guided optical tomography**, Yan Zhao, Michael A. Mastanduno, Shudong Jiang, Fadi El-Ghussein, Thayer School of Engineering at Dartmouth (USA); Jiang Gui, Dartmouth College (USA); Brian W. Pogue, Keith D. Paulsen, Thayer School of Engineering at Dartmouth (USA) . . . . . [9316-4]

SESSION 2

LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . . SAT 9:20 AM TO 12:20 PM

Clinical Applications

Session Chair: **Xavier Intes,** Rensselaer Polytechnic Institute (USA)

9:20 am: **Double clad fiber devices for combined optical coherence tomography and laser tissue coagulation**, Kathy Beaudette, Ecole Polytechnique de Montréal (Canada); Martin L. Villiger, Harvard Medical School and Massachusetts General Hospital (USA); Mathias Strupler, Ecole Polytechnique de Montréal (Canada); Milen Shishkov, Jian Ren, Harvard Medical School and Massachusetts General Hospital (USA); Wendy-Julie Madore, Nicolas Godbout, Ecole Polytechnique de Montréal (Canada); Brett E. Bouma, Harvard Medical School and Massachusetts General Hospital (USA); Caroline Boudoux, Ecole Polytechnique de Montréal (Canada) . . . . . [9316-5]

9:40 am: **Illumination-compensated non-contact imaging photoplethysmography via dual-mode temporally-coded illumination**, Robert Amelard, Christian Scharfenberger, Alexander Wong, David A. Clausi, Univ. of Waterloo (Canada) . . . . . [9316-6]

Coffee Break . . . . . .Sat 10:00 am to 10:30 am

10:30 am: **Multi-modal contrast of tissue anatomy enables correlative biomarker imaging**, Karl E. Garsha, Franklin Ventura, Gary Pestano, Michael Otter, Dea Nagy, Ventana Medical Systems, Inc. (USA); Ray B Nagle, University of Arizona (USA); Esteban Roberts, Michael Barnes, Ventana Medical Systems, Inc. (USA) . . . . . [9316-7]

10:50 am: **Multimodality and image guided interventional devices** *(Invited Paper),* Martin B. van der Mark, Philips Research Nederland B.V. (Netherlands) . . . . . [9316-8]

11:20 am: **High-resolution motion-compensated imaging photoplethysmography for remote heart rate monitoring**, Audrey Chung, Xiao Yu Wang, Robert Amelard, Christian Scharfenberger, Joanne Leong, Alexander Wong, David A. Clausi, Univ. of Waterloo (Canada) . . . . . [9316-9]

11:40 am: **Non-contact monitoring of vital signs independent of light conditions and skin tone: system validation and first clinical results**, John H. Klaessens, Rudolf M. Verdaasdonk, Albert J. van der Veen, Jordi Penedo, Joost de Jong, Frank A. M. van den Dungen, Vrije Univ. Medical Ctr. (Netherlands) . . . . . [9316-10]

12:00 pm: **Dual multispectral and 3D structured light laparoscope**, Neil T. Clancy, Imperial College London (United Kingdom); Jianyu Lin, Shobhit Arya, Danail Stoyanov, George B. Hanna, Daniel S. Elson, Imperial College London (United Kingdom) . . . . . [9316-11]

Lunch Break . . . . . .Sat 12:20 pm to 1:50 pm

SESSION 3

LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . . SAT 1:50 PM TO 4:20 PM

Multimodality Microscopy

Session Chair: **Fred S. Azar,** Philips Healthcare (USA)

1:50 pm: **Correlative super-resolution fluorescence microscopy combined with optical coherence tomography**, Sungho Kim, Gyeongtae Kim, Sanghee Shim, Sungchul Bae, Ulsan National Institute of Science and Technology (Korea, Republic of) . . . . . [9316-12]

2:10 pm: **Multimodal non-invasive optical imaging methods for structure and functional assay of nociceptive pain model in Drosophila melanogaster**, Chiao-Ying Lin, Chii-Wann Lin, Jyh-Horng Chen, National Taiwan Univ. (Taiwan) . . . . . [9316-13]

2:30 pm: **Detection of oral precancer with fluorescence lifetime imaging and reflectance confocal microscopy**, Bilal H. Malik, Shuna Cheng, Joey M. Jabbour, Rodrigo Cuenca, Texas A&M Univ. (USA); Yi-Shing Lisa Cheng D.D.S., Texas A&M Univ., Baylor College of Dentistry (USA); John Wright, Texas A&M Univ.; Baylor College of Dentistry (USA); Javier A. Jo, Kristen C. Maitland, Texas A&M Univ. (USA) . . . . . [9316-14]

2:50 pm: **Integrated ultrasound and optical coherence tomography (OCT) endoscope for enhanced endoscopic diagnosis of bile duct cancer (cholangiocarcinoma)**, Teng Ma, The Univ. of Southern California (USA) and NIH Resource Ctr. on Medical Ultrasonic Transducer Technology (USA); Jiawen Li, Univ. of California, Irvine (USA) and Beckman Laser Institute and Medical Clinic (USA); Thomas M. Cummins, The Univ. of Southern California (USA) and NIH Resource Ctr. on Medical Ultrasonic Transducer Technology (USA); Jacques Van Dam, The Univ. of Southern California (USA); Koping Kirk Shung, The Univ. of Southern California (USA) and NIH Resource Ctr. on Medical Ultrasonic Transducer Technology (USA); Zhongping Chen, Univ. of California, Irvine (USA) and Beckman Laser Institute and Medical Clinic (USA); Qifa Zhou, The Univ. of Southern California (USA) and NIH Resource Ctr. on Medical Ultrasonic Transducer Technology (USA) . . . . . [9316-15]

Coffee Break . . . . . .Sat 3:10 pm to 3:40 pm

3:40 pm: **Multimodal dual-clad fiber MEMS probe for simultaneous OCT and fluorescence imaging of inflammation in the lung**, Liane Bernstein, Ecole Polytechnique de Montréal (Canada); Lida P. Hariri, Massachusetts General Hospital (USA); Wendy-Julie Madore, Ecole Polytechnique de Montréal (Canada); David C. Adams, Massachusetts General Hospital (USA); Mathias Strupler, Étienne De Montigny, Kathy Beaudette, Ecole Polytechnique de Montréal (Canada); Yan Wang, Massachusetts General Hospital (USA); Nicolas Godbout, Ecole Polytechnique de Montréal (Canada); Melissa J. Suter, Massachusetts General Hospital (USA); Caroline Boudoux, Ecole Polytechnique de Montréal (Canada) . . . . . [9316-16]

4:00 pm: **Multifunctional highly dispersible PEGylated Eu3+-doped CaMoO4@Au-nanorods core/shell nanoparticles for fluorescence imaging, surface-enhanced Raman spectroscopy (SERS) detection, and photo-thermal therapy (PTT) applications of human lung cancer cells**, Qifei Li, Abdul K. Parchur, Anhong Zhou, Utah State Univ. (USA) . . . . . [9316-17]

SESSION 4

LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . . SAT 4:20 PM TO 6:00 PM

Preclinical / Hybrid Imaging

Session Chair: **Xavier Intes,** Rensselaer Polytechnic Institute (USA)

4:20 pm: **Development of a multi-scale and multi-modality imaging system to characterize tumors and their microenvironment in vivo**, Valérie Rouffiac, Institut Gustave Roussy (France) and Imagerie par Résonance Magnétique Médicale et Multi-Modalités, CNRS, Univ. Paris-Sud, (France); Karine Ser-Leroux, Emilie Dugon, Institut Gustave Roussy (France); Ingrid Leguerney, Imagerie par Résonance Magnétique Médicale et Multi-Modalités, CNRS, Univ. Paris-Sud, (France) and Institut Gustave Roussy (France); Melanie Polrot, Institut Gustave Roussy (France); Sandra Robin, Imagerie par Résonance Magnétique Médicale et Multi-Modalités, CNRS, Univ. Paris-Sud, (France) and Institut Gustave Roussy (France); Sophie Salome-Desnoulez, Institut Gustave Roussy (France); Jean-Christophe Ginefri, Catherine Sebrie, Imagerie par Résonance Magnétique Médicale et Multi-Modalités, CNRS, Univ. Paris-Sud, (France); Corinne Laplace-Builhé, Institut Gustave Roussy (France) and Imagerie par Résonance Magnétique Médicale et Multi-Modalités, CNRS, Univ. Paris-Sud, (France) . . . . . [9316-18]

4:40 pm: **Co-registration of Ultrasound and Frequency-Domain Photoacoustic Radar Images and Image Improvement for tumor detection**, Edem Dovlo, Bahman Lashkari, Univ. of Toronto (Canada); Sung soo Sean Choi, University of Toronto (Canada); Andreas Mandelis, Univ. of Toronto (Canada) . . . . . [9316-19]

5:00 pm: **Multi-modality imaging using a handheld gamma camera and MRI for tumor localization**, Cheryl Dika, Cubresa Inc. (Canada); Dianne Georgian-Smith M.D., Brigham and Women's Hospital (USA) . . . . . [9316-20]

5:20 pm: **Photo-magnetic imaging: high resolution optical imaging modality**, Alex T. Luk, Gultekin Gulsen, Farouk Nouizi, Univ. of California, Irvine (USA) . . . . [9316-21]

5:40 pm: **Microscopic x-ray luminescence computed tomography**, Wei Zhang, Dianwen Zhu, Kun Zhang, Changqing Li, Univ. of California, Merced (USA) . . . . . [9316-22]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

POSTERS-SUNDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Non-contact assessment of melanin distribution via multispectral temporal illumination coding, Robert Amelard, Christian Scharfenberger, Alexander Wong, David A. Clausi, Univ. of Waterloo (Canada) . . . . . [9316-23]

Acquisition of priori tissue optical structure based on non-rigid image registration, Wenbo Wan, Tianjin Univ. (China); Jiao Li, Tianjin Univ. (China) and Tianjin Key Lab. of Biomedical Detecting Techniques and Instruments (China); Lingling Liu, Yihan Wang, Yan Zhang, Tianjin Univ. (China); Feng Gao, Tianjin Univ. (China) and Tianjin Key Lab. of Biomedical Detecting Techniques and Instruments (China) . . . . . [9316-24]

Photoacoustic tomography guided diffuse optical tomography for small-animal model, Yihan Wang, Tianjin Univ. (China); Feng Gao, Tianjin Univ. (China) and Tianjin Key Lab. of Biomedical Detecting Techniques and Instruments (China); Wenbo Wan, Yan Zhang, Tianjin Univ. (China); Jiao Li, Tianjin Univ. (China) and Tianjin Key Lab. of Biomedical Detecting Techniques and Instruments (China) . . . . . [9316-25]

Solid-state parallel acquisition system for NIR imaging within the MR, Fadi El-Ghussein, Thayer School of Engineering at Dartmouth (USA) . . . . . [9316-26]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their ground-breaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9317
LOCATION: ROOM 276 (MEZZANINE)

Saturday–Sunday 7–8 February 2015 • Proceedings of SPIE Vol. 9317

Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications XV

Conference Chair: **Israel Gannot,** Tel Aviv Univ. (Israel)

Program Committee: **James P. Clarkin,** Polymicro Technologies, A Subsidiary of Molex Incorporated (USA); **Ilko Ilev,** U.S. Food and Drug Administration (USA); **Jin U. Kang,** Johns Hopkins Univ. (USA); **Karl-Friedrich Klein,** Technische Hochschule Mittelhessen (Germany); **Pierre Lucas,** The Univ. of Arizona (USA); **Yuji Matsuura,** Tohoku Univ. (Japan); **Angela B. Seddon,** The Univ. of Nottingham (United Kingdom)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 276 (MEZZANINE) . . . . . SAT 8:20 AM TO 10:00 AM

Fibers and Sensors I

Session Chair: **Angela B. Seddon,**
The Univ. of Nottingham (United Kingdom)

8:20 am: **In-vivo assessment of ultra-structural alterations as an early event in cancer progression: implications for cancer screening**, Adam Eshein, Andrew J. Radosevich, Nikhil N. Mutyal, The-Quyen Nguyen, Wenli Wu, Bradley Gould, Northwestern Univ. (USA); Hemant K. Roy, Boston Medical Ctr. (USA); Vadim Backman, Northwestern Univ. (USA) . . . . . [9317-1]

8:40 am: **Compact Raman needle probe integrated with fine needle aspiration biopsy for solid tissues**, Jianfeng Wang, Wei Zheng, Zhiwei Huang, National Univ. of Singapore (Singapore) . . . . . [9317-2]

9:00 am: **Photoacoustic spectroscopy of gas phase biomarker in simulated exhale breath and liquid phase biomarker on biological sample surface**, Hanh N. D. Le, Johns Hopkins Univ. (USA); Do-Hyun Kim, U.S. Food and Drug Administration (USA) . . . . . [9317-3]

9:20 am: **Transferability of antibody pairs from ELISA to fiber optic-surface plasmon resonance for infliximab detection**, Thomas Van Stappen, Jiadi Lu, Katholieke Univ. Leuven (Belgium); Maarten Bloemen, KU Leuven (Belgium); Nick Geukens, Dragana Spasic, Filip Delport, Katholieke Univ. Leuven (Belgium); Thierry Verbiest, KU Leuven (Belgium); Jeroen Lammertyn, Ann Gils, Katholieke Univ. Leuven (Belgium) . . . . . [9317-4]

9:40 am: **Fast depth-sensitive fluorescence measurements in turbid media using fiber rings**, Yi Hong Ong, Quan Liu, Nanyang Technological Univ. (Singapore) . . . . . [9317-5]

Coffee Break . . . . . .Sat 10:00 am to 10:30 am

SESSION 2

LOCATION: ROOM 276 (MEZZANINE) . . . . . SAT 10:30 AM TO 11:00 AM

Keynote Speaker I

Session Chair: **Israel Gannot,** Tel Aviv Univ. (Israel)

10:30 am: **Long period grating biosensors** *(Keynote Presentation)*, Wojtek Bock, Univ. du Québec en Outaouais (Canada) . . . . . [9317-6]

SESSION 3

LOCATION: ROOM 276 (MEZZANINE) . . . . . SAT 11:00 AM TO 12:00 PM

Fibers and Sensors II

Session Chair: **James A. Harrington,**
Rutgers, The State Univ. of New Jersey (USA)

11:00 am: **Automated long-term tracking of freely moving animal and functional brain imaging based on fiber-optic microscopy**, Jaepyeong Cha, Gyeong Woo Cheon, Jin U. Kang, Johns Hopkins Univ. (USA) . . . . . [9317-7]

11:20 am: **In-vivo concentration ratio estimation of two fluorescent probes for early detection of Alzheimer's disease**, Osnat Harbater, Israel Gannot, Tel Aviv Univ. (Israel) . . . . . [9317-8]

11:40 am: **Farfield intensity profiles of HPLC fiber-optic flow cells in the UV-VIS region**, Jan Werner, Technische Hochschule Mittelhessen (Germany); Mathias Belz, World Precision Instruments (USA); Karl-Friedrich Klein, Technische Hochschule Mittelhessen (Germany) . . . . . [9317-9]

Lunch/Exhibition Break . . . . . .Sat 12:00 pm to 1:30 pm

SESSION 4

LOCATION: ROOM 276 (MEZZANINE) . . . . . SAT 1:30 PM TO 3:30 PM

Industry Session

Session Chair: **Jim Clarkin,** Polymicro Technologies,
A Subsidiary of Molex Incorporated (USA)

1:30 pm: **MIR chalcogenide fiber and devices** *(Invited Paper)*, Francois Chenard, Oseas Alvarez, Hassan Moawad, IRflex Corp. (USA) . . . . . [9317-10]

1:50 pm: **Multicore optical fiber grating array fabrication for medical sensing applications**, Paul S. Westbrook, Kenneth S. Feder, Tristan Kremp, Thierry F. Taunay, Eric M. Monberg, Debra A. Simoff, Gabe S. Puc, Roy M. Ortiz, OFS Fitel LLC (USA) . . . . . [9317-11]

2:10 pm: **Fiber spectroscopy for biomedical diagnostics in-vivo**, Viacheslav Artyushenko, art photonics GmbH (Germany) . . . . . [9317-12]

2:30 pm: **All-optical power and data transfer in catheters using an efficient LED**, Anneke van Dusschoten, Philips Research Europe (Netherlands); Martin Pekar, Philips Research Europe (Netherlands) and Thoraxcenter, Erasmus MC (Netherlands); Martin B. van der Mark, Philips Research Europe (Netherlands) . . . . . [9317-13]

2:50 pm: **Long term UV transmission stability in deep UV optical fiber for medical and spectroscopy applications**, John H. Shannon, Valery K. Khalilov, Richard J. Timmerman, Dale Geshell, Polymicro Technologies (USA) . . [9317-14]

3:10 pm: **Noninvasive continuous blood pressure monitoring**, Armen R. Poghosyan, Vahram Mouradian, Levon Hovhannisyan, Sensogram Technologies Inc. (USA) . . . . . [9317-15]

Coffee Break . . . . . .Sat 3:30 pm to 4:00 pm

SESSION 5

LOCATION: ROOM 276 (MEZZANINE) . . . . . SAT 4:00 PM TO 6:00 PM

Fibers and Sensors III

Session Chair: **Jessica C. Ramella-Roman,**
Florida International Univ. (USA)

4:00 pm: **Investigation of silver-only and silver/TOPAS coated hollow glass waveguides for visible and NIR laser delivery**, Jeffrey E. Melzer, James A. Harrington, Rutgers, The State Univ. of New Jersey (USA) . . [9317-16]

4:20 pm: **Improvement of transmission properties for a rugged polymer-coated silver hollow fiber**, Katsumasa Iwai, Hiroyuki Takaku, Sendai National College of Technology (Japan); Mitsunobu Miyagi, Tohoku Institute of Technology (Japan); Yi-Wei Shi, School of Information Science and Engineering, Fudan Univ. (China); Yuji Matsuura, Graduate School of Engineering, Tohoku Univ. (Japan) . . . . . [9317-17]

4:40 pm: **Quantitative study of surface contaminant and the monitoring of bacterial persistence on medical device surfaces using hyperspectral imaging.**, Hanh N. D. Le, Johns Hopkins Univ. (USA); Victoria M. Hitchins, U.S. Food and Drug Administration (USA); Moon S. Kim, U.S. Dept. of Agriculture (USA); Jeeseong C. Hwang, National Institute of Standards and Technology (USA); Jin U. Kang, Johns Hopkins Univ. (USA); Do-Hyun Kim, U.S. Food and Drug Administration (USA) . . . . . [9317-18]

5:00 pm: **Fiber-based polarimetric stress sensor for measuring the Young's modulus of biomaterials**, Mark C. Harrison, Andrea M. Armani, The Univ. of Southern California (USA) . . . . . [9317-19]

5:20 pm: **Low cost fiber optic sensing of sugar solution**, Esakkimuthuraju Murugan, Anurag Reddy Patlolla, Badrinath Vadakkapattu Canthadai, Vidya Jyothi Institute of Technology (India); Vengal Rao Pachava, National Institute of Technology, Warangal (India) . . . . . [9317-20]

5:40 pm: **Optical coherent tomography (OCT) in laser tissue bonding of incisions in the cornea**, Yishai Porat, David Varsano, Irina S. Barequet, Meira Neudorfer, Tel Aviv Univ. (Israel); Mordechai Rosner M.D., Sheba Medical Ctr. (Israel); Abraham Katzir, Tel Aviv Univ. (Israel) . . . . . [9317-42]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

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See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 6

LOCATION: ROOM 276 (MEZZANINE) . . . . . SUN 8:20 AM TO 10:00 AM

Fibers and Sensors IV

Session Chair: **Yuji Matsuura,** Tohoku Univ. (Japan)

8:20 am: **Controlled single cell destruction using optical fibers**, Hao Wang, Anna Pyayt, Univ. of South Florida (USA) . . . . . [9317-21]

8:40 am: **Biconically tapered fiber optic sensor with ultrahigh sensitivity for biosensing applications**, Ertan Salik, Martin Sanchez, California State Polytechnic Univ., Pomona (USA); Ragip Pala, California Institute of Technology (USA); Adrian Ortiz, Victor Herrera, Christian Garrido, California State Polytechnic Univ., Pomona (USA) . . . . . [9317-22]

9:00 am: **SMART micro-scissors based precise incision**, Hyuncheol Park, Chaebeom Yeo, Cheol Song, Daegu Gyeongbuk Institute of Science & Technology (Korea, Republic of) . . . . . [9317-23]

9:20 am: **Mode division multiplexing and mode excitation/detection in multimode optical fibers** *(Invited Paper)*, Giovanni Milione, City College of New York (USA) . . . . . [9317-24]

9:40 am: **Phosphor-based fiber optic microprobes for ionizing beam radiation dosimetry**, Arash Darafsheh, The Univ. of Pennsylvania Health System (USA); Taejong Paik, Stan Najmr, Michael Tenuto, Christopher B. Murray, Univ. of Pennsylvania (USA); Joseph S. Friedberg, Jarod C. Finlay, The Univ. of Pennsylvania Health System (USA) . . . . . [9317-25]

SESSION 7

LOCATION: ROOM 276 (MEZZANINE) . . . . . SUN 10:00 AM TO 10:30 AM

Keynote II

Session Chair: **Pierre Lucas,** The Univ. of Arizona (USA)

10:00 am: **UV-fibers: two decades of improvements in medical and sensing applications** *(Keynote Presentation)*, Karl-Friedrich Klein, Technische Hochschule Mittelhessen (Germany); Valery K. Khalilov, Polymicro Technologies, A Subsidiary of Molex Inc. (USA). . . . . [9317-26]

Coffee Break . . . . . Sun 10:30 am to 11:00 am

SESSION 8

LOCATION: ROOM 276 (MEZZANINE) . . . . . SUN 11:00 AM TO 12:00 PM

Fibers and Sensors V

Session Chair: **Pierre Lucas,** The Univ. of Arizona (USA)

11:00 am: **Design and fabrication of disposable plasmonic fiber probes for biosensing**, Carmelo Fallauto, Andrea Braglia, Alberto Vallan, Guido Perrone, Politecnico di Torino (Italy); Vasile A. Popescu, Niculae N. Puscas IV, Univ. Politehnica of Bucharest (Romania) . . . . . [9317-27]

11:20 am: **Active depth-locking handheld micro-injector based on common-path swept source optical coherence tomography**, Gyeong Woo Cheon, Yong Huang, Jin U. Kang, Johns Hopkins Univ. (USA). . . . . [9317-28]

11:40 am: **Fiber-optic direct Raman imaging system based on a hollow-core fiber bundle**, Satomi Inoue, Graduate School of Biomedical Engineering, Tohoku Univ. (Japan); Takashi Katagiri, Graduate School of Engineering, Tohoku Univ. (Japan); Yuji Matsuura, Graduate School of Biomedical Engineering, Tohoku Univ. (Japan). . . . . [9317-29]

Lunch/Exhibition Break . . . . . Sun 12:00 pm to 1:30 pm

SESSION 9

LOCATION: ROOM 276 (MEZZANINE) . . . . . SUN 1:30 PM TO 3:10 PM

Fibers and Sensors VI

Session Chair: **Jin U. Kang,** Johns Hopkins Univ. (USA)

1:30 pm: **All-fiber probe for laser-induced thermotherapy with integrated temperature measurement capabilities**, Yu Liu, Wei Chen, Hao Yu, R. Gassino, Andrea Braglia, Massimo Olivero, Alberto Vallan, Guido Perrone, Politecnico di Torino (Italy) . . . . . [9317-30]

1:50 pm: **Nonlinearly fiber-converted coherent source with broad spectral coverage for multiphoton imaging**, Haohua Tu, Yuan Liu, Youbo Zhao, Stephen A. Boppart M.D., Univ. of Illinois at Urbana-Champaign (USA) [9317-31]

2:10 pm: **Suspended core photonic crystal Fibers fluorescence sensor platform for nucleic acid detection**, Alessandro Candiani, Michele Sozzi, Alessandro Tonelli, Annamaria Cucinotta, Roberto Corradini, Stefano Selleri, Univ. degli Studi di Parma (Italy) . . . . . [9317-32]

2:30 pm: **Wireless implantable microscopy using oblique back-illumination**, Tim N. Ford, Kengyeh K. Chu, Tao Wu, Robert W. Carruth, Daryl Chulho Hyun, Weina Lu, MGH Wellman Ctr. for Photomedicine (USA); Guillermo J. Tearney M.D., MGH Wellman Ctr. for Photomedicine (USA) and MGH Pathology (USA) and Harvard-MIT Div. of Health Science and Technology (USA) . . . . . [9317-33]

2:50 pm: **Peripheral circulation detection by using portable near-infrared spectroscopy: the study of temperature effect**, Chun-Jung Huang, BOIL (Taiwan) and National Chiao Tung Univ. (Taiwan); Ching-Cheng Chuang, BOIL (Taiwan); Chia-Wei Sun, National Chiao Tung Univ. (Taiwan) and BOIL (Taiwan) . . . . . [9317-34]

Coffee Break . . . . . Sun 3:10 pm to 3:40 pm

SESSION 10

LOCATION: ROOM 276 (MEZZANINE) . . . . . SUN 3:40 PM TO 5:00 PM

Fibers and Sensors VII

Session Chair: **Karl-Friedrich Klein,**
Technische Hochschule Mittelhessen (Germany)

3:40 pm: **Simultaneous Electroencephalography / Near-infrared Spectroscopy measurement on prefrontal cortex with WCST task**, Dai-Chen Lu, Chia-Wei Sun, Ching-Cheng Chuang, National Chiao Tung Univ. (Taiwan) . . . . . [9317-35]

4:00 pm: **Correction method of bending loss in the hollow optical fiber for endoscopic submucosal dissection using carbon dioxide laser**, Daisuke Kusakari, Hisanao Hazama, Graduate School of Engineering, Osaka Univ. (Japan); Kunio Awazu, Graduate School of Engineering, Osaka Univ. (Japan) and Graduate School of Frontier Bioscience, Osaka Univ. (Japan) and The Ctr. for Advanced Medical Engineering and Informatics, Osaka Univ. (Japan). . . . . [9317-36]

4:20 pm: **Wide dynamic range sensing in photonic crystal microcavity biosensors**, Chun-Ju Yang, Yi Zou, The Univ. of Texas at Austin (USA); Naimei Tang, Omega Optics, Inc. (USA); Hai Yan, The Univ. of Texas at Austin (USA); Swapnajit Chakravarty, Omega Optics, Inc. (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) and Omega Optics, Inc. (USA) . . . . . [9317-37]

4:40 pm: **Distributed fibre optic surface plasmon resonance sensors**, Mohamad Diaa Baiad, Raman Kashyap, Ecole Polytechnique de Montréal (Canada) . . . . . [9317-38]

CONFERENCE 9317
LOCATION: ROOM 276 (MEZZANINE)

POSTERS-SUNDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

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All optical phase stepping for optical imaging with nonlinearity in specialty fiber, Eun-Seo Choi, Seung Suk Lee, Joo Ha Kim, Chosun Univ. (Korea, Republic of); Bok Hyeon Kim, Tae Joong Eom, Advanced Photonics Research Institute (Korea, Republic of) . . . . . [9317-39]

Hand-held micro-forceps incorporating a motor-derived grasping on an OCT sensor-guided SMART surgical tool platform, Phillip Lee, Gyeong Woo Cheon, Johns Hopkins Univ. (USA); Peter L. Gehlbach, Johns Hopkins School of Medicine (USA); Jin U. Kang, Johns Hopkins Univ. (USA) . . . . . [9317-40]

Real-time 3D reconstruction of catheter shape using FBGs based sensors, Francois Parent, Ecole Polytechnique de Montréal (Canada) . . . . . [9317-41]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their ground-breaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9318
LOCATION: ROOM 309 (ESPLANADE)

Tuesday–Wednesday 10–11 February 2015
Proceedings of SPIE Vol. 9318

Optical Biopsy XIII: Toward Real-Time Spectroscopic Imaging and Diagnosis

Conference Chairs: **Robert R. Alfano,** The City College of New York (USA); **Stavros G. Demos,** Lawrence Livermore National Lab. (USA)

Program Committee: **Irving J. Bigio,** Boston Univ. (USA); **Nicole J. Crane,** Naval Medical Research Ctr. (USA); **Zhiwei Huang,** National Univ. of Singapore (Singapore); **Amir Gandjbakhche,** National Institutes of Health (USA); **Israel Gannot,** Tel Aviv Univ. (Israel); **Igor V. Meglinski,** Univ. of Otago (New Zealand); **Yang Pu,** The City College of New York (USA); **Milind Rajadhyaksha,** Memorial Sloan-Kettering Cancer Ctr. (USA); **Kestutis Sutkus,** The City College of New York (USA); **Siavash Yazdanfar,** GE Global Research (USA)

TUESDAY 10 FEBRUARY

WELCOME REMARKS
LOCATION: ROOM 309 (ESPLANADE) . . . . . 8:55 AM TO 9:00 AM

Session Chair: **Robert R. Alfano,** The City College of New York (USA)

SESSION 1
LOCATION: ROOM 309 (ESPLANADE) . . . . . TUE 9:00 AM TO 10:00 AM

Imaging and Biomarkers I
Session Chairs: **Yang Pu,** The City College of New York (USA); **Wubao Wang,** The City College of New York (USA)

9:00 am: **Non-contact optical imaging of healing and non-healing diabetic foot ulcers**, Anuradha Godavarty, Yamini Khandavilli, YoungJin Jung, Florida International Univ. (USA); Someshwara Rao, Dr.Somesh Diabetic Foot Clinic (India) . . . . . [9318-1]

9:20 am: **Exhaled breath analysis with quantum cascade laser spectroscopy**, Adonis Reyes Reyes, Technische Univ. Delft (Netherlands); Esther van Mastrigt M.D., Marielle W. Pijnenburg M.D., Johan C. de Jongste M.D., Erasmus MC, Sophia Children's Hospital (Netherlands); H. Paul Urbach, Nandini Bhattacharya, Technische Univ. Delft (Netherlands) . . . . . [9318-2]

9:40 am: **High histologic grade and increased relative content of tryptophan in breast cancer using ratios from fingerprint fluorescence spectral peaks**, Laura A. Sordillo, Peter P. Sordillo M.D., Yury Budansky, Yang Pu, Robert R. Alfano, The City College of New York (USA) . . . . . [9318-3]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 2
LOCATION: ROOM 309 (ESPLANADE) . . . . . TUE 10:30 AM TO 12:00 PM

Imaging and Biomarkers II
Session Chairs: **Milind Rajadhyaksha,** Memorial Sloan-Kettering Cancer Ctr. (USA); **Israel Gannot,** Tel Aviv Univ. (Israel)

10:30 am: **Photoacoustic biopsy: a feasibility study** *(Invited Paper)*, Guan Xu, Scott Tomlins, Javed Siddiqui, Mandy Davis, Lakshmi P. Kunju, John Wei, Xueding Wang, Univ. of Michigan Medical School (USA) . . . . . [9318-4]

11:00 am: **Raman spectroscopy complements optical coherent tomography in tissue classification and cancer detection**, Ji Qi, Narendran Sudheendran, Chih Hao Liu, Kirill V. Larin, Wei-Chuan Shih, Univ. of Houston (USA). . . [9318-5]

11:20 am: **Tissue classification and diagnostics using a fiber probe for combined Raman and fluorescence spectroscopy**, Riccardo Cicchi, Istituto Nazionale di Ottica (Italy) and European Lab. for Non-linear Spectroscopy (Italy); Suresh Anand, European Lab. for Non-linear Spectroscopy (Italy); Alfonso Crisci, Univ. degli Studi di Firenze (Italy); Flavio Giordano, Azienda Ospedaliera Univ. Anna Meyer (Italy); Susanna Rossari M.D., Vincenzo De Giorgi, Vincenza Maio, Daniela Massi, Gabriella Nesi, Anna Maria Buccoliero, Marco Carini, Univ. degli Studi di Firenze (Italy); Renzo Guerrini, "Anna Meyer" Pediatric Hospital (Italy); Nicola Pimpinelli, Univ. degli Studi di Firenze (Italy); Francesco S. Pavone, European Lab. for Non-linear Spectroscopy (Italy) and Univ. degli Studi di Firenze (Italy) . . . . . [9318-6]

11:40 am: **Targeted detection and risk stratification of breast lesions using spectroscopy-based characterization of microcalcifications**, Ishan Barman, Johns Hopkins Univ. (USA); R. Sathyavathi, Anushree Saha, Case Western Reserve Univ., School of Medicine (USA); Ramachandra R. Dasari, Massachusetts Institute of Technology (USA); Maryann Fitzmaurice, Case Western Reserve Univ., School of Medicine (USA) . . . . . [9318-7]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:30 pm

SESSION 3
LOCATION: ROOM 309 (ESPLANADE) . . . . . TUE 1:30 PM TO 3:00 PM

Instrumentation and Techniques I
Session Chairs: **Stavros G. Demos,** Lawrence Livermore National Lab. (USA); **Amir Gandjbakhche,** National Institutes of Health (USA)

1:30 pm: **Time resolved fluorescence spectroscopy using a single fiber probe for fluorescence lifetime assessment in real-time**, Fartash Vasefi, David S. Kittle, Keith L. Black M.D., Pramod V. Butte, Cedars-Sinai Medical Ctr. (USA) . . . . . [9318-8]

2:00 pm: **Fluorescence lifetime spectroscopy for breast cancer margins assessment** *(Invited Paper)*, Dimitris S. Gorpas, Hussain Fatakdawala, Yanhong Zhang, Richard Bold, Laura Marcu, Univ. of California, Davis (USA) . . . . [9318-9]

2:20 pm: **Implementing multi-biomarker optical biopsy using fluorescence microendoscopy**, Akilan Palanisami, Bryan Q. Spring, Tayyaba Hasan, Massachusetts General Hospital (USA) . . . . . [9318-10]

2:40 pm: **Intraoperative detection of glioma invasion beyond MRI enhancement with Raman spectroscopy in humans**, Michael Jermyn, Kelvin Mok, McGill Univ. (Canada); Jeanne Mercier, Ecole Polytechnique de Montréal (Canada); Joannie Desroches, McGill Univ. (Canada); Julien Pichette, Karl Saint-Arnaud, Ecole Polytechnique de Montréal (Canada); Marie-Christine Guiot, Kevin Petrecca, McGill Univ. (Canada); Frédéric Leblond, Ecole Polytechnique de Montréal (Canada) . . . . . [9318-11]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 4
LOCATION: ROOM 309 (ESPLANADE) . . . . . TUE 3:30 PM TO 5:40 PM

Instrumentation and Techniques II
Session Chairs: **Igor V. Meglinski,** Univ. of Otago (New Zealand); **Nicole J. Crane,** Naval Medical Research Ctr. (USA)

3:30 pm: **MUSE: deep UV excitation microscopy for imaging of exogenous fluorophores in tissue with applications in histology and pathology** *(Invited Paper)*, Farzad Fereidouni, Ananya Datta Mitra, Univ. of California, Davis (USA); Stavros G. Demos, Lawrence Livermore National Lab. (USA); Richard M. Levenson M.D., Univ. of California, Davis (USA) . . . . . [9318-12]

4:00 pm: **Vessel contrast enhancement in hyperspectral images**, Asgeir Bjørgan, Martin Denstedt, Matija Milanic, Lukasz A. Paluchowski, Lise L. Randeberg, Norwegian Univ. of Science and Technology (Norway) . . . . . [9318-13]

4:20 pm: **Experimental evaluation of a hyperspectral imager for near-infrared fluorescent contrast agent studies**, Siri Luthman, Univ. of Cambridge (United Kingdom); Sarah E. Bohndiek, Univ. of Cambridge (United Kingdom) and Cancer Research UK Cambridge Institute (United Kingdom) and CRUK & EPSRC Cancer Imaging Ctr. in Cambridge and Manchester (United Kingdom) . . . . . [9318-14]

4:40 pm: **Fast spectral imaging with reconfigurable spectral bands**, Sarfaraz Baig, Hui Lu, Guomin Jiang, Michael R. Wang, Univ. of Miami (USA) . . [9318-15]

5:00 pm: **Discrimination of premalignant conditions of oral cancer using Raman spectroscopy of urinary metabolites**, Brindha Elumalai, Ramu Rajasekaran, Prakasarao Aruna, Anna Univ. Chennai (India); Dornadula Koteeswaran, Meenakshi Ammal Dental College & Hospital (India); Singaravelu Ganesan, Anna Univ. Chennai (India) . . . . . [9318-16]

5:20 pm: **Application of two photon microscope in quantification of blood-brain barrier solute permeability increased by focused ultrasound sonication**, Lingyan Shi, Paolo Palacio-Mancheno, Joseph Badami, Da W. Shin, Mn Zeng, Luis Cardoso, Raymond Tu, Bingmei Fu, The City College of New York (USA) . . . . . [9318-34]

POSTERS-TUESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . TUE 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the BiOS poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Brain NIR transmission windows for deeper imaging, Lingyan Shi, Laura A. Sordillo, Robert R. Alfano, The City College of New York (USA) . . . . . [9318-17]

Optical Biopsy - a new armamentarium to detect disease using light, Yang Pu, Robert R. Alfano, The City College of New York (USA) . . . . . [9318-26]

Nonnegative constraint analysis of key fluorophores within human breast cancer using native fluorescence spectroscopy excited by selective wavelength of 300 nm, Yang Pu, The City College of New York (USA); Laura A. Sordillo, City College of New York (USA); Robert R. Alfano, The City College of New York (USA) . . . . . [9318-27]

Validation of hierarchical cluster analysis for identification of bacterial species using 42 bacterial isolates, Meron Y. Ghebremedhin, Shubha Yesupriya, Nicole J. Crane, Naval Medical Research Ctr. (USA) . . . . . [9318-28]

Tryptophan as biomarker to detect gastrointestinal tract cancer using non-negative biochemical analysis of native fluorescence and Stokes shift spectroscopy, Leana Wang, New York Univ. (USA); Yan Zhou M.D., The General Hospital of the Air Force, PLA (China); Cheng-Hui Liu, The City College of New York (USA); Lixin Zhou M.D., Beijing Cancer Hospital (China); Yong He, Beijing Normal Univ. (China); Yang Pu, Thien-An Nguyen, Robert R. Alfano, The City College of New York (USA) . . . . . [9318-29]

A comparison study of different excitation wavelengths to determine the relative content of key biomolecules in breast cancer and breast normal tissue, Laura A. Sordillo, Peter P. Sordillo M.D., Yury Budansky, Yang Pu, Robert R. Alfano, The City College of New York (USA) . . . . . [9318-30]

Real-time Raman sensing without spectrometer, Dinesh Kumar, Ulsan National Institute of Science and Technology (Korea, Republic of); Young Heon Kim, Ulsan National Institute of Science and Technology (Korea, Republic of); Timothy K. Yang, Ulsan National Institute of Science and Technology (Korea, Republic of) and Ctr. for Soft and Living Matter, Institute of Basic Science (Korea, Republic of); Sungho Kim, Ulsan National Institute of Science and Technology (Korea, Republic of); Sung Chul Bae, Ulsan National Institute of Science and Technology (Korea, Republic of) and Ctr. for Soft and Living Matter, Institute of Basic Science (Korea, Republic of); Min Ju Kim, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9318-31]

Resonant Raman spectra of grades of human brain glioma tumors reveal the content of tryptophan, Yan Zhou M.D., The General Hospital of the Air Force, PLA (China); Cheng-Hui Liu, IUSL, The City College of New York (USA); Lixin Zhou M.D., Beijing Cancer Hospital (China); Ke Zhu, Yulong Liu, Institute of Physics (China); Lin Zhang, The City College of New York (USA); Susie Boydston-White, The City College of New York (USA) and Borough of Manhattan Community College (USA); Gangge Cheng M.D., The General Hospital of the Air Force, PLA (China); Das Bidyut, Fairfield Univ. (USA); Yang Pu, Robert R. Alfano, The City College of New York (USA) . . . . . [9318-32]

Automation of a dispersive Raman spectrometer using LabVIEW aiming in vivo diagnosis of skin cancer, Landulfo Silveira Jr., Giovanni Schettino, Camilo Castelo Branco Univ. (Brazil); Ailson N. Campos, Instituto de Aeronáutica e Espaço (Brazil); Renato A. Zângaro M.D., Marcos T. Pacheco, Univ. Camilo Castelo Branco (Brazil); Carlos A. Pasqualucci M.D., Faculdade de Medicina, Univ. de São Paulo (Brazil) . . . . . [9318-33]

Q plate 4F phase mask microscopy for edge enhancement in life science media, Richard Gozali, Thien-An Nguyen, Robert R. Alfano, The City College of New York (USA) . . . . . [9318-35]

WEDNESDAY 11 FEBRUARY

SESSION 5

LOCATION: ROOM 309 (ESPLANADE) . . . . . WED 9:00 AM TO 10:00 AM

Raman Scattering Methods

Session Chairs: **Laura A. Sordillo,** The City College of New York (USA); **Lingyan Shi,** The City College of New York (USA)

9:00 am: **Biophotonics of skin: method for correction of deep Raman spectra distorted by elastic scattering**, Blandine Roig, Anne Koenig, François Perraut, CEA-LETI (France); Olivier Piot, MéDIAN Biophotonique et Technologies pour la Santé, Univ. de Reims Champagne-Ardenne (France); Cyril Gobinet, Michel Manfait, MéDIAN Biophotonique et Technologies pour la Santé, Univ. de Reims Chanmpagne-Ardenne (France); Jean-Marc Dinten, CEA-LETI (France) . . . . . [9318-18]

9:20 am: **Noise removal of Raman spectra with extremely low signal to noise ratio**, Shuo Chen, Xiaoqian Lin, Clement Yuen, Nanyang Technological Univ. (Singapore); Saraswathi Padmanabhan, Roger W. Beuerman, Singapore Eye Research Institute (Singapore); Quan Liu, Nanyang Technological Univ. (Singapore) . . . . . [9318-19]

9:40 am: **Inhibition of cellular respiration with a femtosecond laser via impulsive stimulated Raman scattering**, Chieh Han Lu, Kung Hsuan Lin, Academia Sinica (Taiwan); Kong Thon Tsen, Arizona State Univ. (USA); Yung Shu Kuan, Institute of Biological Chemistry, Academia Sinica (Taiwan). [9318-20]

Coffee Break . . . . . Wed 10:00 am to 10:20 am

SESSION 6

LOCATION: ROOM 309 (ESPLANADE) . . . . . WED 10:20 AM TO 12:20 PM

Polarization Methods

Session Chairs: **Zhiwei Huang,** National Univ. of Singapore (Singapore); **Stavros G. Demos,** Lawrence Livermore National Lab. (USA)

10:20 am: **Image enhancement of surface micro-structure on mucosa for polarimetric endoscopy** *(Invited Paper)*, Katsuhiro Kanamori, Panasonic Corp. (Japan) . . . . . [9318-21]

10:50 am: **Propagation of Laguerre-Gaussian beams in turbid-tissue like scattering medium**, Alexander Doronin, Igor V. Meglinski, Univ. of Otago (New Zealand); Robert R. Alfano, The City College of New York (USA). . . . . [9318-22]

11:10 am: **Role of helicity reversal in the state of polarization of scattered circularly polarized light**, Callum M. Macdonald, Alexander Doronin, Univ. of Otago (New Zealand); Stephen L. Jacques, Oregon Health & Science Univ. (USA); Igor V. Meglinski, Univ. of Otago (New Zealand) . . . . . [9318-23]

11:30 am: **Classification of normal and precancerous cervical tissues using nonlinear maximum representation and discrimination features (NMRDF) on polarized reflectance data**, Seema Devi, Asima Pradhan, Indian Institute of Technology Kanpur (India); Asha Agarwal, Kiran Pandey, Chayanika Pantola, Ganesh Shanker Vidhyarthi Memorial Medical College (India) . . . . . [9318-24]

11:50 am: **Compact supercontinuum sources for biomedical applications** *(Invited Paper)*, Philippe Leproux, XLIM Institut de Recherche (France) and Leukos (France); Vincent Couderc, Claire Lefort, XLIM Institut de Recherche (France) . . . . . [9318-25]

CONFERENCE 9319
LOCATION: ROOM 302 (ESPLANADE)

Monday–Wednesday 9–11 February 2015 • Proceedings of SPIE Vol. 9319

Optical Tomography and Spectroscopy of Tissue XI

Conference Chairs: **Bruce J. Tromberg,** Beckman Laser Institute and Medical Clinic (USA); **Arjun G. Yodh,** Univ. of Pennsylvania (USA); **Eva Marie Sevick-Muraca,** The Univ. of Texas Health Science Ctr. at Houston (USA)

Conference Co-Chair: **Robert R. Alfano,** The City College of New York (USA)

Program Committee: **Samuel Achilefu,** Washington Univ. School of Medicine in St. Louis (USA); **David A. Boas,** Massachusetts General Hospital (USA); **Sergio Fantini,** Tufts Univ. (USA); **Marco Ferrari,** Univ. degli Studi dell'Aquila (Italy); **Amir H. Gandjbakhche,** National Institutes of Health (USA); **Jeremy C. Hebden,** Univ. College London (United Kingdom); **Andreas H. Hielscher,** Columbia Univ. (USA); **Jana M. Kainerstorfer,** Tufts Univ. (USA); **Anand T. N. Kumar,** Athinoula A. Martinos Ctr. for Biomedical Imaging (USA); **Frederic Leblond,** Ecole Polytechnique de Montréal (Canada); **Mark J. Niedre,** Northeastern Univ. (USA); **Brian W. Pogue,** Dartmouth College (USA); **Darren M. Roblyer,** Boston Univ. (USA); **Quing Zhu,** Univ. of Connecticut (USA)

MONDAY 9 FEBRUARY

SESSION 1

LOCATION: ROOM 302 (ESPLANADE) . . . . . MON 8:20 AM TO 9:50 AM

New Clinical Applications

Session Chair: **Amir Gandjbakhche,** National Institutes of Health (USA)

8:20 am: **A MD-NIR interactance based wireless sensing platform for the measurement of a subcutaneous fat thickness: a pilot study**, Minseok Lee, Kyoung Su Park, Seung-ha Lee, Sehwan Kim, Dankook Univ. (Korea, Republic of) . . . . . [9319-1]

8:40 am: **Spectral changes in subcutaneous fat with weight loss measured by diffuse optical spectroscopy**, Goutham Ganesan, Ylenia Santoro, Robert V. Warren, Anais Leproux, Enrico Gratton, Shaista Malik M.D., Pietro R. Galassetti, Bruce J. Tromberg, Univ. of California, Irvine (USA) . . . . . [9319-2]

9:00 am: **Non-invasive response monitoring of lymphoma patients treated with chemotherapy, immunotherapy and radiation therapy using diffuse optics**, So Hyun Chung, Julien Menko, Univ. of Pennsylvania (USA); Jakub Svoboda M.D., Stephen J. Schuster M.D., Sunita Nasta M.D., John Plastaras M.D., Hospital of the Univ. of Pennsylvania (USA); David R. Busch, The Children's Hospital of Philadelphia (USA); Jennifer M. Lynch, Sarah Grundy, Steven Schenkel, Univ. of Pennsylvania (USA); Madeline E. Winters, The Children's Hospital of Philadelphia (USA); Jerry D. Glickson, Hospital of the Univ. of Pennsylvania (USA); Arjun G. Yodh, Univ. of Pennsylvania (USA)[9319-3]

9:20 am: **Multi-spectral wide field imaging technique for monitoring treatment outcomes in Kaposi Sarcoma and Cushing Syndrome** *(Invited Paper)*, Amir Gandjbakhche, National Institutes of Health (USA) . [9319-4]

Coffee Break . . . . . Mon 9:50 am to 10:20 am

SESSION 2

LOCATION: ROOM 302 (ESPLANADE) . . . . . MON 10:20 AM TO 12:10 PM

Brain, Neuro, and Functional Imaging I

Session Chair: **Joseph P. Culver,**
Washington Univ. School of Medicine in St. Louis (USA)

10:20 am: **Fast computational subject-specific models for real-time diffuse optical imaging of the human brain** *(Invited Paper)*, Hamid Dehghani, Xue Wu, The Univ. of Birmingham (United Kingdom); Adam T. Eggebrecht, Silvina L. Ferradal, Joseph P. Culver, Washington Univ. School of Medicine in St. Louis (USA) . . . . . [9319-5]

10:50 am: **Atlas-based high-density diffuse optical tomography for imaging the whole human cortex**, Xue Wu, The Univ. of Birmingham (United Kingdom); Adam T. Eggebrecht, Washington Univ. School of Medicine in St. Louis (USA); Silvina L. Ferradal, Joseph P. Culver, Washington Univ. School of Medicine in St. Louis (USA) and Washington Univ. in St. Louis (USA); Hamid Dehghani, The Univ. of Birmingham (United Kingdom). . . . . [9319-6]

11:10 am: **Evidence of ventricular contamination of the optical signal in preterm neonates with post hemorrhagic ventricle dilation**, Jessica Kishimoto, Mamadou Diop, Lawson Health Research Institute (Canada) and Western Univ. (Canada); Peter McLachlan, Western Univ. (Canada) and Lawson Health Research Institute (Canada); David S. C. Lee, London Health Sciences Ctr. (Canada); Sandrine de Ribaupierre, Western Univ. (Canada); Keith St. Lawrence, Lawson Health Research Institute (Canada) and Western Univ. (Canada) . . . . . [9319-7]

11:30 am: **Imaging brain function in children with Autism Spectrum Disorder with diffuse optical tomography**, Adam T. Eggebrecht, John R. Pruett Jr., Bradley L. Schlaggar, Steven E. Petersen, John N. Constantino, Joseph P. Culver, Washington Univ. School of Medicine in St. Louis (USA) . . . . . [9319-8]

11:50 am: **Mapping brain function at the bedside during acute stroke recovery using High-Density DOT**, Karla M. Bergonzi, Washington Univ. in St. Louis (USA); Adam T. Eggebrecht, Washington Univ. School of Medicine in St. Louis (USA); Andrew Fishell, Jin-Moo Lee, Joseph P. Culver, Washington Univ. in St. Louis (USA). . . . . [9319-9]

Lunch Break . . . . . Mon 12:10 pm to 1:30 pm

SESSION 3

LOCATION: ROOM 302 (ESPLANADE) . . . . . MON 1:30 PM TO 3:30 PM

Breast Imaging I

Session Chairs: **Ashwin B. Parthasarathy,** Univ. of Pennsylvania (USA); **So Hyun Chung,** Univ. of Pennsylvania (USA)

1:30 pm: **An optimized near-infrared spectral tomography system for real-time imaging of breast tumor responses during the process of neoadjuvant chemotherapy infusion**, Yan Zhao, Fadi El-Ghussein, Thayer School of Engineering at Dartmouth (USA); Ziqi Zhang, Boston Univ. (USA); Brian W. Pogue, Keith D. Paulsen, Shudong Jiang, Thayer School of Engineering at Dartmouth (USA) . . . . . [9319-10]

1:50 pm: **Dynamic optical tomography for monitoring tumor response in breast cancer patients receiving neoadjuvant chemotherapy**, Jacqueline E. Gunther, Emerson Lim, Hyun-Keol Kim, Molly L. Flexman, Lukas Zweck, Columbia Univ. (USA); Susan Refice, Melinda Brown, Herbert Irving Comprehensive Cancer Ctr. (USA); Kevin Kalinsky, Dawn L. Hershman, Columbia Univ. (USA) and Herbert Irving Comprehensive Cancer Ctr. (USA); Andreas H. Hieslcher, Columbia Univ. (USA) . . . . . [9319-11]

2:10 pm: **Value of diffuse optical imaging in prediction of response after the start of single-agent bevacizumab followed by neoadjuvant chemotherapy for breast cancer patients**, Shiget Ueda, Toshiaki Saeki, Hideki Takeuchi, Saitama Medical Univ. (Japan) . . . . . [9319-12]

2:30 pm: **Tumor vascular reactivity as a marker to predict tumor response to chemotherapy**, Songhyun Lee, Myeongsu Seong, Hyeryun Jeong, Jae G. Kim, Gwangju Institute of Science and Technology (Korea, Republic of) . . . . . [9319-13]

2:50 pm: **Diffuse optical tomography measured macroscopic physiological and metabolic parameters correlate with microscopic proliferation and vessel area breastcancer biomarkers.**, So Hyun Chung, Univ. of Pennsylvania (USA); Michael D. Feldman M.D., The Univ. of Pennsylvania Health System (USA); Regine Choe, Univ. of Rochester (USA); Daniel Martinez, The Children's Hospital of Philadelphia (USA); Helen Kim, Mary E. Putt, Univ. of Pennsylvania (USA); David R. Busch, The Children's Hospital of Philadelphia (USA); Brian Czerniecki M.D., Julia C. Tchou M.D., Mitchell D. Schnall M.D., Mark A. Rosen M.D., Hospital of the Univ. of Pennsylvania (USA); Angela DeMichele M.D., The Univ. of Pennsylvania Health System (USA); Arjun G. Yodh, Univ. of Pennsylvania (USA) . . . . . [9319-14]

3:10 pm: **Predicting hormonal therapy response in breast cancer using diffuse optical spectroscopic imaging (DOSI): ongoing clinical study**, Thomas D. O'Sullivan, Anais Leproux, Kyle Cutler, George P. Philipopoulos, Alice M. Police, Freddie Combs, Univ. of California, Irvine (USA); Dorota Wisner, Univ. of California, San Francisco (USA); Albert E. Cerussi, Min-Ying Su, Bruce J. Tromberg, Univ. of California, Irvine (USA) . . . . . [9319-15]

Coffee Break . . . . . Mon 3:30 pm to 4:00 pm

CONFERENCE 9319
LOCATION: ROOM 302 (ESPLANADE)

SESSION 4
LOCATION: ROOM 302 (ESPLANADE) . . . . . MON 4:00 PM TO 5:40 PM

Breast Imaging II

Session Chair: **Darren M. Roblyer,** Boston Univ. (USA)

4:00 pm: **Multi-modal dynamic breast compression imaging using diffuse optical tomography and x-ray digital breast tomosynthesis (DBT)**, Bin Deng, Bernhard Zimmermann, Qianqian Fang, David A. Boas, Massachusetts General Hospital (USA) and Athinoula A. Martinos Ctr. for Biomedical Imaging (USA); Jayne A. Cormier, Daniel B. Kopans, Mansi A. Saksena, Massachusetts General Hospital (USA); Stefan A. Carp, Massachusetts General Hospital (USA) and Athinoula A. Martinos Ctr. for Biomedical Imaging (USA) . . . . . [9319-16]

4:20 pm: **Malignant and normal breast tissues present different vascular responses to paced breathing measured by diffuse optical spectroscopy**, Anais Leproux, Michael T. Ghijsen, Amanda F. Durkin, Albert E. Cerussi, Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA) . . . . . [9319-17]

4:40 pm: **Optical mammography instrument for broadband spectroscopy (600-1,000nm), 2D imaging with fine spatial sampling (2mm?2mm), and depth sensitivity**, Nishanth Krishnamurthy, Pamela G. Anderson, Jana M. Kainerstorfer, Angelo Sassaroli, Sergio Fantini, Tufts Univ. (USA) . . . . . [9319-18]

5:00 pm: **Diffuse optical imaging of the breast using structured-light**, Jessica Kwong, Farouk Nouizi, Jaedu Cho, Jie Zheng, Yifan Li, Jeon-Hor Chen, Min-Ying Su, Gultekin Gulsen, Univ. of California, Irvine (USA) . . . . . [9319-19]

5:20 pm: **Quantitative oximetry with broadband optical mammography: clinical results**, Pamela G. Anderson, Jana M. Kainerstorfer, Nishanth Krishnamurthy, Tufts Univ. (USA); Marc J. Homer, Tufts Medical Ctr. (USA); Angelo Sassaroli, Tufts Univ. (USA); Roger A. Graham, Tufts Medical Ctr. (USA); Sergio Fantini, Tufts Univ. (USA) . . . . . [9319-20]

POSTERS-MONDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . MON 5:30 PM TO 7:30 PM

Conference attendees are invited to attend the BiOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Diffuse correlation spectroscopy (DCS) and diffuse optical spectroscopy (DOS) measurements of blood flow changes from arm cuff ischemia: a comparison study, Zhe Li, Univ. of Pennsylvania (USA) and Tianjin Univ. (China); Steven Schenkel, Wesley B. Baker, Univ. of Pennsylvania (USA); Detian Wang, The Univ. of Pennsylvania (USA) and Institute of Fluid Physics (China); Ashwin B. Parthasarathy, Arjun G. Yodh, Univ. of Pennsylvania (USA) . . . . . [9319-62]

In-vivo experimental validation for a featured-data time-domain diffuse fluorescence tomography based on the radiative transfer equation, Yan Zhang, Limin Zhang, Tianjin Univ. (China); Huijuan Zhao, Feng Gao, Tianjin Univ. (China) and Tianjin Key Lab. of Biomedical Detecting Techniques and Instruments (China); Jiao Li, Tianjin Univ. (China) . . . . . [9319-63]

Optimisation of acquisition time in bioluminescence imaging, Shelley L. Taylor, Suzannah Mason, Sophie Glinton, The Univ. of Birmingham (United Kingdom); Mark Cobbold, School of Immunity and Infection, Medical School, University of Birmingham (United Kingdom); Iain B. Styles, The Univ. of Birmingham (United Kingdom); Hamid Dehghani, The Univ. of Birmingham (United Kingdom) and School of Computer Science, Univ. of Birmingham (United Kingdom) . . . . . [9319-64]

Development of a multispectral diffuse optical tomography system for earlier diagnosis of rheumatoid arthritis, HaoYang Wu, Hamid Dehghani, The Univ. of Birmingham (United Kingdom); Andrew Filer, The Univ. of Birmingham (United Kingdom) and School of Immunity and Infection (United Kingdom); Iain B. Styles, The Univ. of Birmingham (United Kingdom) . . . . . [9319-65]

High resolution 3D fluorescence tomography using ballistic photon, Jie Zheng, Farouk Nouizi, Jessica Kwong, Gultekin Gulsen, JohnTu & Thomas Yuen Ctr. for Functional Onco-Imaging (USA) and Univ. of California, Irvine (USA) . . . . . [9319-66]

High-resolution fluorescence molecular tomography in the second near-infrared window, Kan Wang, Xiaoquan Yang, Yong Deng, Hui Gong, Qingming Luo, Huazhong Univ. of Science and Technology (China) . . . . . [9319-67]

Analysis for nonlinear inversion technique developed to estimate depth-distribution of absorption by spatially resolved backscattering measurement, Kazuhiro Nishida, Hokkaido Univ. (Japan); Takeshi Namita, Kyoto Univ. Graduate School of Medicine (Japan); Yuji Kato, Koichi Shimizu, Hokkaido Univ. (Japan) . . . . . [9319-68]

Imaging of tissue using a NIR supercontinuum laser light source with wavelengths in the second and third NIR optical windows, Laura A. Sordillo, Lukas Lindwasser, Yury Budansky, The City College of New York (USA); Philippe Leproux, Faculte des Sciences et Techniques (France); Robert R. Alfano, The City College of New York (USA) . . . . . [9319-69]

Broadband characterization of tissue simulating phantoms using a supercontinuum laser in a scanning diffuse optical spectroscopy instrument, Albert E. Cerussi, Beckman Laser Institute and Medical Clinic (USA); Kevin Conde, Corona de Mar High School (USA) and Beckman Laser Institute and Medical Clinic (USA); Jesse H. Lam, Beckman Laser Institute and Medical Clinic (USA); Vaibhav Verma, Beckman High School (USA) and Beckman Laser Institute and Medical Clinic (USA) . . . . . [9319-70]

Characterizing infantile hemangiomas with a near-infrared spectroscopic handheld wireless device, Christopher J. Fong, Jennifer W. Hoi, Hyun-Keol Kim, Gerald Behr, Lauren Geller, Nina Antonov, Molly L. Flexman, Maria Garzon, Andreas H. Hielscher, Columbia Univ. (USA) . . . . . [9319-71]

Monitoring the effect of strength training on muscle structure and metabolism with diffuse optical spectroscopy, Robert V. Warren, Goutham Ganesan, Joshua Cotter, Pietro R. Galassetti, Bruce J. Tromberg, Univ. of California, Irvine (USA) . . . . . [9319-73]

Implementation of 3D prostrate ring-scanning mechanism for NIR diffuse optical imaging phantom validation, Jhao-Ming Yu, Liang-Yu Chen, National Central Univ. (Taiwan); Min-Cheng Pan, Tungnan Univ. (Taiwan); Ya-Fen Hsu, Landseed Hospital, Taiwan (Taiwan); Min-Chun Pan, National Central Univ. (Taiwan) . . . . . [9319-74]

Measuring the functional response of lower back muscles using diffuse optical spectroscopy, Gerard D. Tran, Goutham Ganesan, Mijin Choi, Beckman Laser Institute and Medical Clinic (USA); Todd May, Camp Pendleton (USA); Albert E. Cerussi, Beckman Laser Institute and Medical Clinic (USA) . . . . . [9319-75]

Robustness of diffuse optical spectroscopy and imaging (DOSI) system by observing reproducibility of near-infrared absorption and scattering spectra, Mijin Choi, Albert E. Cerussi, Soroush M. Zarandi, Beckman Laser Institute and Medical Clinic (USA) . . . . . [9319-76]

A reduced-space basis function neural network method for diffuse optical tomography, Hyun-Keol Kim, Jacqueline E. Gunther, Jennifer W. Hoi, Andreas H. Hielscher, Columbia Univ. (USA) . . . . . [9319-77]

Comprasion of linear reconstruction technique for diffuse optic tomography in in-vitro experiment, Tanju Mercan, Hüseyin Özgür Kazanci, Murat Canpolat, Akdeniz Üniv. (Turkey) . . . . . [9319-79]

Whole-body temperature modulated fluorescence tomography for small animals, Farouk Nouizi, Tiffany C. Kwong, Jaedu Cho, Univ. of California, Irvine (USA); Uma Sampathkumaran, Yue Zhu, Maksudul M. Alam, InnoSense LLC (USA); Gultekin Gulsen, Univ. of California, Irvine (USA) . . . . . [9319-72]

Optimization of optode assignment in a combined continuous wave and frequency domain tomographic optical breast imaging system, Bernhard Zimmermann, Massachusetts General Hospital (USA) and Athinoula A. Martinos Ctr. for Biomedical Imaging (USA) and Massachusetts Institute of Technology (USA); Matthias C. Hofmann, Massachusetts General Hospital (USA) and Athinoula A. Martinos Ctr. for Biomedical Imaging (USA); Stefan A. Carp, David A. Boas, Qianqian Fang, Massachusetts General Hospital (USA) and Athinoula A. Martinos Ctr. for Biomedical Imaging (USA) . . . . . [9319-78]

Diffuse optical tomography system design and reconstruction of tail fat of sheep as a breast phantom, Murat Canpolat, Hüseyin Özgür Kazanci, Tanju Mercan, Akdeniz Üniv. (Turkey) . . . . . [9319-80]

Vertical-cavity surface-emitting lasers (VCSELs) sources for frequency domain photon migration, Thomas D. O'Sullivan, Keun-Sik No, Alex Matlock, Brian Hill, Albert E. Cerussi, Bruce J. Tromberg, Univ. of California, Irvine (USA) . . . . . [9319-81]

Cognitive control of muscle assessed using simultaneous diffuse optical spectroscopy and electrophysiology, Joshua Tromberg, Univ. of California, Irvine (USA) . . . . . [9319-85]

Potential role of ultrasound-guided diffuse optical tomography in diagnosis of malignant and benign breast lesions, Quing Zhu, Univ. of Connecticut (USA); Andrew Ricci Jr., Hartford Hospital (USA); Poornima Hegde, Mark Kane M.D., Univ. of Connecticut Health Ctr. (USA); Edward Cronin, Hartford Hospital (USA); Yan Xu, B. Tavakoli, Univ. of Connecticut (USA); Susan Tannenbaum M.D., Univ. of Connecticut Health Ctr. (USA) . . . . . [9319-82]

The effect and correction of reference heterogeneity in diffuse optical tomography, Hamed Vavadi, Chen Xu, Quing Zhu, Univ. of Connecticut (USA) . . . . . [9319-83]

Development of a robust and fast calibration procedure for diffuse optical tomography, Chen Xu, Hai Li, Guangqian Yuan, Hamed Vavadi, Quing Zhu, Univ. of Connecticut (USA) . . . . . [9319-84]

TUESDAY 10 FEBRUARY

SESSION 5

LOCATION: ROOM 302 (ESPLANADE) . . . . . TUE 8:00 AM TO 10:10 AM

Brain, Neuro, and Functional Imaging II

Session Chair: **Sergio Fantini,** Tufts Univ. (USA)

8:00 am: **Functional connectivity in the mouse brain using diffuse optical tomography**, Matthew D. Reisman, Adam Q. Bauer, Joseph P. Culver, Washington Univ. in St. Louis (USA) . . . . . [9319-21]

8:20 am: **Coherent hemodynamics spectroscopy: a new tool to measure cerebral autoregulation in the microcirculation** *(Invited Paper)*, Jana M. Kainerstorfer, Angelo Sassaroli, Kristen Tgavalekos, Sergio Fantini, Tufts Univ. (USA) . . . . . [9319-22]

8:50 am: **Cerebral hemodynamic effects of hypoxia-ischemia and hypothermia**, Erin M. Buckley, Massachusetts General Hospital (USA); Shyama Patel, Weill Cornell Medical College (USA); Benjamin Miller, Massachusetts General Hospital (USA); Patricia E. Grant M.D., Boston Children's Hospital (USA); Maria Angela Franceschini, Massachusetts General Hospital (USA); Susan Vannucci, Weill Cornell Medical College (USA) . [9319-23]

9:10 am: **Multimodal assessment of cerebrovascular disturbances during extracorporeal support**, Fenghua Tian, The Univ. of Texas at Arlington (USA); Lakshmi Raman, Children's Medical Ctr. Dallas (USA); Hanli Liu, The Univ. of Texas at Arlington (USA) . . . . . [9319-24]

9:30 am: **Rapid event-related fNIRS to study prefrontal hemodynamic responses during associative recognition**, Amarnath S. Yennu, James D. Schaeffer, Kellen C. Gandy, Fenghua Tian, Heekyeong Park, Hanli Liu, The Univ. of Texas at Arlington (USA) . . . . . [9319-25]

9:50 am: **Functional near-infrared spectroscopy for adaptive human-computer interfaces**, Beste F. Yuksel, Tufts Univ. (USA); Evan M. Peck, Bucknell Univ. (USA) and Tufts Univ. (USA); Daniel Afergan, Samuel W. Hincks, Tomoki Shibata, Jana M. Kainerstorfer, Kristen Tgavalekos, Angelo Sassaroli, Sergio Fantini, Robert J. K. Jacob, Tufts Univ. (USA). . . . . [9319-26]

Coffee Break . . . . . Tue 10:10 am to 10:40 am

SESSION 6

LOCATION: ROOM 302 (ESPLANADE) . . . . . TUE 10:40 AM TO 12:10 PM

Fluorescence I

Session Chair: **Mark J. Niedre,** Northeastern Univ. (USA)

10:40 am: **Fluorescent lifetime imaging of deep seated fluorophore**, Ilya V. Turchin, Institute of Applied Physics (Russian Federation); Alexander V. Khilov, Institute of Applied Physics (Russian Federation); Ilya I. Fiks, Vladimir I. Plehanov, Mikhail Y. Kirillin, Institute of Applied Physics (Russian Federation) . . . . . [9319-27]

11:00 am: **Fluorescence molecular imaging system with a novel mouse surface extraction method and a rotary scanning scheme**, Yue Zhao, Dianwen Zhu, Reheman Baikejiang, Changqing Li, Univ. of California, Merced (USA) . . . . . [9319-28]

11:20 am: **Accelerating spatially non-uniform update for sparse target recovery in fluorescence molecular tomography by ordered subsets and momentum methods**, Dianwen Zhu, Changqing Li, Univ. of California, Merced (USA) . . . . . [9319-29]

11:40 am: **Multiplexed fluorescence tomography with spectral and temporal data: intrinsic regularization with nonnegative least squares** *(Invited Paper)*, Vivian E. Pera, Dana H. Brooks, Mark J. Niedre, Northeastern Univ. (USA) . . . . . [9319-30]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 1:40 pm

SESSION 7

LOCATION: ROOM 302 (ESPLANADE) . . . . . TUE 1:40 PM TO 3:00 PM

Fluorescence II

Session Chair: **Gultekin Gulsen,** Univ. of California, Irvine (USA)

1:40 pm: **Fast full angle fluorescence molecular tomography system based on rotating mirrors**, Daifa Wang, Jin He, Yubo Fan, Deyu Li, BeiHang Univ. (China) . . . . . [9319-31]

2:00 pm: **Multispectral time-resolved diffuse fluorescence tomography**, Ying Mu, Mark J. Niedre, Northeastern Univ. (USA) . . . . . [9319-32]

2:20 pm: **Excitation light leakage suppression using temperature sensitive fluorescent agents**, Farouk Nouizi, Tiffany C. Kwong, Jessica Kwong, Jaedu Cho, Yu-wen Chan, Univ. of California, Irvine (USA); Uma Sampathkumaran, Yue Zhu, Maksudul M. Alam, InnoSense LLC (USA); Gultekin Gulsen, Univ. of California, Irvine (USA) . . . . . [9319-33]

2:40 pm: **Targeting tumor hypoxia: third generation 2-nitroimidazole ICG conjugate**, Feifei Zhou, Saeid Zanganeh, Innus Mohammad, Akram Abuteen, Michael B. Smith, Quing Zhu, Univ. of Connecticut (USA) . . . . . [9319-34]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 8

LOCATION: ROOM 302 (ESPLANADE) . . . . . TUE 3:30 PM TO 5:30 PM

Advances in Instrumentation and Technology I

Session Chair: **Thomas D. O'Sullivan,** Univ. of California, Irvine (USA)

3:30 pm: **Real-time acquisition of tissue optical properties and surface profile using 3D-SSOP**, Martijn Van de Giessen, Leiden Univ. Medical Ctr. (Netherlands) and Technische Univ. Delft (Netherlands); Joseph Angelo, Boston Univ. (USA) and Beth Israel Deaconess Medical Ctr. (USA); Christina Vargas M.D., Beth Israel Deaconess Medical Ctr. (USA); Sylvain Gioux, Beth Israel Deaconess Medical Ctr. (USA) and Harvard Medical School (USA) . . . . [9319-35]

3:50 pm: **Portable integrated frequency domain and continuous wave real-time diffuse optical spectroscopy and imaging**, Soroush M. Zarandi, Beckman Laser Institute and Medical Clinic (USA); Siavash Sedighzadeh Yazdi, Univ. of California, Irvine (USA); Thomas D. O'Sullivan, Brian Hill, Beckman Laser Institute and Medical Clinic (USA); Michael Green, Univ. of California, Irvine (USA); Albert E. Cerussi, Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA) . . . . . [9319-36]

4:10 pm: **Determining scattering anisotropy by combining single fiber reflectance spectroscopy and optical coherence tomography**, Anouk L. Post, Xu Zhang, Nienke Bosschaart, Abel Swaan, Ton G. van Leeuwen, Henricus J. C. M. Sterenborg, Dirk J. Faber, Academisch Medisch Centrum, Univ. van Amsterdam (Netherlands) . . . . . [9319-37]

4:30 pm: **A compact, multi-wavelength, and high frequency response light source for diffuse optical spectroscopy and imaging**, Kyoung Su Park, Minseok Lee, Phil-Sang Chung M.D., Sehwan Kim, Dankook Univ. (Korea, Republic of) . . . . . [9319-38]

4:50 pm: **A diffuse optical probe for the evaluation of subsurface tissue composition and metabolism during minimally invasive surgery**, Jesse H. Lam, Hossein Yazdi, Soroush M. Mirzaei Zarandi, Beckman Laser Institute and Medical Clinic (USA); Zhamshid Okhunov, Univ. of California, Irvine (USA); Jue Hou, Beckman Laser Institute and Medical Clinic (USA); Michael del Junco, Jaime Landman, Univ. of California, Irvine (USA); Bruce J. Tromberg, Albert E. Cerussi, Beckman Laser Institute and Medical Clinic (USA). . . . . [9319-39]

5:10 pm: **Multispectral spatial frequency domain imaging for three-dimensional reconstruction of tissue hemoglobin content in vivo**, Robert H. Wilson, Kyle P. Nadeau, Michael T. Ghijsen, Bernard Choi, Anthony J. Durkin, Bruce J. Tromberg, Univ. of California, Irvine (USA) . . . . . [9319-40]

CONFERENCE 9319
LOCATION: ROOM 302 (ESPLANADE)

WEDNESDAY 11 FEBRUARY

SESSION 9
LOCATION: ROOM 302 (ESPLANADE) . . . . . WED 8:00 AM TO 10:00 AM

Theory, Algorithms, and Modeling
Session Chair: **Hamid Dehghani,** The Univ. of Birmingham (United Kingdom)

8:00 am: **Comparison of linear and nonlinear models for coherent hemodynamics spectroscopy**, Angelo Sassaroli, Jana M. Kainerstorfer, Sergio Fantini, Tufts Univ. (USA) . . . . . [9319-41]

8:20 am: **Boundary conditions independent diffuse correlation spectroscopy**, Mamadou Diop, Keith St. Lawrence, Lawson Health Research Institute (Canada) . . . . . [9319-42]

8:40 am: **A non-stochastic iterative computational method to model light propagation in turbid media**, Thomas J. McIntyre, Roger Zemp, Univ. of Alberta (Canada) . . . . . [9319-43]

9:00 am: **Modified Beer-Lambert law for blood flow**, Wesley B. Baker, Ashwin B. Parthasarathy, Univ. of Pennsylvania (USA); David R. Busch, Univ. of Pennsylvania (USA) and The Children's Hospital of Philadelphia (USA); Rickson C. Mesquita, Univ. Estadual de Campinas (Brazil); Joel H. Greenberg, Arjun G. Yodh, Univ. of Pennsylvania (USA) . . . . . [9319-44]

9:20 am: **Analytical model for sub-diffusive light reflection and the application to spatial frequency-domain imaging**, Michael Reilly, Min Xu, Fairfield Univ. (USA). . . . . [9319-45]

9:40 am: **3D parameter reconstruction in hyperspectral diffuse optical tomography**, Arvind Krishna Saibaba, Nishanth Krishnamurthy, Pamela G. Anderson, Jana M. Kainerstorfer, Angelo Sassaroli, Eric L. Miller, Sergio Fantini, Misha E. Kilmer, Tufts Univ. (USA) . . . . . [9319-46]

Coffee Break . . . . . .Wed 10:00 am to 10:30 am

SESSION 10
LOCATION: ROOM 302 (ESPLANADE) . . . . . WED 10:30 AM TO 12:10 PM

Pre-Clinical / Clinical Applications
Session Chair: **Jae Gwan Kim,** Beckman Laser Institute and Medical Clinic (USA)

10:30 am: **Characterization of hemodynamics and oxygenation in the renal cortex of rats**, Dirk Grosenick, Heidrun Wabnitz, Rainer Macdonald, Physikalisch-Technische Bundesanstalt (Germany); Thoralf Niendorf, Max-Delbrück-Ctr. für Molekulare Medizin Berlin-Buch (Germany); Kathleen Cantow, Bert Flemming, Charité Universitätsmedizin Berlin (Germany); Karen Arakelyan, Max-Delbrück-Ctr. für Molekulare Medizin Berlin-Buch (Germany); Erdmann Seeliger, Charité Universitätsmedizin Berlin (Germany) . . . . . [9319-47]

10:50 am: **Quantification of joint inflammation in rheumatoid arthritis by time-resolved diffuse optical spectroscopy and tracer kinetic modeling**, Seva Ioussoufovitch, Laura B. Morrison, Keith St. Lawrence, Ting-Yim Lee, Mamadou Diop, Lawson Health Research Institute (Canada) . . . . . [9319-48]

11:10 am: **A novel bioluminescence tomography guided system for preclinical radiation research**, Bin Zhang, Ken Kang-Hsin Wang, Sohrab Eslami, Iulian I. Iordachita, Johns Hopkins Univ. (USA); Michael S. Patterson, McMaster Univ. (Canada); John Wong, Johns Hopkins Univ. (USA) . . . [9319-49]

11:30 am: **A non-contact system for three dimensional blood flow imaging in mouse leg using diffuse correlation tomography**, Songfeng Han, Univ. of Rochester (USA); Johannes Johansson, Miguel A. Mireles, ICFO - Institut de Ciències Fotòniques (Spain); Ashley R. Proctor, Univ. of Rochester (USA); Turgut Durduran, ICFO - Institut de Ciències Fotòniques (Spain); Regine Choe, Univ. of Rochester (USA). . . . . [9319-50]

11:50 am: **Diffuse correlation and optical spectroscopies for the monitoring and detection of spinal cord ischemia**, Angela S. D'souza, Stony Brook Univ. (USA); Rickson C. Mesquita, Univ. of Pennsylvania (USA) and Univ. Estadual de Campinas (Brazil); Thomas Bilfinger, Robert Galler, Stony Brook Univ. Medical Ctr. (USA); Arjun G. Yodh, Univ. of Pennsylvania (USA); Thomas Floyd, Stony Brook Univ. (USA) . . . . . [9319-51]

Lunch/Exhibition Break . . . . . .Wed 12:10 pm to 1:40 pm

SESSION 11
LOCATION: ROOM 302 (ESPLANADE) . . . . . WED 1:40 PM TO 3:10 PM

Advances in Time Domain Techniques
Session Chair: **Rinaldo Cubeddu,** Politecnico di Milano (Italy)

1:40 pm: **In-vivo time-resolved multidistance near infra-red spectroscopy of adult heads: time shift tolerance of measured reflectance to suppress the coupling between absorption and reduced scattering coefficients**, Tadatoshi Tanifuji, Daisuke Sakai, Kitami Institute of Technology (Japan). . . . . [9319-52]

2:00 pm: **Dynamic image reconstruction in time-resolved diffuse optical tomography**, Samuel Powell, Robert J. Cooper, Jeremy Hebden, Simon R. Arridge, Univ. College London (United Kingdom) . . . . . [9319-53]

2:20 pm: **Towards next generation time-domain diffuse optics devices** *(Invited Paper)*, Alberto Dalla Mora, Davide Contini, Politecnico di Milano (Italy); Simon R. Arridge, Univ. College London (United Kingdom); Fabrizio Martelli, Univ. degli Studi di Firenze (Italy); Alberto Tosi, Gianluca Boso, Politecnico di Milano (Italy); Andrea Farina, Consiglio Nazionale delle Ricerche (Italy); Turgut Durduran, ICFO - Institut de Ciències Fotòniques (Spain); Edoardo Martinenghi, Alessandro Torricelli, Antonio Pifferi, Politecnico di Milano (Italy). . . . . [9319-54]

2:50 pm: **Diffuse optical tomography by using time-resolved single pixel camera**, Cosimo D'Andrea, Politecnico di Milano (Italy) and Istituto Italiano di Tecnologia (Italy); Andrea Farina, CNR-Istituto di Fotonica e Nanotecnologie (Italy); Martina Lepore, Laura Di Sieno, Alberto Dalla Mora, Politecnico di Milano (Italy); Nicolas Ducros, Institut National des Sciences Appliquées de Lyon (France); Antonio Pifferi, Gianluca Valentini, Politecnico di Milano (Italy); Simon R. Arridge, Univ. College London (United Kingdom). . . . . [9319-55]

Coffee Break . . . . . .Wed 3:10 pm to 3:40 pm

SESSION 12
LOCATION: ROOM 302 (ESPLANADE) . . . . . WED 3:40 PM TO 5:40 PM

Advances in Instrumentation and Technology II
Session Chair: **Jana M. Kainerstorfer,** Tufts Univ. (USA)

3:40 pm: **Optical tomography using a random diffuser and digital phase conjugation**, Yuta Goto, Atsushi Okamoto, Atsushi Shibukawa, Akihisa Tomita, Hokkaido Univ. (Japan); Kunihiro Sato, Hokkai-Gakuen Univ. (Japan). . [9319-56]

4:00 pm: **Long-term validation of a multi-wavelength frequency-domain diffuse optical spectroscopy instrument**, Thomas D. O'Sullivan, Keun-Sik No, Alex Matlock, Amanda F. Durkin, Brian Hill, Anais Leproux, Albert E. Cerussi, Bruce J. Tromberg, Univ. of California, Irvine (USA) . . . . . [9319-57]

4:20 pm: **Utilizing an open-microcavity optoacoustic sensor for spectroscopic determination of methemoglobin concentration**, Ralph W. Peterson, Amber N. Miller, The Univ. of Texas at San Antonio (USA); Jian Ling, Southwest Research Institute (USA); Jing Yong Ye, The Univ. of Texas at San Antonio (USA) . . . . . [9319-58]

4:40 pm: **Real time mapping and tracking of optical properties in deep tissue**, Kyle Cutler, Zachary DeStefano, Soroush M. Zarandi, Thomas D. O'Sullivan, Albert E. Cerussi, Gopi Meenakshisundaram, Aditi Majumder, Univ. of California, Irvine (USA); Seung-ha Lee, Dankook Univ. (Korea, Democratic Peoples Republic of); Bruce J. Tromberg, Univ. of California, Irvine (USA) . . . . . [9319-59]

5:00 pm: **Real-time multispectral spatial frequency domain imaging using binary patterns and a frequency encoded source**, Kyle P. Nadeau, Michael T. Ghijsen, Anthony J. Durkin, Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA). . . . . [9319-60]

5:20 pm: **Imaging metabolic oxygen consumption using coherent single snapshot optical properties (cSSOP)**, Michael T. Ghijsen, Univ. of California, Irvine (USA); Kyle P. Nadeau, Bernard Choi, Anthony J. Durkin, Beckman Laser Institute and Medical Clinic (USA); Sylvain Gioux, Beth Israel Deaconess Medical Ctr. (USA); Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA) . . . . . [9319-61]

CONFERENCE 9320
LOCATION: ROOM 200 (MEZZANINE)

COSPONSOR:

Saturday–Monday 7–9 February 2015 • Proceedings of SPIE Vol. 9320

Microfluidics, BioMEMS, and Medical Microsystems XIII

Conference Chairs: **Bonnie L. Gray,** Simon Fraser Univ. (Canada); **Holger Becker,** microfluidic ChipShop GmbH (Germany)

Program Committee: **Brian W. Anthony,** Massachusetts Institute of Technology (USA); **Yolanda Fintschenko,** LabSmith, Inc. (USA); **Bruce K. Gale,** The Univ. of Utah (USA); **Albert K. Henning,** Aquarian Microsystems (USA); **Yu-Cheng Lin,** National Cheng Kung Univ. (Taiwan); **Yuehe Lin,** Pacific Northwest National Lab. (USA); **Ciara K. O'Sullivan,** Univ. Rovira i Virgili (Spain); **Ian Papautsky,** Univ. of Cincinnati (USA); **Bastian E. Rapp,** Karlsruher Institut für Technologie (Germany); **Thomas Stieglitz,** Albert-Ludwigs-Univ. Freiburg (Germany); **Sindy Kam-Yan Tang,** Stanford Univ. (USA); **Albert van den Berg,** MESA+ Institute for Nanotechnology (Netherlands); **Wanjun Wang,** Louisiana State Univ. (USA); **Bernhard H. Weigl,** PATH (USA)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 200 (MEZZANINE) . . . . . SAT 1:30 PM TO 3:20 PM

Manufacturing I

Session Chair: **Bonnie L. Gray,** Simon Fraser Univ. (Canada)

1:30 pm: **Materials selection and manufacturing of thermoplastic elastomer microfluidics** *(Invited Paper)*, Dan Sameoto, Abdul Wasay, Univ. of Alberta (Canada) . . . . . [9320-1]

2:00 pm: **Rapid prototyping of microfluidic channels in nitrocellulose using laser-direct-write patterning**, Peijun J. W. He, Ioannis N. Katis, Robert W. Eason, Collin L. Sones, Univ. of Southampton (United Kingdom) . . . . . [9320-2]

2:20 pm: **Rapid prototyping of glass microfluidic chips**, Frederik Kotz, Karlsruher Institut für Technologie (Germany); Klaus Plewa, Werner Bauer, Thomas Hanemann, Ansgar Waldbaur, Karlsruhe Institute of Technology (Germany); Elisabeth Wilhelm, Christiane Neumann, Bastian E. Rapp, Karlsruher Institut für Technologie (Germany) . . . . . [9320-3]

2:40 pm: **Protein assay structured on paper by using lithography**, Elisabeth Wilhelm, Tobias M. Nargang, Wala Al Bitar, Björn Waterkotte, Bastian E. Rapp, Karlsruher Institut für Technologie (Germany). . . . . [9320-4]

3:00 pm: **Direct-write laser techniques for the manufacture of multiplexed paper-based diagnostic sensors**, Ioannis N. Katis, Peijun J. W. He, Robert W. Eason, Collin L. Sones, Optoelectronics Research Ctr., Univ. of Southampton (United Kingdom). . . . . [9320-5]

Coffee Break . . . . . .Sat 3:20 pm to 3:50 pm

SESSION 2

LOCATION: ROOM 200 (MEZZANINE) . . . . . SAT 3:50 PM TO 5:20 PM

Manufacturing/Optofluidics

Session Chair: **Holger Becker,** microfluidic ChipShop GmbH (Germany)

3:50 pm: **Silicon photonics biosensing: different packaging platforms and application possibilities** *(Invited Paper)*, C. Arce, E. Hallynck, Sam Werquin, Jan-Willem F. I. B. Hoste, Daan Martens, Peter Bienstman, Univ. Gent (Belgium) . . . . . [9320-6]

4:20 pm: **An scalable engineering approach to improve performance of a miniaturized optical detection system for in vitro Point-of-Care Testing**, Hannah R. Robbins, Sijung Hu, Changqing Liu, Loughborough Univ. (United Kingdom) . . . . . [9320-7]

4:40 pm: **Comparison of roll-to-roll replication approaches for microfluidic and optical functions in lab-on-a-chip diagnostic devices**, Christian Brecher, Fraunhofer-Institut für Produktionstechnologie (Germany) and Lab. for Machine Tools and Production Engineering (WZL) (Germany); Christian Wenzel, Thomas Bastuck, Christoph Baum, Fraunhofer-Institut für Produktionstechnologie (Germany) . . . . . [9320-8]

5:00 pm: **Environmental sensing with optical fiber sensors processed with focused ion beam and atomic layer deposition**, Jaime Viegas, Ricardo Janeiro, Raquel Flores, Ammar Alqahtani, Marcus V. S. Dahlem, Masdar Institute of Science & Technology (United Arab Emirates) . . . . . [9320-9]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 3

LOCATION: ROOM 200 (MEZZANINE) . . . . . SUN 8:30 AM TO 10:00 AM

Microfluidic Devices I

Session Chair: **Dan Sameoto,** Univ. of Alberta (Canada)

8:30 am: **Photo-patterned free-standing hydrogel microarrays for massively parallel protein analysis** *(Invited Paper)*, Todd A. Duncombe, Amy E. Herr, Univ. of California, Berkeley, Bioengineering (USA) . . . . . [9320-10]

9:00 am: **Modelling defect tolerance sensitivity to microfluidic channel periodic post parameters**, Mahyar Mehran, Bonnie L. Gray, Glenn H. Chapman, Simon Fraser Univ. (Canada). . . . . [9320-11]

9:20 am: **A novel reciprocating micropump based on Lorentz force**, Alinaghi Salari, Univ. of Calgary (Canada); Abbas Hakimsima, Sharif Energy Research Institute (Iran, Islamic Republic of); Mohammad Behshad Shafii, Sharif Univ. of Technology (Iran, Islamic Republic of). . . . . [9320-12]

9:40 am: **A light-activated optopiezoelectric thin-film actuator for microfluidic applications**, Hsin-Hu Wang, Chih-Kung Lee, Yu-Hsiang Hsu, National Taiwan Univ. (Taiwan) . . . . . [9320-13]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 4

LOCATION: ROOM 200 (MEZZANINE) . . . . . SUN 10:30 AM TO 12:00 PM

Microfluidic Devices II

Session Chair: **Todd A. Duncombe,** Univ. of California, Berkeley (USA)

10:30 am: **Micro and nano sensors on a rotating disc** *(Invited Paper)*, Anja Boisen, Technical Univ. of Denmark (Denmark) . . . . . [9320-14]

11:00 am: **Particle trajectory in microfluidic channels determined by spatially modulated fluorescence emission**, Joerg Martini, Bowen Cheng, Malte F. Huck, Peter Kiesel, Michael I. Recht, Doron Kletter, Palo Alto Research Center, Inc. (USA) . . . . . [9320-15]

11:20 am: **Fluid flow optimization of an AC electrothermal micropump consisting of two opposing rows of microelectrodes for biofluidic applications**, Alinaghi Salari, Colin Dalton, Univ. of Calgary (Canada) . [9320-16]

CONFERENCE 9320
LOCATION: ROOM 200 (MEZZANINE)

11:40 am: **Laser direct writing 3D structures for microfluidic channels: flow meter and mixer**, Chih-Lang Lin, Central Taiwan Univ. of Science and Technology (Taiwan); Yi-Hsiung Lee, Jiun-Yi Yang, Po-Yu Chen, Yi-Jui Liu, Feng Chia Univ. (Taiwan); Patrice L. Baldeck, Ctr. National de la Recherche Scientifique (France) . . . . . [9320-17]

Lunch/Exhibition Break . . . . . Sun 12:00 pm to 1:30 pm

SESSION 5
LOCATION: ROOM 200 (MEZZANINE) . . . . . SUN 1:30 PM TO 3:00 PM

Medical Devices I
Session Chair: **Sam Kassegne,** San Diego State Univ. (USA)

1:30 pm: **Deformation cytometry: mechanical phenotyping for label free detection of cellular disease states** *(Invited Paper)*, Eric D. Diebold, Jonathan Lin, Dino Di Carlo, Univ. of California, Los Angeles (USA) . . . [9320-18]

2:00 pm: **DNA separation and fluorescent detection in an optofluidic chip with sub-base-pair resolution**, Markus Pollnau, Manfred Hammer, Chaitanya Dongre, Hugo J. W. M. Hoekstra, Univ. Twente (Netherlands) . . . . . [9320-19]

2:20 pm: **Microfluidic surface-enhanced Raman scattering (SERS) sensor with monolithically integrated nanoporous gold disk (NPGD) arrays for rapid and label-free biomolecular detection**, Wei-Chuan Shih, Ming Li, Fusheng Zhao, Jianbo Zeng, Univ. of Houston (USA) . . . . . [9320-20]

2:40 pm: **Optical detection of clot contractility in a 'wound-in-a-chip' device**, Nikita Taparia, Lucas H. Ting, Annie O. Smith, Nathan J. Sniadecki, Univ. of Washington (USA) . . . . . [9320-21]

Coffee Break . . . . . Sun 3:00 pm to 3:30 pm

SESSION 6
LOCATION: ROOM 200 (MEZZANINE) . . . . . SUN 3:30 PM TO 5:00 PM

Medical Devices II
Session Chair: **Eric D. Diebold,** Univ. of California, Los Angeles (USA)

3:30 pm: **New generation of neural prosthetic ECoG arrays using glassy carbon-based micromachined microelectrodes** *(Invited Paper)*, Sam Kassegne, San Diego State Univ. (USA) . . . . . [9320-22]

4:00 pm: **Beyond isolated cells: microfluidic transport of large tissue for pancreatic cancer diagnosis**, Ronnie Das, Rachel G. Murphy, Eric J. Seibel, Univ. of Washington (USA) . . . . . [9320-23]

4:20 pm: **Influence of direct laser written three-dimensional topographies on osteoblast-like cells**, Judith K. Hohmann, Research Ctr. OPTIMAS, Technische Univ. Kaiserslautern (Germany); Georg von Freymann, Research Ctr. OPTIMAS, Technische Univ. Kaiserslautern (Germany) and Fraunhofer-Institut für Physikalische Messtechnik (Germany) . . . . . [9320-24]

4:40 pm: **A microfabricated, microfluidic biomems device to model human brain aneurisms: the aneurysm-on-a-chip (tm)**, Lisa M. Reece, Jian-Wei Khor, Raviraj V. Thakur, Steven T. Wereley, James F. Leary, Purdue Univ. (USA) . . . . . [9320-25]

POSTERS-SUNDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Fabrication of 3D microenvironments to study MCF-7 cell growth, Oriana Avila, Adriano J. G. Otuka, Instituto de Física de São Carlos, Univ. de São Paulo (Brazil); Laura M. de Freitas, Univ. Estadual Paulista "Júlio de Mesquita Filho" (Brazil); Vinicius Tribuzi, Instituto de Física de São Carlos, Univ. de São Paulo (Brazil); Carla R. Fontana, Cleber R. Mendonça, Univ. Estadual Paulista "Júlio de Mesquita Filho" (Brazil) . . . . . [9320-41]

A novel AC electrothermal micropump for biofluid transport using parallel interdigitated microelectrode array, Alinaghi Salari, Colin Dalton, Univ. of Calgary (Canada) . . . . . [9320-42]

A bioMEMS device for the study of mechanical properties of cells, Joseph M. Sanders, Logan Butt, Ashley N. Clark, James K. Williams, Michael R. Padgen, SUNY College of Nanoscale Science and Engineering (USA); Patricia Keely, Univ. of Wisconsin-Madison (USA); John S. Condeelis, Albert Einstein College of Medicine (USA); Julio Aguirre-Ghiso, Icahn School of Medicine at Mount Sinai (USA); James Castracane, SUNY College of Nanoscale Science and Engineering (USA) . . . . . [9320-43]

A novel organic diode design using only PCBM as an active polymer layer, Haleh Shahbazbegian, Jasbir N. Patel, Bozena Kaminska, Simon Fraser Univ. (Canada) . . . . . [9320-44]

Microfluidics diffusive gradient monitored by time-lapse images of microbial cells, Aline F. Oliveira, Carlos L. Cesar, UNICAMP (Brazil); Reinaldo G. Bastos, UFSCAR (Brazil); Lucimara G. de La Torre, UNICAMP (Brazil) . . . . . [9320-45]

Novel polymer microfluidic optics for quantum cascade lasers in the mid-infrared, Sheng Wu, California Institute of Technology (USA) . . . . . [9320-46]

Vibration effect on cross-flow and co-flow focusing mechanisms for microbubble generation, Alinaghi Salari, Colin Dalton, Univ. of Calgary (Canada) . . . . . [9320-47]

High efficient biofuid micromixing using ultra-fast AC electrothermal flow, Alinaghi Salari, Colin Dalton, Univ. of Calgary (Canada) . . . . . [9320-48]

Cellular temperature monitoring using dielectrophoretic impedance masurement, Kozo Taguchi, Ryo Kido, Ritsumeikan Univ. (Japan) . . . [9320-49]

BIOS SUNDAY PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their groundbreaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

MONDAY 9 FEBRUARY

SESSION 7
LOCATION: ROOM 200 (MEZZANINE) . . . . . MON 9:30 AM TO 11:50 AM

Applications I
Session Chair: **Klas Hjort,** Uppsala Univ. (Sweden)

9:30 am: **Extraction and fractionation of RNA and DNA from single cells using selective lysing and isotachophoresis** *(Invited Paper)*, Hirofumi Shintaku, Kyoto Univ. (Japan) and Stanford Univ. (USA); Juan G. Santiago, Stanford Univ. (USA) . . . . . [9320-36]

10:00 am: **Fluorescence cross-correlation spectroscopy for time dependent flows: a numerical investigation**, Nicolo' G Ceffa, Univ degli Studi di Milano-Bicocca (Italy); Paolo Pozzi, Univ. degli Studi di Milano-Bicocca (Italy); Margaux Bouzin, Univ. degli Studi di Milano Bicocca (Italy); Cassia A. Marquezin, Instituto Federal de Goiás (Brazil); Laura Sironi, Laura D'Alfonso, Maddalena Collini, Giuseppe Chirico, Univ. degli Studi di Milano-Bicocca (Italy) . . . . . [9320-37]

Coffee Break . . . . . Mon 10:20 am to 10:50 am

10:50 am: **Microfluidic system for the identification of bacterial pathogens causing urinary tract infections**, Holger Becker, Nadine Hlawatsch, microfluidic ChipShop GmbH (Germany); Tommy Haraldsson, Wouter van der Wijngaart, KTH Royal Institute of Technology (Sweden); Anders Lind, Q-Linea AB (Sweden); Surbi Malhotra-Kumar, Agata Turlej-Rogacka, Herman Goossens, Univ. Antwerpen (Belgium) . . . . . [9320-38]

11:10 am: **Simultaneous detection of mycophenolic acid and tacrolimus with a thirteen channel optical biochip**, Francesco Baldini, Ambra Giannetti, Sara Tombelli, Cosimo Trono, Istituto di Fisica Applicata Nello Carrara, IFAC-CNR (Italy); Giampiero Porro, Datamed S.r.L. (Italy); Clemens Kremer, Holger Becker, microfluidic ChipShop GmbH (Germany). . . . . [9320-39]

11:30 am: **Capture of CD4 cell from the whole blood with the circular microfluidic device functionalized by glutaraldehyde**, Yeu-Farn Shih, Nien-Tsu Huang, Chih-Kung Lee, National Taiwan Univ. (Taiwan) . . . . . [9320-40]

Lunch Break . . . . . Mon 11:50 am to 1:20 pm

SESSION 8

LOCATION: ROOM 200 (MEZZANINE) . . . . . MON 1:20 PM TO 3:10 PM

Applications II

Session Chair: **Hirofumi Shintaku,** Kyoto Univ. (Japan)

1:20 pm: **High-pressure microfluidics** *(Invited Paper)*, Klas Hjort, Uppsala Univ. (Sweden) . . . . . [9320-26]

1:50 pm: **BIOFOS: micro-ring resonator-based biophotonic system for food analysis**, Ioanna Zergioti, Christos Kouloumentas, Maria Massaouti, Hercules Avramopoulos, National Technical Univ. of Athens (Greece); Henk Leeuwis, René G. Heideman, Eric Schreuder, LioniX BV (Netherlands); Siegfried Graf, Helmut F. Knapp, Ctr. Suisse d'Electronique et de Microtechnique SA, CSEM (Switzerland); Lise Barthelmebs, Thierry Noguer, Univ. de Perpignan Via Domitia, UPVD (France); George Tsekenis, Biomedical Research Foundation, Academy of Athens (Greece); Maria Patitsa, Biomedical Research Foundation, Academy of Athens, BRFAA (Greece); Anke Trilling, Luc Scheres, Surfix BV (Netherlands); Maarten Smulders, Han T. Zuilhof, Wageningen Univ. (Netherlands); Gerard J. T. Heesink, Saxion Univ. of Applied Sciences (Netherlands); Agusti Romero, IRTA (Spain); Layla Fernandez, COVAP (Spain). . . . . [9320-27]

2:10 pm: **Integrated microfluidic system with automatic sampling for permanent molecular and antigen-based detection of CBRNE-related pathogens**, Holger Becker, Sebastian Schattschneider, Richard Klemm, Nadine Hlawatsch, Claudia Gärtner, microfluidic ChipShop GmbH (Germany) . [9320-28]

2:30 pm: **High-throughput microfluidic line scan imaging for cytological characterization**, Joshua A. Hutcheson, Amy J. Powless, Aneeka A. Majid, Adair Claycomb, Ingrid Fritsch, Kartik Balachandran, Timothy J. Muldoon, Univ. of Arkansas (USA) . . . . . [9320-29]

2:50 pm: **Three-dimensional optofluidic device for isolating microbes**, Anusha Keloth, Lynn Paterson, Gerard H. Markx, Ajoy K. Kar, Heriot-Watt Univ. (United Kingdom). . . . . [9320-30]

Coffee Break . . . . . Mon 3:10 pm to 3:40 pm

SESSION 9

LOCATION: ROOM 200 (MEZZANINE) . . . . . MON 3:40 PM TO 5:30 PM

Optofluidics

Session Chairs: **Bonnie L. Gray,** Simon Fraser Univ. (Canada);
Holger Becker, microfluidic ChipShop GmbH (Germany)

3:40 pm: **Optofluidic technologies for mobile and global health** *(Invited Paper)*, David Erickson, Cornell Univ. (USA). . . . . [9320-31]

4:10 pm: **Realization of integral 3-dimensional image using fabricated tunable liquid lens array**, Muyoung Lee, Junoh Kim, Cheoljoong Kim, Jin Su Lee, Yonghyub Won, KAIST (Korea, Republic of) . . . . . [9320-32]

4:30 pm: **Ultralow-loss waveguide crossings for the integration of microfluidics and optical waveguide sensors**, Zheng Wang, Hai Yan, The Univ. of Texas at Austin (USA); Zongxing Wang, Omega Optics, Inc. (USA); Yi Zou, Chun-Ju Yang, The Univ. of Texas at Austin (USA); Swapnajit Chakravarty, Harish Subbaraman, Naimei Tang, Xiaochuan Xu, Omega Optics, Inc. (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) . . . . . [9320-33]

4:50 pm: **Femtosecond laser fabricated optofluidic device to mechanically discriminate between cells**, Rebeca Martinez Vazquez, CNR-Istituto di Fotonica e Nanotecnologie (Italy); Giovanni Nava, Tie Yang, Univ. degli Studi di Pavia (Italy); Manuela Veglione, Istituto di Genetica Molecolare, CNR (Italy); Paolo Minzioni, Univ. degli Studi di Pavia (Italy); Francesca Bragheri, CNR-Istituto di Fotonica e Nanotecnologie (Italy); Ilaria Chiodi, Maira Di Tano, Chiara Mondello, Istituto di Genetica Molecolare, CNR (Italy); Ilaria Cristiani, Univ. degli Studi di Pavia (Italy); Roberto Osellame, CNR-Istituto di Fotonica e Nanotecnologie (Italy) . . . . . [9320-34]

5:10 pm: **Nanoplasmonic micropaticles: enhanced sensitivity for high-throughput bioassay**, Zhengtuo Zhao, Di Hu, Gargi Ghosh, Joe F. Lo, Univ. of Michigan-Dearborn (USA) . . . . . [9320-35]

PANEL DISCUSSION

LOCATION: ROOM 200 (MEZZANINE) . . . . MON 5:30 PM TO 7:00 PM

Prospects and Future of Microfluidics

Moderator: **Holger Becker**, microfluidic ChipShop GmbH (Germany)

The commercialization of microfluidic devices and systems is rapidly progressing. However not all promising approaches have become an economic success and investor's payback often has not met initial expectations. The discussion will look upon experiences made in the product development and market introduction phase of microfluidics enabled devices and will present lessons learned from various perspectives, from device performance to commercial organization. It tries to identify trends and will present case studies from different applications.

BEST STUDENT PAPER AWARD

We are pleased to announce that a cash prize will be awarded to the best student paper in this conference. Qualifying papers and presentations will be evaluated by the awards committee and the winner will be notified at the end of or after the meeting.

AWARD SPONSOR:

microfluidic ChipShop

OCMI The Ohio Center for Microfluidic Innovation at The University of Cincinnati

CONFERENCE 9321

LOCATION: ROOM 133 (EXHIBIT LEVEL) AND ROOM 305 (ESPLANADE)

Sunday–Tuesday 8–10 February 2015 • Proceedings of SPIE Vol. 9321

Optical Interactions with Tissue and Cells XXVI

Conference Chair: **E. Duco Jansen,** Vanderbilt Univ. (USA)

Program Committee: **Hope Thomas Beier,** Air Force Research Lab. (USA); **Randolph Glickman,** The Univ. of Texas Health Science Ctr. at San Antonio (USA); **Steven L. Jacques,** Oregon Health & Science Univ. (USA); **Bennett L. Ibey,** Air Force Research Lab. (USA); **Beop-Min Kim,** Korea Univ. (Korea, Republic of); **Jessica C. Ramella-Roman,** The Catholic Univ. of America (USA); **Marissa Nicole Rylander,** Virginia Polytechnic Institute and State Univ. (USA); **Robert J. Thomas,** Air Force Research Lab. (USA); **Alfred Vogel,** Univ. zu Lübeck (Germany); **Gerald J. Wilmink,** WiseWear Corp. (USA)

SUNDAY 8 FEBRUARY

SESSION 1

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . . SUN 10:40 AM TO 12:10 PM

Ultrashort Laser Microsurgery

Joint Session with Conferences 9321 and 9355

Session Chair: **Alexander Heisterkamp,**
Leibniz Univ. Hannover (Germany)

10:40 am: **Ultrafast laser surgery of transparent ocular tissues** *(Invited Paper)*, Daniel V. Palanker, Stanford Univ. (USA) . . . . . [9355-6]

11:10 am: **Ultrashort pulse laser interactions with cortical bone tissue for applications in orthopaedic surgery**, Simon A. Ashforth, Miriam C. Simpson, The Univ. of Auckland (New Zealand) . . . . . [9355-7]

11:30 am: **Laser-induced formation of micro-pores in the tissues for cartilage repair and treatment of glaucoma**, Emil N. Sobol, Olga I. Baum, Institute on Laser and Information Technologies (Russian Federation); Alexander Shnirelman, Concordia Univ. (Canada); Valerii Vinokour, Argonne National Lab. (USA) . . . . . [9321-1]

11:50 am: **Femtosecond laser collagen cross-linking without traditional photosensitizers**, Nicola G. Celi, Michael D. Yu, Sinisa Vukelic, Columbia Univ. (USA) . . . . . [9321-2]

Lunch Break . . . . . Sun 12:10 pm to 1:40 pm

SESSION 2

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . . SUN 1:40 PM TO 3:30 PM

Optical Perforation and Manipulation of Cells I

Joint Session with Conferences 9321 and 9355

Session Chair: **Alexander Heisterkamp,**
Leibniz Univ. Hannover (Germany)

1:40 pm: **Perspectives in nano-structure assisted laser manipulation of mammalian cells** *(Invited Paper)*, Dag Heinemann, Laser Zentrum Hannover e.V. (Germany) . . . . . [9355-8]

2:10 pm: **Selective optoporation of cells targeted with functionalized gold nanoparticles enhancing ultrafast laser pulse irradiation**, Eric Bergeron, Alexandre Torres, Rosalie Martel, Camille Rodriguez, Christos Boutopoulos, Ecole Polytechnique de Montréal (Canada); Jukka Niskanen, Univ. de Montréal (Canada); Jean-Jacques Lebrun, Royal Victoria Hospital (Canada) and McGill Univ. Health Ctr. (Canada); Françoise M. Winnik, Univ. de Montréal (Canada); Michel Meunier, Ecole Polytechnique de Montréal (Canada) . . . . . [9355-9]

2:30 pm: **Mechanical response of single nerve cells estimated by femtosecond laser-induced impulsive force**, Takanori Iino, Nara Institute of Science and Technology (Japan); Tadahide Furuno, Aichi Gakuin Univ. (Japan); Man Hagiyama, Akihiko Ito, Kinki Univ. (Japan); Yoichiroh Hosokawa, Nara Institute of Science and Technology (Japan) . . . . . [9355-10]

2:50 pm: **Femtosecond-pulse plasmonic ionization kills cancer cells**, Limor Minai, Adel Zeidan, Daniella Yeheskely-Hayon, Dvir Yelin, Technion-Israel Institute of Technology (Israel) . . . . . [9355-11]

3:10 pm: **Evaluation of different laser systems for decolonization of bacteria under transparent nanocrystalline yttria-stabilized-zirconia cranial implants**, Yasaman Damestani, Yasuhiro Kodera, Javier E. Garay, Guillermo Aguilar, Univ. of California, Riverside (USA) . . . . . [9321-3]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 3

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . . SUN 4:00 PM TO 6:00 PM

Optical Perforation and Manipulation of Cells II

Joint Session with Conferences 9321 and 9355

Session Chair: **Michel Meunier,**
Ecole Polytechnique de Montréal (Canada)

4:00 pm: **Effect of nanoparticle size on plasmonic enhanced off-resonance femtosecond laser nanocavitation**, Christos Boutopoulos, Ecole Polytechnique de Montréal (Canada) and Univ. of St Andrews (United Kingdom); Ali Hatef, Matthieu Fortin-Deschênes, David Rioux, Rémi Lachaine, Michel Meunier, Ecole Polytechnique de Montréal (Canada) . . . . . [9355-12]

4:20 pm: **Laser transfection with gold nanoparticles: Current state and new particle structures as a perspective**, Stefan Kalies, Lara Gentemann, Georgios C. Antonopoulos, Mirko Rakoski, Dag Heinemann, Markus Schomaker, Tammo Ripken, Laser Zentrum Hannover e.V. (Germany); Heiko Meyer, Laser Zentrum Hannover e.V. (Germany) and Hannover Medical School (Germany) . . . [9355-13]

4:40 pm: **Plasmonic cell transfection using micropyramid arrays**, Nabiha Saklayen, Daryl I. Vulis, Marinus Huber, Harvard Univ. (USA); Lauren E. Milling, Univ. of Illinois at Urbana-Champaign (USA); Sebastien Courvoisier, Univ. de Genève (Switzerland); Valeria Nuzzo, ECE PARIS Ecole d'Ingenieurs (France); Eric Mazur, Harvard Univ. (USA) . . . . . [9355-14]

5:00 pm: **Hemifusion of cells using femtosecond laser pulses**, Nir Katchinskiy, Roseline Godbout, Helly R. Goez, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) . . . . . [9321-4]

5:20 pm: **Sorting on the basis of deformability of single cells in a femtosecond laser fabricated optofluidic device**, Francesca Bragheri, Istituto di Fotonica e Nanotecnologie, CNR (Italy); Petra Paiè, Politecnico di Milano (Italy); Tie Yang, Giovanni Nava, Univ. degli Studi di Pavia (Italy); Rebeca Martinez Vàzquez, Politecnico di Milano (Italy); Maira Di Tano, Manuela Veglione, Istituto di Genetica Molecolare, CNR (Italy); Paolo Minzioni, Univ. degli Studi di Pavia (Italy); Chiara Mondello, Istituto di Genetica Molecolare, CNR (Italy); Ilaria Cristiani, Univ. degli Studi di Pavia (Italy); Roberto Osellame, Istituto di Fotonica e Nanotecnologie, CNR (Italy) . . . . . [9355-15]

5:40 pm: **Design, simulation, and fabrication of plasmonic pyramid substrate for cell transfection**, Marinus Huber, Harvard Univ. (USA); Daryl I. Vulis, Harvard School of Engineering and Applied Sciences (USA); Nabiha Saklayen, Harvard Univ. (USA); Sébastien Courvoisier, Jean-Pierre Wolf, Univ. de Genève (Switzerland); Eric Mazur, Harvard School of Engineering and Applied Sciences (USA). . . . . [9355-16]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

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Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

MONDAY 9 FEBRUARY

SESSION 4

LOCATION: ROOM 305 (ESPLANADE) . . . . . MON 9:00 AM TO 9:40 AM

NOTE ROOM CHANGE

Ultrafast Laser Interactions

Session Chair: **E. Duco Jansen,** Vanderbilt Univ. (USA)

9:00 am: **Mechanism of morphological feature formation in the interior of cornea induced by femtosecond laser pulses**, Yizang Guo, Sinisa Vukelic, Columbia Univ. (USA) . . . . . [9321-5]

9:20 am: **Role of molecular photodissociation in ultrafast laser surgery**, Jenny Wang, Stanford Univ. (USA); Georg Schuele, Abbott Medical Optics (USA); Philip Huie, Daniel V. Palanker, Stanford Univ. (USA) . . . . . [9321-6]

SESSION 5

LOCATION: ROOM 305 (ESPLANADE) . . . . . MON 9:40 AM TO 10:20 AM

Photomechanical and Photothermal

Session Chair: **E. Duco Jansen,** Vanderbilt Univ. (USA)

9:40 am: **Temperature dependence of melanosome microcavitation thresholds by single nanosecond laser pulses**, Morgan S. Schmidt, Paul K. Kennedy, Air Force Research Lab. (USA); Gary D. Noojin, TASC, Inc. (USA); Robert J. Thomas, Benjamin A. Rockwell, Air Force Research Lab. (USA) . . . . . [9321-7]

10:00 am: **Two-wavelength approach for control of coagulation depth during laser tissue soldering**, Martin M. Wehner, Mirko Aden, Nina Toedter, Beate Rosenkranz, Fraunhofer-Institut für Lasertechnik (Germany) . . . . . [9321-8]

Coffee Break . . . . . Mon 10:20 am to 10:50 am

SESSION 6

LOCATION: ROOM 305 (ESPLANADE) . . . . . MON 10:50 AM TO 12:10 PM

Photothermal Response I

Session Chair: **E. Duco Jansen,** Vanderbilt Univ. (USA)

10:50 am: **Porcine cadaver iris model for iris heating during corneal surgery with a femtosecond laser**, Hui Sun, Zhongwei Fan, Jiang Wang, Ying Yan, Academy of Opto-Electronics (China); Tibor Juhasz, Ronald M. Kurtz, Univ. of California, Irvine (USA). . . . . [9321-9]

11:10 am: **Improvement of thermal effects to rabbit atherosclerotic aortas by macro pulse irradiation of a quantum cascade laser in the 5.7 µm wavelength range**, Keisuke Hashimura, Katsunori Ishii, Kunio Awazu, Osaka Univ. (Japan) . . . . . [9321-10]

11:30 am: **Brillouin spectroscopy characterizes microscopic viscoelasticity associated with skin injury**, Zhaokai Meng, Andrew J. Traverso, Vladislav V. Yakovlev, Texas A&M Univ. (USA) . . . . . [9321-11]

11:50 am: **Modeling tissue heating under tunable near IR radiation**, Joel N. Bixler, Brett H. Hokr, Texas A&M Univ. (USA); Aaron F. Hoffman, Fort Hays State Univ. (USA); Michael L. Denton, TASC, Inc. (USA); Benjamin A. Rockwell, Air Force Research Lab. (USA); Vladislav V. Yakovlev, Texas A&M Univ. (USA); Robert J. Thomas, Air Force Research Lab. (USA). . . . . [9321-12]

Lunch Break . . . . . Mon 12:10 pm to 1:40 pm

SESSION 7

LOCATION: ROOM 305 (ESPLANADE) . . . . . MON 1:40 PM TO 3:00 PM

Photothermal Response II

Session Chair: **E. Duco Jansen,** Vanderbilt Univ. (USA)

1:40 pm: **Optical properties and laser dose-mortality curves for anopheles stephensi mosquitoes**, Matthew D. Keller, David Leahy, Emma Mullen, Bryan J. Norton, Eric Johanson, Maclen Marvit, Artyom Makagon, Intellectual Ventures Lab. (USA) . . . . . [9321-13]

2:00 pm: **The photothermal effects of 1940nm thulium fiber laser on brain tissue: in vivo dosimetry study**, Burcu Tunç Çamlıbel, Murat Gülsoy, Bogaziçi Üniv. (Turkey). . . . . [9321-14]

2:20 pm: **Evidence of thermal additivity during short laser pulses in an in vitro retinal model**, Michael L. Denton, TASC, Inc. (USA); Amanda J. Tijerina, Conceptual MindWorks, Inc. (USA); Gary D. Noojin, John M. Rickman, TASC, Inc. (USA); Cherry C. Castellanos, Air Force Research Lab. (USA); Phillip N. Dyer, TASC, Inc. (USA); Benjamin A. Rockwell, Robert J. Thomas, Air Force Research Lab. (USA) . . . . . [9321-15]

2:40 pm: **Computational model of heterogeneous heating in melanin**, Jason M. Kellicker, Gregory J. Kowalski, Charles A. DiMarzio, Northeastern Univ. (USA) . . . . . [9321-16]

POSTERS-MONDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . MON 5:30 PM TO 7:30 PM

Conference attendees are invited to attend the BiOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Study optical properties of biological tissue in the presence of microbubbles, Homa Assadi, Vincent Lee, Raffi Karshafian, Ryerson Univ. (Canada); Alexandre Douplik, Ryerson Univ. (Canada) and Erlangen Graduate School in Advanced Optical Technologies (Germany) . . . . . [9321-32]

DNA fragmentation and nuclear phenotype in tendons exposed to low-intensity infrared laser, Flavia de Paoli, Larissa Ramos Cerqueira, Univ. Federal de Juiz de Fora (Brazil); Mayara Martins Ramos, Centro Univ. Serra dos Órgãos (Brazil); Vera M. Campos, Univ. do Estado do Rio de Janeiro (Brazil); Samara C. Ferreira-Machado, Univ. Federal Fluminense (Brazil); Mauro Geller, Centro Univ. Serra dos Órgãos (Brazil); Adenilson Souza da Fonseca, Univ. do Estado do Rio de Janeiro (Brazil) and Centro Univ. Serra dos Órgãos (Brazil) . . . . . [9321-33]

Effects of formalin fixation on tissue optical properties of in vitro brain samples, Suresh Anand, European Lab. for Non-linear Spectroscopy (Italy); Riccardo Cicchi, Istituto Nazionale di Ottica, CNR (Italy) and European Lab. for Non-Linear Spectroscopy (Italy) and Univ. degli Studi di Firenze (Italy); Fabrizio Martelli, Univ. degli Studi di Firenze (Italy); Flavio Giordano, Azienda Ospedaliera Univ. Anna Meyer (Italy); Anna Maria Buccoliero, Renzo Guerrini, Univ. degli Studi di Firenze (Italy); Francesco S. Pavone, European Lab. for Non-linear Spectroscopy (Italy) and Istituto Nazionale di Ottica, CNR (Italy) and Univ. degli Studi di Firenze (Italy) . . . . . [9321-34]

Dynamics of water-mediated hard dental tissue ablation with Ho:YAG laser visualized by high speed photography, Zhenlin Zhan, Chuanguo Chen, Xuwei Li, Fujian Normal Univ. (China) . . . . . [9321-35]

Photobiostimulation effects of low-level laser irradiation on chondrocyte proliferation in different concentration of fetal bovine serum, Liqin Zheng, Fujian Normal Univ. (China). . . . . [9321-36]

Assessment of ultra-high resolution optical coherence tomography for monitoring tissue effects caused by laser photocoagulation of ex-vivo porcine retina, Patrick Steiner, Univ. Bern (Switzerland); Volker Enzmann, Sebastian Wolf, Inselspital Bern (Switzerland); Anke Bossen, Christoph Meier, Berner Fachhochschule Technik und Informatik (Switzerland); Raphael Sznitman, ARTORG Center, University of Bern (Switzerland) and Department of Ophthalmology, Inselspital (Switzerland) . . . . . [9321-37]

Optical cryoimaging of rat kidney and the protective effect of chromosome 13 in salt-induced hypertension, Fahimeh Salehpour, Mahsa Ranji, Univ. of Wisconsin-Milwaukee (USA); Allen W. Cowley Jr., Chun Yang, Theresa Kurth, Medical College of Wisconsin (USA). . . . . [9321-38]

Low-intensity infrared laser effects on zymosan-induced articular inflammatory response, Lúcia Mara Januário dos Anjos, Univ. Federal de Juiz de Fora (Brazil); Adenilson Souza da Fonseca, Univ. do Estado do Rio de Janeiro (Brazil); Jacy Gameiro, Flávia de Paoli, Univ. Federal de Juiz de Fora (Brazil) . . . . . [9321-39]

Adipose tissue ablation efficiency measurement for mid-infrared laser-assisted lipolysis, Bongkyun Kim, Jin-Chul Ahn , Phil-Sang Chung, Dankook Univ. (Korea, Republic of) . . . . . [9321-40]

Optical characterization of pancreatic normal and tumor tissues with double integrating sphere system, Tugba Kiris, Saadet Akbulut, Aysenur Kiris, Fatih Univ. (Turkey); Zuhal Gücin, Bezmialem Foundation Univ. (Turkey); Oguzhan Karatepe, Medipol Univ. Hospital (Turkey); Burcu Tunç Çamlıbel, Boğaziçi Üniv. (Turkey); Hasim Özgür Tabakoglu, Fatih Univ. (Turkey) . [9321-41]

CONFERENCE 9321
LOCATION: ROOM 305 (ESPLANADE)

TUESDAY 10 FEBRUARY

SESSION 8

LOCATION: ROOM 305 (ESPLANADE) . . . . . TUE 8:30 AM TO 12:00 PM

Photochemical and Cellular Bio-response

Session Chair: **Randolph D. Glickman,** The Univ. of Texas Health Science Ctr. at San Antonio (USA)

8:30 am: **Cytotoxicity change with albumin binding of Talaporfin sodium in extracellular photosensitization reaction on cardiomyocyte**, Emiyu Ogawa, Sayaka Motohashi, Tsunenori Arai, Graduate School, Keio Univ. (Japan). . . . . [9321-17]

8:50 am: **Photoinduced conformational changes to porphyrin-bound albumin reduces albumin binding to Osteonectin**, Sarah C. Rozinek, The Univ. of Texas at San Antonio (USA) and Air Force Research Lab. (USA); Robert J. Thomas, Air Force Research Lab. (USA); Lorenzo Brancaleon, The Univ. of Texas at San Antonio (USA). . . . . [9321-18]

9:10 am: **Evaluation of cell killing effect by PDT with different beam profiles to investigate efficient therapeutic condition**, Hitomi Yabe, Hisanao Hazama, Norihiro Honda, Osaka Univ. (Japan); Takuya Ishii, Katsushi Inoue, Masahiro Ishizuka, Tohru Tanaka, SBI Pharmaceuticals Co., Ltd. (Japan); Kunio Awazu, Osaka Univ. (Japan) . . . . . [9321-19]

9:30 am: **Origins of intracellular calcium mobilization evoked by infrared laser stimulation**, Cory A. Olsovsky, Texas A&M Univ. (USA); Gleb P. Tolstykh, General Dynamics Information Technology (USA); Bennett L. Ibey, Hope T. Beier, Air Force Research Lab. (USA) . . . . . [9321-20]

9:50 am: **Raman spectroscopy for the exploration of lipid peroxidation from electromagnetic exposure**, Maria A. Troyanova-Wood, Texas A&M Univ. (USA); Gary L. Thompson, Oak Ridge Institute for Science & Education (USA); Bennett L. Ibey, Hope T. Beier, Air Force Research Lab. (USA) . . . . . [9321-21]

Coffee Break . . . . . Tue 10:10 am to 10:40 am

10:40 am: **Time response of electrical conduction block in novel cardiomyocyte wire by extra-cellular photosensitization reaction at various irradiances**, Mariko Kurotsu, Emiyu Ogawa, Graduate School, Keio Univ. (Japan); Tsunenori Arai, Keio Univ. (Japan). . . . . [9321-22]

11:00 am: **Terahertz spectroscopy and detection of brain tumor in rat fresh-tissue samples**, Sayuri Yamaguchi, Canon Inc. (Japan); Yasuko Fukushi, Hamamatsu Univ. School of Medicine (Japan); Oichi Kubota, Takeaki Itsuji, Canon Inc. (Japan); Seiji Yamamoto, Hamamatsu Univ. School of Medicine (Japan); Toshihiko Ouchi, Canon Inc. (Japan). . . . . [9321-23]

11:20 am: **Investigation of the effects of low- and high-power 2.52 THz radiation on human keratinocytes**, Cesario Z. Cerna, General Dynamics Advanced Information Systems (USA); David P. Elam, Consortium Research Fellows Program (USA); Mark A. Sloan, General Dynamics Advanced Information Systems (USA); Ibey L. Bennet, Air Force Research Lab. (USA); Ibtissam Echchgadda, General Dynamics Advanced Information Systems (USA) . . . . . [9321-24]

11:40 am: **Effects of different terahertz frequencies on gene expression in human keratinocytes**, Ibtissam Echchgadda, Cesario Z. Cerna, Mark A. Sloan, General Dynamics Advanced Information Systems (USA); David P. Elam, Consortium Research Fellows Program (USA); Bennet L. Ibey, Air Force Research Lab. (USA) . . . . . [9321-25]

Lunch Break . . . . . Tue 12:00 pm to 1:30 pm

SESSION 9

LOCATION: ROOM 305 (ESPLANADE) . . . . . TUE 1:30 PM TO 3:30 PM

Optical Properties, Spectroscopy, and Imaging

Session Chair: **Jessica C. Ramella-Roman,** The Catholic Univ. of America (USA)

1:30 pm: **Optical clearing of the mouse brain and light attenuation quantitation**, Angela M. d'Esposito, Daniil I. Nikitichev, Simon Walker-Samuel, Adrien E. Desjardins, Mark F. Lythgoe, Univ. College London (United Kingdom) . . . . . [9321-26]

1:50 pm: **Simulation and measurement of transcranial near infrared light penetration**, Lan Yue, The Univ. of Southern California (USA); Manuel Monge, California Institute of Technology (USA); Mehmet H. Ozgur, Stan Louie, Carol Miller, The Univ. of Southern California (USA); Azita Emami, California Institute of Technology (USA); Mark S. Humayun, The Univ. of Southern California (USA) . . . . . [9321-27]

2:10 pm: **Comparison of Monte Carlo ray optics method and Lorenz-Mie theory for study of scattering of a focused laser beam in Zebrafish brain**, Itia A. Favre-Bulle, The Univ. of Queensland (Australia) . . . . . [9321-28]

2:30 pm: **Calculating optical properties of specific structure inside tissue using transmission electron microscopy (TEM)**, Wenli Wu, Andrew J. Radosevich, The-Quyen Nguyen, Scott T. Young, Yue Li, Adam Eshein, Graham Spicer, Northwestern Univ. (USA); Hemant K. Roy, Boston Univ. (USA); Vadim Backman, Northwestern Univ. (USA) . . . . . [9321-29]

2:50 pm: **Measurement of the absorption coefficient of biological materials using integrating cavity ring-down spectroscopy**, Joel N. Bixler, Michael T. Cone, John D. Mason, Eleonora Figueroa, Brett H. Hokr, Texas A&M Univ. (USA); Jeffrey C. Wigle, Benjamin A. Rockwell, Air Force Research Lab. (USA); Vladisslav V. Yakovlev, Edward S. Fry, Texas A&M Univ. (USA) . . . . . [9321-30]

3:10 pm: **Use of extended source model to predict spatially resolved diffuse reflectance close to the source for semi-infinite medium**, Pankaj Singh, Prabodh Kumar Pandey, Asima Pradhan, Indian Institute of Technology Kanpur (India). . . . . [9321-31]

CONFERENCE 9322
LOCATION: ROOM 258 (MEZZANINE)

Saturday–Sunday 7–8 February 2015 • Proceedings of SPIE Vol. 9322

BIOS

Dynamics and Fluctuations in Biomedical Photonics XII

Conference Chairs: **Valery V. Tuchin,** N.G. Chernyshevsky Saratov State Univ. (Russian Federation), Univ. of Oulu {Finland); **Kirill V. Larin,** Univ. of Houston (USA); **Martin J. Leahy,** National Univ. of Ireland, Galway (Ireland); **Ruikang K. Wang,** Univ. of Washington (USA)

Program Committee: **Pierre O. Bagnaninchi,** The Univ. of Edinburgh (United Kingdom); **Wei R. Chen,** Univ. of Central Oklahoma (USA); **Joseph P. Culver,** Washington Univ. School of Medicine in St. Louis (USA); **Ekaterina I. Galanzha,** Univ. of Arkansas for Medical Sciences (USA); **Miya Ishihara,** National Defense Medical College (Japan); **Jingying Jiang,** Tianjin Univ. (China); **Sean J. Kirkpatrick,** Michigan Technological Univ. (USA); **Jürgen M. Lademann,** Charité Universitätsmedizin Berlin (Germany); **Hong Liu,** The Univ. of Oklahoma (USA); **Qingming Luo,** Huazhong Univ. of Science and Technology (China); **Igor V. Meglinski,** Univ. of Otago (New Zealand); **Brian S. Sorg,** Univ. of Florida (USA); **Vladislav Toronov,** Ryerson Univ. (Canada); **Lihong V. Wang,** Washington Univ. in St. Louis (USA); **Ying Yang,** Keele Univ. (United Kingdom); **Anna N. Yaroslavsky,** Univ. of Massachusetts Lowell (USA); **Vladimir P. Zharov,** Univ. of Arkansas for Medical Sciences (USA); **Dan Zhu,** Huazhong Univ. of Science and Technology (China)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 258 (MEZZANINE) . . . . . SAT 8:00 AM TO 10:30 AM

Speckle Technologies

Session Chair: **Ruikang K. Wang,** Univ. of Washington (USA)

8:00 am: **Multi-modal imaging approach for functional quantitative visualization of acute vascular reaction** *(Invited Paper)*, Vyacheslav Kalchenko, Yuri Kuznetsov, Weizmann Institute of Science (Israel); Igor V. Meglinski, Univ. of Otago (New Zealand); Alon Harmelin, Weizmann Institute of Science (Israel) . . . . . [9322-1]

8:30 am: **Nematic liquid crystal spatial light modulator for mimicking laser speckle contrast imaging**, Mitchell Kirby, Kosar Khaksari, Sean J. Kirkpatrick, Michigan Technological Univ. (USA) . . . . . [9322-2]

8:50 am: **Alternative contrast mechanisms in optical coherence tomography: speckle temporal synchronization effects**, Valentin Demidov, I. Alex Vitkin, Univ. of Toronto (Canada) . . . . . [9322-3]

9:10 am: **Compact, transmission-based speckle sensor for clinical assessment of peripheral blood circulation and vascular tone**, Tyler B. Rice, Laser Associated Sciences, LLC (USA) and Beckman Laser Institute (USA); Sean M. White, Bruce Yang, Laser Associated Sciences, LLC (USA); Pietro R. Galassetti, Univ. of California (USA) . . . . . [9322-4]

9:30 am: **Bayesian analysis of the OCT-based dynamic light scattering signal for improved directional velocimetry**, Kevin C. Zhou, Brendan K. Huang, Michael A. Choma, Yale Univ. (USA) . . . . . [9322-5]

9:50 am: **3D reconstruction of live mammalian embryo vasculature using sparsity-integrated speckle anomaly detection and speckle variance OCT**, Narendran Sudheendran, Univ. of Houston (USA) . . . . . [9322-52]

10:10 am: **Full-field interferometric confocal microscopy for the phase-sensitive quantification of axial and lateral/transverse motion**, Ikbal Sencan, Brendan K. Huang, Brandon Redding, Hui Cao, Michael A. Choma, Yale Univ. (USA) . . . . . [9322-8]

Coffee Break . . . . . .Sat 10:30 am to 11:00 am

SESSION 2

LOCATION: ROOM 258 (MEZZANINE) . . . . . SAT 11:00 AM TO 12:30 PM

Tissue and Cell Dynamics I

Session Chair: **Kirill V. Larin,** Univ. of Houston (USA)

11:00 am: **Tracing red blood cells in human capillary automatically by third harmonic generation microscopy**, Guan-Liang Lin, Chien-Ming Lee, Yuan-Ta Shih, Ming-Rung Tsai, Chi-Kuang Sun, National Taiwan Univ. (Taiwan) . . . . . [9322-9]

11:20 am: **RBC aggregation based system for long-term photoplethysmography (PPG): new prospects for PPG applications** *(Invited Paper)*, Leonid D. Shvartsman, The Hebrew Univ. of Jerusalem (Israel); Boris Tverskoy, Oxirate, Inc. (USA) . . . . . [9322-10]

11:50 am: **Quantitative assessment of the elasticity change in hyaline cartilage during optical clearing using optical coherence elastography**, Chih Hao Liu, Rita Idugboe, Jiasong Li, Manmohan Singh, Zhaolong Han, Wu Chen, Shang Wang, Thomas Hsu, Valery P. Zakharov, Emil N. Sobol, Valery V. Tuchin, Michael D. Twa, Kirill V. Larin, Univ. of Houston (USA) . . . . . [9322-11]

12:10 pm: **Characterizing the micro structural and kinetics of fast changing samples by simultaneous polarization measurements**, Ran Liao, Honghui He, Nan Zeng, Hui Ma, Graduate School at Shenzhen, Tsinghua Univ. (China) . . . . . [9322-51]

Lunch Break . . . . . .Sat 12:30 pm to 2:00 pm

SESSION 3

LOCATION: ROOM 258 (MEZZANINE) . . . . . SAT 2:00 PM TO 5:10 PM

Tissue and Cell Dynamics II

Session Chair: **Valery V. Tuchin,** N.G. Chernyshevsky Saratov State Univ. (Russian Federation)

2:00 pm: **Analysis of the penetration of nanoparticles into the hair follices by laser scanning microscopy** *(Invited Paper)*, Juergen M. Lademann, Charité Universitätsmedizin Berlin (Germany) . . . . . [9322-12]

2:30 pm: **Effect of speckle decorrelation on the application of optical phase conjugation (OPC) in biological tissue**, Haowen Ruan, Mooseok Jang, California Institute of Technology (USA); Euiheon Chung, Gwangju Institute of Science and Technology (Korea, Republic of); Ivo M. Vellekoop, Univ. Twente (Netherlands); Benjamin Judkewitz, Charité Universitätsmedizin Berlin (Germany) and California Institute of Technology (USA); Changhuei Yang, California Institute of Technology (USA) . . . . . [9322-13]

2:50 pm: **Monitoring of interaction of low frequency electric field with biological tissues upon optical clearing with optical coherence tomography**, Adrian F. Peña Delgado, Alexander Doronin, Univ. of Otago (New Zealand); Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Igor V. Meglinski, Univ. of Otago (New Zealand) . . . . . [9322-14]

3:10 pm: **Application of new optical coherence elastography to monitor the mineralization processing in bone tissue engineering constructs**, Guangying Guan, Shaozhen Song, Zhihong Huang, Univ. of Dundee (United Kingdom); Ying Yang, Keele Univ. (United Kingdom) . . . . . [9322-15]

Coffee Break . . . . . .Sat 3:30 pm to 4:00 pm

4:00 pm: **Towards non-invasive 3D hepatotoxicity assays with optical coherence phase microscopy**, Leonard Nelson, Andreas Koulovasilopoulos, Philipp Treskes, John Plevris, Pierre O. Bagnaninchi, The Univ. of Edinburgh (United Kingdom). . . . . [9322-16]

4:20 pm: **S-transform based approach for probing refractive index fluctuations in connective tissues for precancer detection**, Sabyasachi Mukhopadhyay, Indian Institute of Science Education and Research Kolkata (India); Asima Pradhan, Indian Institute of Technology Kanpur (India); Nirmalya Ghosh, Prasanta K. Panigrahi, Indian Institute of Science Education and Research Kolkata (India) . . . . . [9322-17]

4:40 pm: **Nanoporous gold disks for photothermal light harvesting and light-gated molecular release** *(Invited Paper)*, Wei-Chuan Shih, Greggy M. Santos, Univ. of Houston (USA) . . . . . [9322-18]

CONFERENCE 9322
LOCATION: ROOM 258 (MEZZANINE)

BIOS HOT TOPICS
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 4
LOCATION: ROOM 258 (MEZZANINE) . . . . . SUN 8:00 AM TO 9:20 AM

Clinical Imaging and Evaluation
Session Chair: **Juergen M. Lademann,** Charité Universitätsmedizin Berlin (Germany)

8:00 am: **Investigation of diseases through red blood cells' shape using photoacoustic response technique**, Deblina Biswas, Abhijeet Gorey, Indian Institute of Technology Indore (India); George C. K. Chen, BC Photonics Technological Co. (Canada); Norman Sharma, Choitram Hospital and Research Ctr. (India); Srivathsan Vasudevan, Indian Institute of Technology Indore (India) . . . . . [9322-19]

8:20 am: **Correlation mapping microscopy**, James McGrath, Sergey A. Alexandrov, National Univ. of Ireland, Galway (Ireland); Martin J. Leahy, National Univ. of Ireland, Galway (Ireland) and Royal College of Surgeons (Ireland) . . . . . [9322-20]

8:40 am: **Parametric imaging of viscoelastic creep deformation in soft tissue using compression optical coherence elastography**, Philip Wijesinghe, Robert A. McLaughlin, David D. Sampson, Brendan F. Kennedy, The Univ. of Western Australia (Australia) . . . . . [9322-21]

9:00 am: **In vivo imaging of microvascular changes within inflammatory human skin induced by tape stripping and mosquito saliva using optical microangiography**, Utku Baran, Woo June Choi, Ruikang K. Wang, Univ. of Washington (USA) . . . . . [9322-22]

SESSION 5
LOCATION: ROOM 258 (MEZZANINE) . . . . . SUN 9:20 AM TO 10:30 AM

Optical Clearing and Biomechanics
Session Chair: **Kirill V. Larin,** Univ. of Houston (USA)

9:20 am: **Full skin quantitative optical coherence elastography achieved by combining vibration and surface acoustic wave methods**, Chunhui Li, Guangying Guan, Zhihong Huang, Ghulam Nabi, Univ. of Dundee (United Kingdom) . . . . . [9322-23]

9:40 am: **Optical clearing kinetic of deep-tissue imaging enhancement mediated by upconversion phosphors**, Alexey P. Popov, Univ. of Oulu (Finland); Eugeny V. Khaydukov, Institute on Laser and Information Technologies (Russian Federation); Alexander V. Bykov, Univ. of Oulu (Finland); Semchishen A. Vladimir, Institute on Laser and Information Technologies (Russian Federation); Artashes V. Karmenyan, National Yang-Ming Univ. (Taiwan); Valery V. Tuchin, Univ. of Oulu (Finland) and N.G. Chernyshevsky Saratov State Univ. (Russian Federation) and Institute of Precise Mechanics and Control (Russian Federation) . . . . . [9322-24]

10:00 am: **Tissue optical clearing window for microvessel and blood flow imaging** *(Invited Paper)*, Dan Zhu, Huazhong Univ. of Science and Technology (China) . . . . . [9322-25]

Coffee Break . . . . . Sun 10:30 am to 11:00 am

SESSION 6
LOCATION: ROOM 258 (MEZZANINE) . . . . . SUN 11:00 AM TO 12:10 PM

Functional Imaging and Spectroscopy
Session Chair: **Martin J. Leahy,** National Univ. of Ireland, Galway (Ireland)

11:00 am: **Bedside optical imaging for personal health monitoring** *(Invited Paper)*, Bruce J. Tromberg, Beckman Laser Institute and Medical Clinic (USA) . . . . . [9322-26]

11:40 am: **The role of camera and illumination choices in absolute blood velocity measurements** *(Invited Paper)*, Jessica C. Ramella-Roman, Stephen Winhoven, Florida International Univ. (USA) . . . . . [9322-29]

Lunch Break . . . . . Sun 12:10 pm to 2:20 pm

SESSION 7
LOCATION: ROOM 258 (MEZZANINE) . . . . . SUN 2:20 PM TO 4:50 PM

Cerebral Haemodynamics
Session Chair: **Anna N. Yaroslavsky,** Univ. of Massachusetts Lowell (USA)

2:20 pm: **Dynamic in-vivo optical imaging and microscopy of the living brain** *(Invited Paper)*, Elizabeth M. Hillman, Columbia Univ. (USA) . . . . . [9322-30]

3:00 pm: **Effects of combined scattering and absorption coefficients on laser speckle contrast imaging values**, Kosar Khaksari, Sean J. Kirkpatrick, Michigan Technological Univ. (USA) . . . . . [9322-31]

Coffee Break . . . . . Sun 3:20 pm to 3:50 pm

3:50 pm: **Investigation of the red blood cells flux change during hypercapnia in the rat brain with optical coherence tomography**, Baoqiang Li, Ecole Polytechnique de Montréal (Canada); Jonghwan Lee, David A. Boas, Massachusetts General Hospital/Harvard Medical School (USA); Frédéric Lesage, Ecole Polytechnique de Montréal (Canada) . . . . . [9322-33]

4:10 pm: **Depth resolved perfusion measurements using multi-distance diffuse correlation spectroscopy in conjunction with a Monte Carlo realistic multi-layer correlation transport model**, Stefan A. Carp, Erin M. Buckley, Massachusetts General Hospital (USA); Daniel S. Yang, Woodbridge High School (USA); David A. Boas, Suk-Tak Chen, Karleyton C. Evans, Juliette J. Selb, Massachusetts General Hospital (USA) . . . . . [9322-34]

4:30 pm: **Detecting brain cancer at the cellular level**, Anna N. Yaroslavsky, Xin Feng, Univ. of Massachusetts Lowell (USA); Yulian Ramirez, Univ. of Massachusetts Medical School (USA); Ying-Ying Huang, Massachusetts General Hospital (USA); Alonzo Ross, Univ. of Massachusetts Medical School (USA); Michael R. Hamblin, Massachusetts General Hospital (USA) . . . [9322-50]

POSTERS-SUNDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Measurement of total velocity components of particle flow with optical coherence tomography, Hongxian Zhou, Northeastern Univ. at Qinhuangdao (China); Zhenhe Ma, Northeastern University (China); Yi Wang, Northeastern Univ. at Qinhuangdao (China) . . . . . [9322-6]

Quantitative analyses of spectral measurement error based on Monte-Carlo simulation, Jingying Jiang, Congcong Ma, Qi Zhang, Junsheng Lu, Tianjin Univ. (China); Kexin Xu, Tianjin Univ. (China) and State Key Lab. of Precision Measuring Technology and Instruments (China) . . . . . [9322-27]

SIFT-based error compensation for ear feature matching and recognition system, Jingying Jiang, Qi Zhang, Congcong Ma, Junsheng Lu, Kexin Xu, Tianjin Univ. (China) . . . . . [9322-28]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their groundbreaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9323
LOCATION: ROOM 306 (ESPLANADE)

Sunday–Tuesday 8–10 February 2015 • Proceedings of SPIE Vol. 9323

Photons Plus Ultrasound: Imaging and Sensing 2015

Conference Chairs: **Alexander A. Oraevsky,** TomoWave Laboratories, Inc. (USA); **Lihong V. Wang,** Washington Univ. in St. Louis (USA)

Program Committee: **Mark A. Anastasio,** Washington Univ. in St. Louis (USA); **Paul C. Beard,** Univ. College London (United Kingdom); **A. Claude Boccara,** Institut Langevin (France); **Stanislav Y. Emelianov,** The Univ. of Texas at Austin (USA); **Rinat O. Esenaliev,** The Univ. of Texas Medical Branch (USA); **Martin Frenz,** Univ. Bern (Switzerland); **Pai-Chi Li,** National Taiwan Univ. (Taiwan); **Andreas Mandelis,** Univ. of Toronto (Canada); **Vasilis Ntziachristos,** Helmholtz Zentrum München GmbH (Germany); **Matthew O'Donnell,** Univ. of Washington (USA); **Günther Paltauf,** Karl-Franzens-Univ. Graz (Austria); **Wiendelt Steenbergen,** Univ. Twente (Netherlands); **William M. Whelan,** Univ. of Prince Edward Island (Canada); **Vladimir P. Zharov,** Univ. of Arkansas for Medical Sciences (USA); **Qifa Zhou,** The Univ. of Southern California (USA); **Quing Zhu,** Univ. of Connecticut (USA)

SUNDAY 8 FEBRUARY

SESSION 1

LOCATION: ROOM 306 (ESPLANADE) . . . . . .SUN 8:00 AM TO 10:00 AM

Clinical Applications

Session Chairs: **Alexander A. Oraevsky,** TomoWave Laboratories, Inc. (USA); **Lihong V. Wang,** Washington Univ. in St. Louis (USA)

8:00 am: **Monitoring cerebral venous blood oxygenation in neonates with a medical-grade optoacoustic system**, Rinat O. Esenaliev, Irene Y. Petrov, Rafael A. Fonseca, Yuriy Petrov, Karon E. Wynne, Donald S. Prough, Andrey Petrov, C. Joan Richardson, The Univ. of Texas Medical Branch (USA) . [9323-1]

8:15 am: **Wavelength optimization for in vivo multispectral photoacoustic tomography of hemoglobin oxygenation in ovarian cancer: clinical studies**, Hassan S. Salehi, Hai Li, Patrick D. Kumavor, Quing Zhu, Univ. of Connecticut (USA) . . . . . [9323-2]

8:30 am: **Deep melanoma in vivo imaging by a handheld photoacoustic microscope**, Yong Zhou, Wenxin Xing, Konstantin I.. Maslov, Washington Univ. in St. Louis (USA); Lynn A. Cornelius, Washington Univ. School of Medicine in St. Louis (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) . . [9323-3]

8:45 am: **Real-time dual modality ultrasound/photoacoustic in-vivo imaging with a portable system**, Pim J. van den Berg, Khalid Daoudi, Univ. Twente (Netherlands); Hein J. Bernelot Moens, Hospital Group Twente (Netherlands); Peter J. Brands, Esaote Europe B.V. (Netherlands); Wiendelt Steenbergen, Univ. Twente (Netherlands) . . . . . [9323-4]

9:00 am: **Investigation of deep clinical OA imaging of large blood vessels in the neck, abdomen and limbs**, Michael Jaeger, Martin Frenz, Univ. Bern (Switzerland) . . . . . [9323-5]

9:15 am: **Clinical study of ex vivo photoacoustic imaging in endoscopic mucosal resection tissues**, Liang Lim, Princess Margaret Cancer Ctr., Univ. Health Network (Canada); Catherine J. Streutker, Norman E. Marcon, Maria Cirocco, Vladimir V. Iakovlev, St. Michael's Hospital (Canada); Ralph DaCosta, Ontario Cancer Institute (Canada); F. Stuart Foster, Sunnybrook Health Sciences Ctr. (Canada); Brian C. Wilson, Princess Margaret Cancer Ctr., Univ. Health Network (Canada) . . . . . [9323-14]

9:30 am: **Optoacoustic monitoring of real-time lesion formation during radiofrequency catheter ablation**, Genny A. Pang, Erwin Bay, Xosé Luis Deán-Ben, Daniel Razansky, Helmholtz Zentrum München GmbH (Germany) . [9323-6]

9:45 am: **Recent advances in clinical application of photoacoustic flow cytometry for detection of circulating tumor cells and clots in vivo and ex vivo**, Vladimir P. Zharov, Yulian Menyaev, Mazen A. Juratli, Mustafa Sarimollaoglu, Dmitry A. Nedosekin, Ekaterina I. Galanzha, James Y. Suen, Laura F. Hutchins, Univ. of Arkansas for Medical Sciences (USA) . . . . . [9323-7]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 2

LOCATION: ROOM 306 (ESPLANADE) . . . . . SUN 10:30 AM TO 12:00 PM

Preclinical Research

Session Chair: **Matthew O'Donnell,** Univ. of Washington (USA)

10:30 am: **Photoacoustic imaging of single circulating melanoma cells in vivo**, Lidai Wang, Junjie Yao, Ruiying Zhang, Guo Li, Washington Univ. in St. Louis (USA); Jun Zou, Texas A&M Univ. (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-9]

10:45 am: **Optimizing the optical wavelength for the photoacoustic imaging of inflammatory arthritis**, Guan Xu, Univ. of Michigan Medical School (USA); Jack Hu, Univ. of Michigan (USA); Gandikota Girish, Univ. of Michigan Medical School (USA); Sheeja? Francis, Univ. of Michigan (USA); Jie Yuan, Nanjing Univ. (China); Xueding Wang, Univ. of Michigan Medical School (USA) . . . . . [9323-10]

11:00 am: **Quantifying bone thickness, light transmission, and contrast interrelationships in transcranial photoacoustic imaging**, Muyinatu A. Lediju Bell, Anastasia K. Ostrowski, Peter Kaanzides, Johns Hopkins Univ. (USA); Emad M. Boctor, Johns Hopkins Outpatient Ctr. (USA) . . . . . [9323-11]

11:15 am: **Developing a clinically translatable light-enhanced transesophageal echocardiography system for monitoring mixed venous oxygen saturation in vivo**, Li Li, Balachundhar Subramaniam, Harvard Medical School (USA); Brett Simon, Beth Israel Deaconess Medical Ctr. (USA); Guillermo J. Tearney, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine (USA) . . . . . [9323-12]

11:30 am: **High-resolution multispectral photoacoustic tomography of human lymph nodes based on multiple sources of intrinsic contrast**, James A. Guggenheim, Thomas J. Allen, Univ. College London (United Kingdom); Andrew Plumb, Univ. College London (United Kingdom) and Univ. College London Hospitals NHS Foundation Trust (United Kingdom); Edward Z. Zhang, Univ. College London (United Kingdom); Manuel Rodriguez-Justo, Shonit Punwani, Univ. College London (United Kingdom) and Univ. College London Hospitals NHS Foundation Trust (United Kingdom); Paul C. Beard, Univ. College London (United Kingdom) . . . . . [9323-13]

11:45 am: **Photoacoustic (PA) tomography of a fluorescent contrast agent and genetically expressed proteins using excited state lifetime modulation**, Julia Märk, Hakan Dortay, Franz-Josef Schmitt, Technische Univ. Berlin (Germany); Jan G. Laufer, Technische Univ. Berlin (Germany) and Charité - Universitätsmedizin Berlin (Germany) . . . . . [9323-126]

Lunch Break . . . . . Sun 12:00 pm to 1:30 pm

SESSION 3

LOCATION: ROOM 306 (ESPLANADE) ..... SUN 1:30 PM TO 3:15 PM

Animal Models

Session Chairs: **Vasilis Ntziachristos,** Helmholtz Zentrum München GmbH (Germany); **Alexander A. Oraevsky,** TomoWave Laboratories, Inc. (USA)

1:30 pm: **Photoacoustic imaging with internal illumination**, Li Lin, Jun Xia, Terence T. W. Wong, Ruiying Zhang, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-15]

1:45 pm: **Retrospective respiration-gated whole-body photoacoustic computed tomography of mice**, Jun Xia, Wanyi Chen, Konstantin I. Maslov, Mark A. Anastasio, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-16]

2:00 pm: **Isotropic-resolution linear-array-based photoacoustic computed tomography through inverse radon transformation**, Guo Li, Jun Xia, Lei Li, Lidai Wang, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . [9323-17]

2:15 pm: **Evaluation of multispectral optoacoustic tomography (MSOT) performance in vitro and in vivo**, James Joseph, Univ. of Cambridge (United Kingdom); Kaisar Dauyey, Univ. of Cambridge (United Kingdom) and Nazarbayev Univ. (Kazakhstan); Fiona J. E. Morgan, Univ. of Cambridge (United Kingdom); Sarah E. Bohndiek, Univ. of Cambridge (United Kingdom) and Cancer Research UK Cambridge Institute (United Kingdom) and CRUK & EPSRC Cancer Imaging Ctr. in Cambridge and Manchester (United Kingdom) . [9323-18]

2:30 pm: **In vivo label-free imaging of mouse femoral nerve by multispectral photoacoustic tomography**, Rui Li, Evan Phillips, Pu Wang, Craig J. Goergen, Ji-Xin Cheng, Purdue Univ. (USA) . . . . . [9323-19]

2:45 pm: **Label free ultrasound-guided spectroscopic photoacoustic imaging of lymph node micrometastases**, Geoffrey P. Luke, The Univ. of Texas at Austin (USA) and The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) and The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) . . . . . [9323-20]

3:00 pm: **Label-free structural photoacoustic tomography of intact mouse brain**, Lei Li, Jun Xia, Guo Li, Alejandro Garcia-Uribe, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-21]

Coffee Break . . . . . Sun 3:15 pm to 3:45 pm

SESSION 4

LOCATION: ROOM 306 (ESPLANADE) ..... SUN 3:45 PM TO 6:00 PM

Dual Modality Systems

Session Chairs: **Martin Frenz,** Univ. Bern (Switzerland); **Quing Zhu,** Univ. of Connecticut (USA)

3:45 pm: **Three-dimensional laser optoacoustic and laser ultrasound imaging system for biomedical research (LOUIS-3DM)**, Sergey A. Ermilov, Richard Su, Tanmayi Oruganti, TomoWave Laboratories, Inc. (USA); Kun Wang, Fatima Anis, Mark A. Anastasio, Washington Univ. in St. Louis (USA); Alexander A. Oraevsky, TomoWave Laboratories, Inc. (USA) . . . . . [9323-22]

4:00 pm: **Multimodal imaging of cancer tissues in liver samples and of vascular structure on rat brain using acousto-optical imaging**, Kevin Contreras, Jean-Baptiste Laudereau, Institut Langevin (France); Vincent Servois, Pascale Mariani, Institut Curie (France); Alexander A. Grabar, Uzhgorod National Univ. (Ukraine); Ivan Cohen, Univ. Pierre et Marie Curie (France); Mikael Tanter, Jean-Luc Gennisson, François Ramaz, Institut Langevin (France) . . . . . [9323-23]

4:15 pm: **Ultrasound-aided multi-parametric transcranial photoacoustic microscopy of the mouse brain**, Bo Ning, Adam J. Dixon, James Bonaffini, Matthew J. Kennedy, Rui Cao, Univ. of Virginia (USA); Ruimin Chen, Qifa Zhou, Koping Kirk Shung, The Univ. of Southern California (USA); John A. Hossack, Song Hu, Univ. of Virginia (USA) . . . . . [9323-24]

4:30 pm: **In vivo photoacoustic / optical coherence tomography imaging: human skin pathologies and their relation to subcutaneous vascular abnormalities**, Behrooz Zabihian, Jessika Weingast, Mengyang Liu, Boris Hermann, Medizinische Univ. Wien (Austria); Edward Z. Zhang, Paul C. Beard, Univ. College London (United Kingdom); Hubert Pehamberger, Wolfgang Drexler, Medizinische Univ. Wien (Austria) . . . . . [9323-25]

4:45 pm: **Dual modality investigation of bone pathologies using quantitative ultrasound and photoacoustics**, Idan Steinberg, Tel Aviv Univ. (Israel); Israel Gannot, Tel Aviv Univ. (Israel) and Johns Hopkins Univ. (USA); Avishay Eyal, Tel Aviv Univ. (Israel) . . . . . [9323-26]

5:00 pm: **Real-time sono-photoacoustic imaging of gold nanoemulsions**, Bastien Arnal, Chen-Wei Wei, Camilo Perez, Thu-Mai Nguyen, Michael Lombardo, Univ. of Washington (USA); Ivan M. Pelivanov, Univ. of Washington (USA) and Moscow State Univ. (Russian Federation); Lilo D. Pozzo, Matthew O'Donnell, Univ. of Washington (USA) . . . . . [9323-27]

5:15 pm: **Cyclic magnetomotive photoacoustic/ultrasound imaging**, Bastien Arnal, Chen-Wei Wei, Thu-Mai Nguyen, Junwei Li, Univ. of Washington (USA); Ivan M. Pelivanov, Univ. of Washington (USA) and Moscow State Univ. (USA); Xiaohu Gao, Matthew O'Donnell, Univ. of Washington (USA) . . . . . [9323-28]

5:30 pm: **Photoacoustic and optical coherence tomography whole-body imaging of chick embryos at multiple normal developmental stages**, Mengyang Liu, Barbara Maurer, Boris Hermann, Behrooz Zabihian, Medizinische Univ. Wien (Austria); Michelle Sandrian, Univ. of Pittsburgh (USA); Angelika Unterhuber, Bernhard Baumann, Medizinische Univ. Wien (Austria); Edward Z. Zhang, Paul C. Beard, Univ. College London (United Kingdom); Wolfgang J. Weninger, Wolfgang Drexler, Medizinische Univ. Wien (Austria) . . . . . [9323-29]

5:45 pm: **Real-time system for intravascular ultrasound and photoacoustic imaging**, Donald VanderLaan, Andrei B. Karpiouk, Douglas E. Yeager, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) . . . . . [9323-30]

POSTERS-SUNDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) ..... SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Development of photoacoustic imaging technology overlaid on ultrasound imaging and its clinical application, Miya Ishihara, National Defense Medical College (Japan); Kazuhiro Tsujita, FUJIFILM Corp. (Japan); Akio Horiguchi, National Defense Medical College (Japan); Kaku Irisawa, FUJIFILM Corp. (Japan); Tomohiro Komatsu, National Defense Medical College (Japan); Makoto Ayaori, Tokorozawa Heart Ctr. (Japan); Takeshi Hirasawa, National Defense Medical College (Japan); Tadashi Kasamatsu, Kazuhiro Hirota, FUJIFILM Corp. (Japan); Hitoshi Tsuda, Katsunori Ikewaki, Tomohiko Asano, National Defense Medical College (Japan) . . . . . [9323-91]

Integrating sphere-based photoacoustic setup for simultaneous absorption coefficient and Grüneisen parameter measurements of biomedical liquids, Yolanda Villanueva, Erwin Hondebrink, Wilma Petersen, Wiendelt Steenbergen, Univ. Twente (Netherlands) . . . . . [9323-92]

Optical absorbance measurements and photoacoustic evaluation of freeze-thawed polyvinyl-alcohol vessel phantoms, Mustafa U. Arabul, Technische Univ. Eindhoven (Netherlands); Maarten Heres, Eindhoven University of Technology (Netherlands); Marcel C. M. Rutten, Frans N. van de Vosse, Richard G. P. Lopata, Technische Univ. Eindhoven (Netherlands) . . . . . [9323-93]

Hybrid ultrahigh resolution optical coherence / photoacoustic microscopy, Boris Hermann, Mengyang Liu, Wolfgang Drexler, Medizinische Univ. Wien (Austria) . . . . . [9323-95]

High frame rate photoacoustic computed tomography using coded excitation, Masataka Azuma, Kyoto Univ. (Japan); Haichong K. Zhang, Johns Hopkins Univ. (USA) and Kyoto Univ. Graduate School of Medicine (Japan); Kengo Kondo, Kyoto Univ. (Japan); Takeshi Namita, Kyoto Univ. Graduate School of Medicine (Japan); Makoto Yamakawa, Kyoto Univ. (Japan); Tsuyoshi Shiina, Kyoto Univ. Graduate School of Medicine (Japan) . . . [9323-96]

Multispectral photoacoustic microscopy based on an optical-acoustic objective, Rui Cao, Joseph P. Kilroy, Bo Ning, Tianxiong Wang, John A. Hossack, Song Hu, Univ. of Virginia (USA) . . . . . [9323-97]

Fast calibration of speed-of-sound using temperature prior in whole-body small animal optoacoustic imaging, Subhamoy Mandal, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany); Elena Nasonova, iThera Medical GmbH (Germany); Xosé Luis Deán-Ben, Helmholtz Zentrum München GmbH (Germany); Daniel Razansky, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany) . . . . . [9323-98]

CONFERENCE 9323
LOCATION: ROOM 306 (ESPLANADE)

Technique development for photoacoustic imaging guided interventions, Qian Cheng, Tongji Univ. (China) and Univ. of Michigan (USA); Haonan Zhang, Tongji Univ. (China) and Univ. of Michigan (USA); Jie Yuan, Nanjing Univ. (China); Ting Feng, Nanjing Univ. (China) and Univ. of Michigan Medical School (USA); Guan Xu, Univ. of Michigan Medical School (USA); Xueding Wang, Univ. of Michigan Medical School (USA) and Tongji Univ. (China). . . . . [9323-99]

Texture generation in compressional photoacoustic elastography, Julian W. Schmid, Univ. Wien (Austria) and Medizinische Univ. Wien (Austria); Thomas Widlak, Univ. Wien (Austria); Behrooz Zabihian, Medizinische Univ. Wien (Austria); Thomas Glatz, Univ. Wien (Austria); Mengyang Liu, Wolfgang Drexler, Medizinische Univ. Wien (Austria); Otmar Scherzer, Univ. Wien (Austria) and Radon Institute of Computational and Applied Mathematics (Austria) . [9323-100]

Early detection of melanoma with the combined use of acoustic microscopy, infrared reflectance and Raman spectroscopy, Georgios T. Karagiannis, Univ. of Thessaly (Greece) and Ormylia Foundation (Greece); Giannis Grivas, Anastasia Tjigotzidou, Aristotle Univ. of Thessaloniki (Greece); Georgios K. Apostolidis, Ifigeneia Grigoriadou, ORMYLIA Art Diagnosis Ctr. (Greece); Ioanna Dori, Argyrios Doumas, Kyriaki-Nefeli Poulatsidou, Aristotle University of Thessaloniki (Greece); Stefan Wesarg, Fraunhofer-Institut für Graphische Datenverarbeitung (Germany); Panagiotis Georgoulias, Univ. of Thessaly (Greece) . . . . . [9323-101]

Longitudinal multi-wavelength photoacoustic imaging of MCF-7 xenograft tumors with inducible tyrosinase expression, Robert J. Paproski, Univ. of Alberta (Canada); Andrew Heinmiller, VisualSonics Inc. (Canada); Roger J. Zemp, Univ. of Alberta (Canada). . . . . [9323-102]

Comparing blanket illumination vs scanned-mosaicing imaging schemes for wide-area photoacoustic tomography, Quinn Barber, Tyler Harrison, Roger J. Zemp, Univ. of Alberta (Canada) . . . . . [9323-103]

Tissue type characterization using photoacoustic power spectrum, a feasibility study, Behnoosh Tavakoli, Seth Goldstein, Jin U. Kang, Johns Hopkins Univ. (USA); Michael A. Choti, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); Emad M. Boctor, Johns Hopkins Outpatient Ctr. (USA) . . . . . [9323-104]

Hybrid optoacoustic and ultrasound imaging in three dimensions and real time by optical excitation of a passive element, Thomas F. Fehm, Technische Univ. München (Germany); Xosé Luis Deán-Ben, Helmholtz Zentrum München GmbH (Germany); Daniel Razansky, Technische Univ. München (Germany) . . . . . [9323-105]

Needle visualization using photoacoustic effect, Hyun Jae Kang, Xiaoyu Guo, Alexis Cheng, Michael A. Choti, Emad M. Boctor, Johns Hopkins Univ. (USA) . . . . . [9323-106]

A micromachined silicon parallel acoustic delay line (PADL) array for real-time photoacoustic tomography (PAT), Young Y. Cho, Cheng-Chung Chang, Texas A&M Univ. (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA); Jun Zou, Texas A&M Univ. (USA) . . . . . [9323-107]

Photoacoustic imaging with rotational compounding for improved signal detection, Alexander Forbrich, Univ. of Alberta (Canada) and FujiFilms VisualSonics Inc. (Canada); Andrew Heinmiller, FujiFilms VisualSonics Inc. (Canada); Jithin Jose, FujiFilms VisualSonics Inc. (Netherlands); Andrew Needles, Desmond Hirson, FujiFilms VisualSonics Inc. (Canada). . . . . [9323-108]

New potentials in design and driving of acousto-optic scanners used in two-photon microscopes, Pál A. Maák, Budapest Univ. of Technology and Economics (Hungary); Gergely Katona, Femtonics Ltd. (Hungary); Gergely Szalay, Institute of Experimental Medicine (Hungary); Máté Veress, Femtonics Ltd. (Hungary); Balazs J. Rózsa, Institute of Experimental Medicine (Hungary) . . . . . [9323-109]

Label-free optical-resolution photoacoustic endomicroscopy in vivo, Joon-Mo Yang, Chiye Li, Washington Univ. in St. Louis (USA); Ruimin Chen, The Univ. of Southern California (USA); Bin Rao, Junjie Yao, Amos Danielli, Konstantin I. Maslov, Washington Univ. in St. Louis (USA); Qifa Zhou, Koping Kirk Shung, The Univ. of Southern California (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-110]

Quantitative assessment of photoacoustic tomography systems integrating clinical ultrasound transducers using novel tissue-simulating phantoms, William C. Vogt, Congxian Jia, Keith A. Wear, Brian S. Garra, T. Joshua Pfefer, U.S. Food and Drug Administration (USA) . . . . . [9323-111]

Three-dimensional photoacoustic and ultrasonic endoscopic imaging of a rabbit esophagus, Joon-Mo Yang, Christopher P. Favazza, Junjie Yao, Washington Univ. in St. Louis (USA); Ruimin Chen, Qifa Zhou, Koping Kirk Shung, The Univ. of Southern California (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-112]

Analysis of current ultrasound: optical tomography systems in an epi-illumination mode, Joseph L. Hollmann, Charles A. DiMarzio, Northeastern Univ. (USA) . . . . . [9323-113]

Wide-field two-dimensional multifocal optical-resolution photoacoustic computed microscopy, Jun Xia, Guo Li, Lidai Wang, Mohammadreza Nasiriavanaki, Konstantin I. Maslov, John Engelbach, Joel R. Garbow, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-114]

Photoacoustic measurement of targeted cellular delivery of gold nanoparticles, Wei Qian, IMRA America, Inc. (USA); Chao Tian, Zhixing Xie, Xia S. Shao, Xueding Wang, Univ. of Michigan (USA) . . . . . [9323-115]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their groundbreaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

MONDAY 9 FEBRUARY

SESSION 5

LOCATION: ROOM 306 (ESPLANADE) . . . . . MON 8:00 AM TO 9:45 AM

Endoscopic and other HiRes Imaging

Session Chairs: **Vladimir P. Zharov,** Univ. of Arkansas for Medical Sciences (USA); **Qifa Zhou,** The Univ. of Southern California (USA)

8:00 am: **In vivo intravascular photoacoustic imaging of atherosclerotic arteries in Ossabaw swine**, Pu Wang, Purdue Univ. (USA); Teng Ma, The Univ. of Southern California (USA); Shanshan Liang, Beckman Laser Institute and Medical Clinic (USA); Mikhail Slipchenko, Spectral Energies, LLC (USA); Jie Hui, Purdue Univ. (USA); Rebecca Bruning, Indiana Univ. (USA); Sukesh Roy, Spectral Energies, LLC (USA); Michael Sturek, Indiana Univ.-Purdue Univ. Indianapolis (USA); Qifa Zhou, The Univ. of Southern California (USA); Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA); Ji-Xin Cheng, Purdue Univ. (USA) . . . . . [9323-31]

8:15 am: **Toward minimally invasive optical-resolution photoacoustic endomicroscopy with a fluid-filled capillary**, Olivier Simandoux, Institut Langevin (France); Nicolino Stasio, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Jérôme Gateau, Lab. Kastler-Brossel, CNRS (France) and Institut Langevin (France); Jean-Pierre Huignard, Jphopto (France); Christophe Moser, Demetri Psaltis, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Emmanuel Bossy, Institut Langevin (France) . . . . . [9323-32]

8:30 am: **Catheter-based photoacoustic endoscope for use in the instrument channel of a clinical video endoscope**, Joon-Mo Yang, Chiye Li, Washington Univ. in St. Louis (USA); Ruimin Chen, Qifa Zhou, Koping Kirk Shung, The Univ. of Southern California (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-33]

8:45 am: **Laser-scanning optical resolution photoacoustic microscopy using a Fabry Perot fibre optic sensor**, Thomas J. Allen, Edward Z. Zhang, Paul C. Beard, Univ. College London (United Kingdom). . . . . [9323-34]

9:00 am: **Amplitude-masked photoacoustic wavefront shaping and application in flowmetry**, Jinyang Liang, Jian Wei Tay, Ashton S. Hemphill, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-35]

9:15 am: **Frequency response optimised fiber optic photoacoustic imaging probes for endoscopic applications**, Edward Z. Zhang, Sunish J. Mathews, Adrien E. Desjardins, Paul C. Beard, Univ. College London (United Kingdom) . . . . . [9323-36]

9:30 am: **Orthogonal Fabry-Pérot sensor array system for minimal artifact photoacoustic tomography**, Robert J. Ellwood, Edward Z. Zhang, Paul C. Beard, Benjamin T. Cox, Univ. College London (United Kingdom). . . . . [9323-37]

Coffee Break . . . . . Mon 9:45 am to 10:15 am

SESSION 6

LOCATION: ROOM 306 (ESPLANADE) . . . . . MON 10:15 AM TO 12:00 PM

Signal Processing and Image Reconstruction

Session Chairs: **Mark A. Anastasio,** Washington Univ. in St. Louis (USA); **Andreas Mandelis,** Univ. of Toronto (Canada)

10:15 am: **Mitigation of the effect of inaccurate ultrasonic transducer responses on image reconstruction in photoacoustic computed tomography**, Mark A. Anastasio, Qiwei Sheng, Kun Wang, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-38]

10:30 am: **Image reconstruction of multi-channel photoacoustic and laser-ultrasound data using reverse time migration**, Jami L. Johnson, The Univ. of Auckland (New Zealand); Jeffrey Shragge, The Univ. of Western Australia (Australia); Kasper van Wijk, The Univ. of Auckland (New Zealand) . . . . [9323-39]

10:45 am: **Accelerated iterative image reconstruction in three-dimensional optoacoustic tomography**, Fatima Anis, Yang Lou, Kun Wang, Washington Univ. in St. Louis (USA); Richard Su, Tanmayi Oruganti, André Conjusteau, Sergey A. Ermilov, Alexander A. Oraevsky, TomoWave Laboratories, Inc. (USA); Mark A. Anastasio, Washington Univ. in St. Louis (USA) . . . . . [9323-40]

11:00 am: **Frequency analysis of the photoacoustic signal generated by coronary atherosclerotic plaque**, Min Wu, Verya Daeichin, Erasmus MC (Netherlands); Antonius F. W. van der Steen, Erasmus MC (Netherlands) and Interuniversity Cardiology Institute of The Netherlands (Netherlands) and Delft Univ. of Technology (Netherlands); Gijs van Soest, Erasmus MC (Netherlands) . . . . . [9323-41]

11:15 am: **Multispectral photoacoustic decomposition with localized regularization for detecting targeted contrast agent**, Behnoosh Tavakoli, Ying Chen, Xiaoyu Guo, Hyun Jae Kang, Johns Hopkins Univ. (USA); Martin Pomper, The Johns Hopkins Hospital (USA); Emad M. Boctor, Johns Hopkins Outpatient Ctr. (USA) . . . . . [9323-42]

11:30 am: **Tracking photoacoustic signal by clinical ultrasound systems using inverse beamforming method**, Xiaoyu Guo, Hyun Jae Kang, Alexis Cheng, Ralph Etienne-Cummings, Emad M. Boctor, Johns Hopkins Univ. (USA) . . . . . [9323-43]

11:45 am: **Photoacoustic reconstruction using beamformed RF data: a synthetic aperture imaging approach**, Haichong K. Zhang, Xiaoyu Guo, Hyun Jae Kang, Emad M. Boctor, Johns Hopkins Univ. (USA) . . . . . [9323-44]

Lunch Break . . . . . .Mon 12:00 pm to 1:45 pm

SESSION 7

LOCATION: ROOM 306 (ESPLANADE) . . . . . MON 1:45 PM TO 6:00 PM

New Imaging Methods and Systems

Session Chairs: **A. Claude Boccara,** Institut Langevin (France); **Rinat O. Esenaliev,** The Univ. of Texas Medical Branch (USA)

1:45 pm: **Photoacoustic tomography using a single xenon flash lamp**, Terence T. W. Wong, Yong Zhou, Alejandro Garcia-Uribe, Lei Li, Konstantin I. Maslov, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-45]

2:00 pm: **Multimodal Raman-photoacoustic imaging for detection and multiplex biomarker assessment of magnetically-trapped circulating tumor cells with single-cell detection capabilities**, Wei Shi, Robert J. Paproski, Roger J. Zemp, Univ. of Alberta (Canada) . . . . . [9323-46]

2:15 pm: **Ultra-sensitive plano-convex optical microresonator detectors for deep tissue photoacoustic imaging**, James A. Guggenheim, Jing Li, Edward Z. Zhang, Paul C. Beard, Univ. College London (United Kingdom) . . . . [9323-48]

2:30 pm: **Assessment of bone mineral density via thermal photoacoustic measurement**, Ting Feng, Nanjing Univ. (China); Kenneth M. Kozloff, Univ. of Michigan Medical School (USA); Cheri Deng, Univ. of Michigan (USA); Jie Yuan, Sidan Du, Nanjing Univ. (China); Xueding Wang, Univ. of Michigan Medical School (USA) . . . . . [9323-49]

2:45 pm: **Imaging and sensing based on dual-pulse nonlinear photoacoustic contrast: a preliminary study on fatty liver**, Chao Tian, Univ. of Michigan Health System (USA); Zhixing Xie, Univ. of Michigan Medical School (USA); Mario Fabiilli, Univ. of Michigan Health System (USA); Xueding Wang, Univ. of Michigan Medical School (USA) . . . . . [9323-50]

Coffee Break . . . . . .Mon 3:00 pm to 3:30 pm

3:30 pm: **Photoacoustic-guided optical wavefront shaping in scattering media with improved performances**, Thomas Chaigne, Jérôme Gateau, Ori Katz, Institut Langevin (France) and Lab. Kastler-Brossel, CNRS (France); Emmanuel Bossy, Institut Langevin (France); Sylvain Gigan, Lab. Kastler-Brossel, CNRS (France) and Institut Langevin (France) . . . . . [9323-51]

3:45 pm: **Forward-viewing multi-element photoacoustic probe for 3D endoscopy**, Rehman Ansari, Edward Z. Zhang, Adrien E. Desjardins, Paul C. Beard, Univ. College London (United Kingdom). . . . . [9323-52]

4:00 pm: **Lifetime-weighted photoacoustic imaging**, Roger J. Zemp, Alexander Forbrich, Peng Shao, Wei Shi, Univ. of Alberta (Canada) . . . [9323-53]

4:15 pm: **Simplified axial sectioning in photoacoustic microscopy via transient absorption**, Scott P. Mattison, Brian E. Applegate, Texas A&M Univ. (USA) . . . . . [9323-54]

4:30 pm: **In vivo optical-resolution photoacoustic remote sensing microscopy**, Parsin Haji Reza, Roger J. Zemp, Univ. of Alberta (Canada) . . . . . [9323-55]

4:45 pm: **Multi-frequency intravascular imaging probe for ultrasound and frequency domain photoacoustic imaging**, Robin F. Castelino, Univ. of Toronto (Canada) and Sunnybrook Health Sciences Ctr. (Canada); Hyunggyun Lee, Sunnybrook Research Institute (Canada); F. Stuart Foster, Univ. of Toronto (Canada) and Sunnybrook Health Sciences Ctr. (Canada) . . . . . [9323-56]

5:00 pm: **Broadband ultrasonic sensor array via optical frequency domain reflectometry**, Haniel Gabai, Idan Steinberg, Avishay Eyal, Tel Aviv Univ. (Israel) . . . . . [9323-57]

5:15 pm: **Optoacoustic imaging in five dimensions**, Xosé Luis Deán-Ben, Sven Gottschalk, Thomas F. Fehm, Daniel Razansky, Helmholtz Zentrum München GmbH (Germany). . . . . [9323-58]

5:30 pm: **Three-dimensional multispectral hand-held optoacoustic imaging with microsecond-level delayed laser pulses**, Xosé Luis Deán-Ben, Erwin Bay, Daniel Razansky, Helmholtz Zentrum München GmbH (Germany) [9323-59]

5:45 pm: **A real-time ultrasonic field mapping system using a Fabry Perot single pixel camera for 3D photoacoustic imaging**, Nam Trung Huynh, Edward Z. Zhang, Marta Betcke, Simon R. Arridge, Paul C. Beard, Benjamin T. Cox, Univ. College London (United Kingdom) . . . . . [9323-60]

POSTERS-MONDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . MON 5:30 PM TO 7:30 PM

Conference attendees are invited to attend the BiOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Realistic photoacoustic image simulations of collections of solid spheres using linear array transducer, Subhajit Karmakar, The Univ. of Burdwan (India); Eno Hysi, Michael C. Kolios, Ryerson Univ. (Canada); Ratan K. Saha, Saha Institute of Nuclear Physics (India). . . . . [9323-117]

Synergistic image reconstruction for hybrid ultrasound and photoacoustic computed tomography, Thomas P. Matthews, Kun Wang, Lihong V. Wang, Mark A. Anastasio, Washington Univ. in St. Louis (USA) . . . . . [9323-118]

Full-wave iterative image reconstruction in transcranial photoacoustic computed tomography of the brain, Kenji Mitsuhashi, Lihong V. Wang, Mark A. Anastasio, Washington Univ. in St. Louis (USA). . . . . [9323-119]

Photoacoustic imaging of small organic molecule-based photoacoustic probe in subcutaneous tumor using P(VDF-TrFE) acoustic sensor, Takeshi Hirasawa, Shinpei Okawa, National Defense Medical College (Japan); Mako Kamiya, Yasuteru Urano, The Univ. of Tokyo (Japan); Miya Ishihara, National Defense Medical College (Japan) . . . . . [9323-120]

Photoacoustic imaging using NIR two-photon excitation for ultrasonic wave generation, Ben E. Urban Jr., Univ. of North Texas (USA). . . . . [9323-121]

In vivo dual modality cystography: photoacoustic and fluorescence imaging using indocyanine green, Sungjo Park, Jae-Won Song, Kyungpook National Univ. (Korea, Republic of); Jeesu Kim, Mansik Jeon, Chulhong Kim, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9323-122]

Quantitative photoacoustic tomography: estimating chromophore concentrations using a radiance Monte Carlo model, Roman Hochuli, Simon R. Arridge, Paul C. Beard, Benjamin T. Cox, Univ. College London (United Kingdom). . . . . [9323-123]

Multi-color high-resolution fluorescence imaging in deep tissue, Baohong Yuan, Bingbing Cheng, Ming-Yuan Wei, The Univ. of Texas at Arlington (USA); Venugopal Bandi, Univ. of North Texas (USA); Yanbo Pei, Yi Hong, Kytai T. Nguyen, The Univ. of Texas at Arlington (USA); Francis D'Souza, Univ. of North Texas (USA) . . . . . [9323-124]

CONFERENCE 9323
LOCATION: ROOM 306 (ESPLANADE)

Experimental validation of a theoretical model of dual wavelength photoacoustic (PA) pump-probe excitation in fluorophores, Julia Märk, Christoph Theiss, Franz-Josef Schmitt, Jan G. Laufer, Technische Univ. Berlin (Germany) . . . . . [9323-125]

Optical-resolution photoacoustic microscopy of the metabolic rate of oxygen in a mouse renal tumor model, Chenghung Yeh, Washington Univ. in St. Louis (USA); Song Hu, Univ. of Virginia (USA); Jinyang Liang, Lei Li, Brian T. Soetikno, Washington Univ. in St. Louis (USA); Zhi-Hong Lu, Rebecca E. Sohn, Washington Univ. School of Medicine in St. Louis (USA); Konstantin I. Maslov, Washington Univ. in St. Louis (USA); Jeffrey M. Arbeit, Washington Univ. School of Medicine in St. Louis (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-128]

Speed of sound and acoustic attenuation of compounds affected during optoacoustic monitoring of thermal therapies measured in the temperature range from 5°C to 60°C, Tanmayi Oruganti, Elena V. Petrova, Alexander A. Oraevsky, Sergey A. Ermilov, TomoWave Laboratories, Inc. (USA) . . . [9323-129]

Real-time interleaved ultrasound/photoacoustic imaging for interventional procedure guidance, Chen-Wei Wei, Thu-Mai Nguyen, Jinjun Xia, Bastien Arnal, Univ. of Washington (USA); Ivan M. Pelivanov, Univ. of Washington (USA) and International Laser Center (Russian Federation); Matthew O'Donnell, Univ. of Washington (USA) . . . . . [9323-131]

Noninvasive photoacoustic microscopy of methemoglobin in vivo, Yong Zhou, Min Tang, Ruiying Zhang, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-132]

Optimal illumination design investigation for partially illuminated optoacoustic breast tomography, Yang Lou, Washington Univ. in St. Louis (USA); Vyacheslav V. Nadvoretskiy, TomoWave Laboratories, Inc. (USA); Kun Wang, Washington Univ. in St. Louis (USA); Sergey Emilov, Alexander A. Oraevsky, TomoWave Laboratories, Inc. (USA); Mark A. Anastasio, Washington Univ. in St. Louis (USA) . . . . . [9323-133]

Laser diode-based, multi-wavelength optoacoustic system for monitoring, imaging, and sensing, Rinat O. Esenaliev, Yuriy Y. Petrov, Irene Y. Petrov, Donald S. Prough, Andrey Petrov, The Univ. of Texas Medical Branch (USA) . . . . . [9323-134]

Noninvasive, optoacoustic detection and characterization of intra- and extracranial hematomas and cerebral hypoxia, Rinat O. Esenaliev, Andrey Petrov, Donald S. Prough, Yuriy Y. Petrov, Irene Y. Petrov, The Univ. of Texas Medical Branch (USA); Vasantha Asokan, Adaeze Agbor, Claudia S. Robertson, Baylor College of Medicine (USA) . . . . . [9323-135]

Multi-depth photoacoustic microscopy with a focus tunable lens, Kiri Lee, Tae Joong Eom, Euiheon Chung, Gwangju Institute of Science and Technology (Korea, Republic of) . . . . . [9323-136]

Hybrid photoacoustic-ultrasound transmission tomography for imaging and 2D spatio-temporal monitoring of temperature in photothermal therapy, Khalid Daoudi, Peter van Es, Srirang Manohar, Wiendelt Steenbergen, Univ. Twente (Netherlands) . . . . . [9323-137]

Multi-view optical resolution photoacoustic microscopy, Liren Zhu, Lei Li, Liang S. Gao, Lihong V. Wang, Washington Univ. in St. Louis (USA). . [9323-138]

Microbubble enhanced photoacoustic tomography, Lidai Wang, Guo Li, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-139]

Assessing carotid atherosclerosis by fiber-optic multispectral photoacoustic tomography, Jie Hui, Rui Li, Pu Wang, Evan Phillips, Purdue Univ. (USA); Rebecca Bruning, Indiana Univ. School of Medicine (USA); ChienSheng Liao, Purdue Univ. (USA); Michael Sturek, Indiana Univ. School of Medicine (USA); Craig J. Goergen, Ji-Xin Cheng, Purdue Univ. (USA). [9323-140]

Multimodal non-contact photoacoustic and OCT imaging with galvanometer scanning, Thomas Berer, Armin Hochreiner, Elisabeth Leiss-Holzinger, Johannes Bauer-Marschallinger, Andreas Buchsbaum, RECENDT GmbH (Austria) . . . . . [9323-141]

Photoacoustic projection imaging using a 64-channel fiber optic detector array, Johannes Bauer-Marschallinger, Karoline Felbermayer, Klaus-Dieter Bouchal, Istvan A. Veres, Hubert Grün, Peter Burgholzer, Thomas Berer, RECENDT GmbH (Austria) . . . . . [9323-142]

A tunable MOPA laser for real-time optical resolution photoacoustic microscopy, Mohammad S. Mahmud, Alexander Forbrich, Wei Shi, Roger J. Zemp, Univ. of Alberta (Canada) . . . . . [9323-143]

Dual modality of non-contact photoacoustic tomography and fluorescence imaging using double cladding fiber, Jonghyun Eom, Seong Jun Park, Ju Wan Kim, Soongho Park, Byeong Ha Lee, Gwangju Institute of Science and Technology (Korea, Republic of) . . . . . [9323-144]

Comparative experiments of photoacoustic system using laser light source and LED array light source, Toshitaka Agano, Naoto Sato, Hitoshi Nakatsuka, XTrillion, Inc. (Japan); Kazuo Kitagawa, Takamitsu Hanaoka, Koji Morisono, Yusuke Shigeta, Funai Electric Co., Ltd. (Japan) . . . . . [9323-145]

Light and ultrasound reflecting off-axis parabolic mirror for photoacoustic endoscopy, Zhonglie Piao, Beckman Laser Institute and Medical Clinic (USA) and Pusan National Univ. (Korea, Republic of); Teng Ma, The Univ. of Southern California (USA); Joseph C. Jing, Jiawen Li, Shanshan Liang, Jun Zhang, Beckman Laser Institute and Medical Clinic (USA); Qifa Zhou, Koping Kirk Shung, The Univ. of Southern California (USA); Chang-Seok Kim, Pusan National Univ. (Korea, Republic of); Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA). . . . . [9323-146]

Attempts to increase penetration of photoacoustic system using led array light source, Toshitaka Agano, Naoto Sato, Hitoshi Nakatsuka, XTrillion, Inc. (Japan); Kazuo Kitagawa, Takamitsu Hanaoka, Koji Morisono, Yusuke Shigeta, Funai Electric Co., Ltd. (Japan) . . . . . [9323-147]

A compact and cost-efficient photoacoustic microscopy system with a pulsed laser diode excitation, Tianheng Wang, Sreyankar Nandy, Hassan S. Salehi, Patrick D. Kumavor, Quing Zhu, Univ. of Connecticut (USA) . . [9323-148]

Fast optical-resolution photoacoustic microscopy using 2-axis MEMS scanner, Jin Young Kim, Changho Lee, Kyungjin Park, Geunbae Lim, Chulhong Kim, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9323-149]

Quantitative ultrasound modulated optical tomography: sensitivity functions, uniqueness, and image reconstruction, Samuel Powell, Simon R. Arridge, Terence S. Leung, Univ. College London (United Kingdom) . . [9323-150]

Model-based inversion for frequency domain optoacoustic tomography, Stephan Kellnberger, Pouyan Mohajerani, Hong Yang, Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany). . . . . [9323-151]

Narrowband second harmonic thermoacoustic signals from solid and soft tissues, Stephan Kellnberger, Murad Omar, Helmholtz Zentrum München GmbH (Germany); George Sergiadis, Helmholtz Zentrum München GmbH (Germany); Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) . . . . . [9323-152]

Photoacoustic perfusion measurements: a comparison with power Doppler in phantoms, Maarten Heres, Ümit Arabul, Benjamin Tchang, Frans N. Van de Vosse, Marcel C. M. Rutten, Richard G. P. Lopata, Technische Univ. Eindhoven (Netherlands) . . . . . [9323-153]

The influence of cellular uptake on the photostability and photoacoustic conversion efficiency of gold nanorods, Lucia Cavigli, Fulvio Ratto, Francesca Tatini, Paolo Matteini, Alberto Cini, Istituto di Fisica Applicata Nello Carrara (Italy); Ilaria Giovannelli, Dipartimento di Fisica e Astronomia, Università di Firenze (Italy); Marella de Angelis, Francesca P. Rossi, Istituto di Fisica Applicata Nello Carrara (Italy); Sonia Centi, Univ. degli Studi di Firenze (Italy); Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy) . . . . . [9323-154]

Detecting inflammation and fibrosis in bowel wall with photoacoustic imaging in a Crohn's disease animal model, Guan Xu, Laura Johnson, Univ. of Michigan Medical School (USA); Jack Hu, Univ. of Michigan (USA); Jonathan R. Dillman, Peter D. R. Higgins, Xueding Wang, Univ. of Michigan Medical School (USA) . . . . . [9323-155]

Image registration for limited-view photoacoustic imaging using two linear array transducers, Weihang Shu, Tim E. Salcudean, Robert N. Rohling, Purang Abolmaesumi, Shuo Tang, The Univ. of British Columbia (Canada) . . . . . [9323-156]

TUESDAY 10 FEBRUARY

SESSION 8

LOCATION: ROOM 306 (ESPLANADE) . . . . . TUE 8:00 AM TO 10:00 AM

Quantitative Tomography

Session Chair: **Paul C. Beard,** Univ. College London (United Kingdom)

8:00 am: **High-frequency photoacoustic imaging of erythrocyte aggregation and oxygen saturation: probing hemodynamic relations under pulsatile blood flow**, Tae-Hoon Bok, Eno Hysi, Michael C. Kolios, Ryerson Univ. (Canada) . . . . . [9323-61]

8:15 am: **A noninvasive single wavelength monitoring of blood oxygen saturation utilizing both photoacoustics absorption and light scattering**, Qiwen Peng, Fei Gao, Xiaohua Feng, Yuanjin Zheng, Nanyang Technological Univ. (Singapore) . . . . . [9323-62]

8:30 am: **Evaluation of Gleason scores by photoacoustic spectral analysis**, Guan Xu, Scott Tomlins, Javed Siddiqui, Mandy Davis, Lakshmi P. Kunju, John Wei, Xueding Wang, Univ. of Michigan Medical School (USA) . . . . . [9323-63]

8:45 am: **Quantitative photoacoustic assessment of ex-vivo lymph nodes of colorectal cancer patients**, Ashwin Sampathkumar, Riverside Research Institute (USA); Emi Saegusa-Beercroft, Univ. of Hawai'i (USA); Jonathan Mamou, Riverside Research Institute (USA); Parag V. Chitnis, George Mason Univ. (USA); Junji Machi, Univ. of Hawai'i at Manoa (USA) and Kuakini Medical Ctr. (USA); Ernest J. Feleppa, Riverside Research Institute (USA) . . . . . [9323-64]

9:00 am: **Cardiac function and perfusion dynamics measured on a beat-by-beat basis in the live mouse using ultra-fast 4D optoacoustic imaging**, Steven J. Ford, Xosé Luis Deán-Ben, Helmholtz Zentrum München GmbH (Germany); Daniel Razansky, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany) . . . . . [9323-65]

9:15 am: **Estimating blood oxygenation from photoacoustic images**, Roman Hochuli, Paul C. Beard, Benjamin T. Cox, Univ. College London (United Kingdom) . . . . . [9323-66]

9:30 am: **Towards quantitative photoacoustic spectroscopy by measuring fluence variations using acousto-optic modulation**, Altaf Hussain, Jacob W. Staley, Erwin Hondebrink, Wilma Petersen, Wiendelt Steenbergen, Univ. Twente (Netherlands) . . . . . [9323-67]

9:45 am: **Influence of the light propagation models on a linearized photoacoustic image reconstruction of the light absorption coefficient**, Shinpei Okawa, Takeshi Hirasawa, Toshihiro Kushibiki, Miya Ishihara, National Defense Medical College (Japan) . . . . . [9323-68]

Coffee Break . . . . . Tue 10:00 am to 10:20 am

SESSION 9

LOCATION: ROOM 306 (ESPLANADE) . . . . . TUE 10:20 AM TO 11:50 AM

Image Guided and Monitoring Procedures

Session Chair: **Wiendelt Steenbergen,** Univ. Twente (Netherlands)

10:20 am: **Universal temperature-dependent normalized optoacoustic response of blood**, Elena V. Petrova, Anton Liopo, Alexander A. Oraevsky, Sergey A. Ermilov, TomoWave Laboratories, Inc. (USA). . . . . [9323-69]

10:35 am: **Probing the in vivo changes in oxygen saturation with photoacoustic imaging as a non-invasive means of assessing treatment progression**, Eno Hysi, Ryerson Univ. (Canada); Jonathan P. May, The Univ. of British Columbia (Canada); Lauren Wirtzfeld, Ryerson Univ. (Canada); Elijus Undzys, Ontario Institute for Cancer Research (Canada); Shyh-Dar Li, The Univ. of British Columbia (Canada); Michael C. Kolios, Ryerson Univ. (Canada). . . . . [9323-70]

10:50 am: **Tissue oxygen monitoring by photoacoustic lifetime imaging (PALI) and its application to image-guided photodynamic therapy (PDT)**, Qi Shao, Ekaterina Morgounova, Shai Ashkenazi, Univ. of Minnesota, Twin Cities (USA) . . . . . [9323-71]

11:05 am: **Real-time needle guidance with photoacoustic and laser-generated ultrasound probes**, Richard Colchester, Edward Z. Zhang, Charles A. Mosse, Daniil I. Nikitichev, Univ. College London (United Kingdom); Simeon West, Univ. College Hospital (United Kingdom); Paul C. Beard, Ioannis Papakonstantinou, Adrien E. Desjardins, Univ. College London (United Kingdom) . . . . . [9323-72]

11:20 am: **A novel approach to delineating bone interfaces and joint spaces in photoacoustic tomography of the finger**, Samir Biswas, Peter van Es, Univ. Twente (Netherlands); Hein J. Bernelot Moens, Hospital Group Twente (Netherlands); Wiendelt Steenbergen, Srirang Manohar, Univ. Twente (Netherlands) . . . . . [9323-73]

11:35 am: **Use of multi-wavelength photoacoustic imaging to distinguish HIFU ablation lesions**, Joshua P. Gray, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) and Univ. of Texas Graduate School of Biomedical Sciences at Houston (USA); Nicholas P. Dana, The Univ. of Texas at Austin (USA); Florian Maier, Oguzhan Ege, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Trevor Mitcham, Jason Stafford, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) and Univ. of Texas Graduate School of Biomedical Sciences at Houston (USA); Stanislav Y. Emelianov, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) and The Univ. of Texas at Austin (USA); Richard Bouchard, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) and Univ. of Texas Graduate School of Biomedical Sciences at Houston (USA) . . . . . [9323-74]

Lunch Break . . . . . Tue 11:50 am to 1:20 pm

SESSION 10

LOCATION: ROOM 306 (ESPLANADE) . . . . . TUE 1:20 PM TO 2:50 PM

Microscopy

Session Chairs: **Lihong V. Wang,** Washington Univ. in St. Louis (USA); **Matthew O'Donnell,** Univ. of Washington (USA)

1:20 pm: **Spatially Fourier-encoded photoacoustic microscopy using a digital micromirror device**, Jinyang Liang, Liang S. Gao, Chiye Li, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-75]

1:35 pm: **High-speed photoacoustic microscopy of epilepsy in the mouse brain**, Pengfei Hai, Junjie Yao, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-76]

1:50 pm: **Retrieving small features in reflection-mode raster-scan optoacoustic mesoscopy using multi-frequency reconstruction**, Murad Omar, Dominik Soliman, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany); Jerome Gateau, Institut Langevin (France); Vasilis Ntziachristos, Technische Univ. München (Germany) and Helmholtz Zentrum München GmbH (Germany) . . . . . [9323-77]

2:05 pm: **Photo-imprint super-resolution photoacoustic microscopy**, Junjie Yao, Lidai Wang, Chiye Li, Chi Zhang, Lihong V. Wang, Washington Univ. in St. Louis (USA). . . . . [9323-78]

2:20 pm: **Photoacoustic and quantitative phase cell imaging using a low-profile low-cost ultrasonic detector**, Adi Sheinfeld, Will J. Eldridge, Carl Herickhoff, Adam Wax, Duke Univ. (USA) . . . . . [9323-79]

2:35 pm: **Margin analysis of breast specimens using photoacoustic microscopy**, Ruiying Zhang, Terence T. W. Wong, Chi Zhang, Tao Ju, Deborah V. Novack, Rebecca L. Aft, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-80]

SESSION 11

LOCATION: ROOM 306 (ESPLANADE) . . . . . TUE 2:50 PM TO 5:40 PM

Molecular Imaging and Nano Probes

Session Chairs: **Stanislav Y. Emelianov,** The Univ. of Texas at Austin (USA); **Pai-Chi Li,** National Taiwan Univ. (Taiwan)

2:50 pm: **Screening circulating tumor cells and microemboli using optical and photoacoustic microscopy**, Jason R. Cook, Chun-Hsien Wu, The Univ. of Texas at Austin (USA); Konstantin V. Sokolov, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) and The Univ. of Texas at Austin (USA); Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA). . . . . [9323-81]

3:05 pm: **Nanosecond dynamics of laser-induced vaporization from polymeric microcapsules studied using an ultrafast optical camera**, Guillaume Lajoinie, Erik Gelderblom, Univ. Twente (Netherlands); Ceciel Chlon, Marcel Böhmer, Philips Research Nederland B.V. (Netherlands); Wiendelt Steenbergen, Univ. Twente (Netherlands); Nico de Jong, Erasmus MC (Netherlands); Srirang Manohar, Michel Versluis, Univ. Twente (Netherlands) . . . . . [9323-82]

3:20 pm: **Triggered vaporization of gold nanodroplets for enhanced photothermal therapy**, Shu-Wei Liu, Wei-Wen Liu, Pai-Chi Li, National Taiwan Univ. (Taiwan) . . . . . [9323-83]

Coffee Break . . . . . Tue 3:35 pm to 3:55 pm

3:55 pm: **Photothermal stimuli-responsive nanoamplifier as a dynamic photoacoustic contrast agent**, Soon Joon Yoon, Yun-Sheng Chen, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) . . . . . [9323-84]

4:10 pm: **Non-invasive photoacoustic imaging of the intestine with organic naphthalocyanines nanoparticles**, Mansik Jeon, Pohang Univ. of Science and Technology (Korea, Republic of); Yumiao Zhang, Jonathan Lovell, Univ. at Buffalo (USA); Chulhong Kim, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9323-85]

4:25 pm: **Blinking perfluorocarbon nanoparticles for background-free optically activated ultrasound and photoacoustic imaging**, Alexander Hannah, Geoffrey P. Luke, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA) . . . . . [9323-86]

4:40 pm: **Effects of silica coating and interfacial thermal resistances on the photoacoustic generation by a gold nanosphere**, Florian Poisson, Amaury Prost, Olivier Simandoux, Anisia Popescu, Jérôme Gateau, Emmanuel Bossy, Institut Langevin (France) . . . . . [9323-87]

4:55 pm: **Validating tyrosinase homologue MelA as a photoacoustic reporter gene for imaging escherichia coli**, Robert J. Paproski, Yan Li, Quinn Barber, John D. Lewis, Robert E. Campbell, Roger J. Zemp, Univ. of Alberta (Canada) . . . . . [9323-88]

5:10 pm: **Optimal parameters for non-linear photoacoustic generation from gold nanospheres in the thermoelastic regime**, Amaury Prost, Olivier Simandoux, Institut Langevin (France); Jérôme Gateau, Institut Langevin (France) and Lab. Kastler-Brossel (France); Emmanuel Bossy, Florian Poisson, Institut Langevin (France) . . . . . [9323-89]

5:25 pm: **In vitro characterization of a lifetime-based activatable photoacoustic probe**, Ekaterina Morgounova, Sadie M. Johnson, Qi Shao, Benjamin J. Hackel, Michael Wilson, Shai Ashkenazi, Univ. of Minnesota, Twin Cities (USA) . . . . . [9323-90]

SENO MEDICAL BEST PAPER AWARD

LOCATION: ROOM 306 (ESPLANADE) . . . . . 5:40 PM TO 6:10 PM

Session Chairs: **Alexander A. Oraevsky,** TomoWave Laboratories, Inc. (USA); **Lihong V. Wang,** Washington Univ. in St. Louis (USA)

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POSTERS-TUESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . TUE 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the BiOS poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Advanced laser systems for photoacoustic imaging, Marc Klosner, Light Age, Inc. (USA); Ashwin Sampathkumar, Riverside Research Institute (USA); Gary Chan, Chunbai Wu, Donald F. Heller, Light Age, Inc. (USA) . . . . [9323-157]

Evaluating the distensibility of microvessels by photoacoustic microscopy, Cheng Wang, Univ. of Shanghai for Science and Technology (China); Guan Xu, Univ. of Michigan Medical School (USA); Qian Cheng, Tongji Univ. (China); Xueding Wang, Univ. of Michigan Medical School (USA) . . . . . [9323-158]

Phantom studies with gold nanorods as contrast agents for photoacoustic imaging: novel and old approaches, Cinzia Avigo, Nicole Di Lascio, Consiglio Nazionale delle Ricerche (Italy); Paolo Armanetti, Univ. di Pisa (Italy); Francesco Stea, Consiglio Nazionale delle Ricerche (Italy); Lucia Cavigli, Fulvio Ratto, Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy); Sandro Meucci, Marco Cecchini, Scuola Normale Superiore (Italy) and Lab. NEST, CNR (Italy); Claudia Kusmic, Francesco Faita, Istituto di Fisiologia Clinica (Italy); Luca Menichetti, Istituto di Fisiologia Clinica (Italy) and Fondazione Toscana G. Monasterio, CNR (Italy) . . . . . [9323-159]

Evaluation of accumulation kinetics of gold nanorods in excretory organs, Nicole Di Lascio, Cinzia Avigo, Istituto di Fisiologia Clinica (Italy); Paolo Armanetti, Univ. di Pisa (Italy); Francesco Stea, Consiglio Nazionale delle Ricerche (Italy); Lucia Cavigli, Fulvio Ratto, Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy); Claudia Kusmic, Istituto di Fisiologia Clinica (Italy); Luca Menichetti, Istituto di Fisiologia Clinica (Italy) and Fondazione Toscana G. Monasterio, CNR (Italy); Francesco Faita, Istituto di Fisiologia Clinica (Italy) . . . . . [9323-160]

Label-free photoacoustic detection of macrophages, Ruiying Zhang, Lidai Wang, Chi Zhang, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9323-161]

A theoretical model for photoacoustic spectal analysis, Guan Xu, Univ. of Michigan Medical School (USA); J. Brian Fowlkes, Univ of Michigan Medical School (USA); Xiaojun Liu, Chao Tao, Nanjing Univ. (China); Xueding Wang, Univ. of Michigan Medical School (USA). . . . . [9323-164]

Photoacoustic physio-chemical analysis and its implementation in deep tissue with a catheter setup, Guan Xu, Univ. of Michigan Medical School (USA); Zhuoxian Meng, Jiandie Lin, Univ. of Michigan (USA); Qian Cheng, Tongji Univ. (China); Xueding Wang, Univ. of Michigan Medical School (USA) . . . . . [9323-165]

3D optoacoustic mesoscopy with a 24MHz translate-rotate scanner, Andrei Chekkoury, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany); Jerome Gateau, Institut Langevin (France); Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany) . . . . . [9323-167]

Ultra-wideband three-dimensional optoacoustic tomography, Andrei Chekkoury, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany); Jérôme Gateau, Institut Langevin (France); Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) and Technische Univ. München (Germany) . . . . . [9323-168]

Photoacoustic spectrum analysis for bone microstructure characterization, Ting Feng, Nanjing Univ. (China); Kenneth M. Kozloff, Univ. of Michigan Medical School (USA); Cheri Deng, Univ. of Michigan (USA); Jie Yuan, Sidan Du, Nanjing Univ. (China); Xueding Wang, Univ. of Michigan Medical School (USA) . . . . . [9323-169]

Quantification of absolute blood oxygen saturation with photoacoustic imaging, Aedán Breathnach, Hrebesh Molly Subhash, Martin J. Leahy, National Univ. of Ireland, Galway (Ireland). . . . . [9323-170]

Soft tissue imaging using a high voxel rate quantum-memory-based acousto-optic technique, Luke R. Taylor, Alexander Doronin, Igor V. Meglinski, Jevon J. Longdell, Univ. of Otago (New Zealand). . . . . [9323-171]

Surgical microscopy system using multimodal imaging system and augmented reality, Changho Lee, Donghyun Lee, Pohang Univ. of Science and Technology (Korea, Republic of); Jeehyun Kim, Kyungpook National Univ. (Korea, Republic of); Chulhong Kim, Pohang Univ. of Science and Technology (Korea, Republic of). . . . . [9323-172]

Two-photon photoacoustic microscopy using image subtraction with two different pulse excitations, Yoshihisa Yamaoka, Yoshinori Harada, Kyoto Prefectural Univ. of Medicine (Japan); Masaaki Sakakura, Kyoto Univ. (Japan); Takeo Minamikawa, Kyoto Prefectural Univ. of Medicine (Japan); Shigeru Nishino, Seiji Maehara, Shujiro Hamano, Terasaki Electric Co., Ltd. (Japan); Hideo Tanaka, Tetsuro Takamatsu, Kyoto Prefectural Univ. of Medicine (Japan). . . . . [9323-173]

A self-monitored theranostic platform based on nanoparticle hyperthermia therapy and alternating magnetic field induced thermoacoustic imaging, Xiaohua Feng, Fei Gao, Yuanjin Zheng, Nanyang Technological Univ. (Singapore) . . . . . [9323-174]

Dynamic ultrasound modulated optical tomography by self-referenced photorefractive holography, Jean-Baptiste Laudereau, Institut Langevin (France); Emilie Benoit à La Guillaume, LLTech SAS (France); Fabrice Devaux, FEMTO-ST (France); Umberto Bortolozzo, Institut Non Linéaire de Nice Sophia Antipolis (France); Alexander A. Grabar, Uzhgorod National Univ. (Ukraine); Jean-Pierre Huignard, Jphopto (France); Stefania Residori, Institut Non Linéaire de Nice Sophia Antipolis (France); François Ramaz, Institut Langevin (France) . . . . . [9323-175]

Integrated system for photomechanical drug delivery and photoacoustic imaging of pharmacokinetics, Yasuyuki Tsunoi, Keio Univ. (Japan); Shunichi Sato, National Defense Medical College (Japan); Ryota Watanabe, Keio Univ. (Japan); Satoko Kawauchi, Yoshihiro Miyagawa, Daisuke Mizokami, Nobuaki Tanaka, Koji Araki, Akihiro Shiotani, Toshiya Takemura, National Defense Medical College (Japan); Mitsuhiro Terakawa, Keio Univ. (Japan). . . . . [9323-176]

Photoacoustic tomography of the human finger: towards the assessment of inflammatory joint diseases, Peter van Es, Samir Biswas, Univ. Twente (Netherlands); Hein J. Bernelot Moens, Hospital Group Twente (Netherlands); Wiendelt Steenbergen, Srirang Manohar, Univ. Twente (Netherlands). [9323-177]

Dual color photoacoustic mapping of sentinel lymph nodes in vivo using organic nanoformulated naphthalocyanines, Jeesu Kim, Changho Lee, Mansik Jeon, Pohang Univ. of Science and Technology (Korea, Republic of); Yumiao Zhang, Jonathan Lovell, Univ. at Buffalo (USA); Chulhong Kim, Pohang Univ. of Science and Technology (Korea, Republic of). . . . . [9323-178]

Denoising framework for multispectral optoacoustic imaging based on a combined wavelet-Karhunen-Loève representation, Stratis Tzoumas, Amir Rozenthal, Christian Lutzweiler, Daniel Razansky, Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany). . . . . [9323-179]

Multiscale, multiwavelength, and multiplane whole body photoacoustic image of small animals in vivo, Jeesu Kim, Mansik Jeon, Mingu Jeon, Chulhong Kim, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9323-180]

High repetition nanosecond Ti:sapphire laser for photoacoustic microscopy, Timothy K. Yang, Ulsan National Institute of Science and Technology (Korea, Republic of) and Institute of Basic Science Ctr. for Soft and Living Matter (Korea, Republic of); Min Ju Kim, Ulsan National Institute of Science and Technology (Korea, Republic of); Chulhong Kim, Pohang Univ. of Science and Technology (Korea, Republic of); Sungchul Bae, Ulsan National Institute of Science and Technology (Korea, Republic of) and Institute of Basic Science Ctr. for Soft and Living Matter (Korea, Republic of) . . . . . [9323-181]

CONFERENCE 9324

LOCATION: ROOM 252 (MEZZANINE) AND ROOM 258 (MEZZANINE)

Monday–Tuesday 9–10 February 2015 • Proceedings of SPIE Vol. 9324

Biophotonics and Immune Responses X

Conference Chair: **Wei R. Chen,** Univ. of Central Oklahoma (USA)

Program Committee: **Gianfranco L. Canti,** Univ. degli Studi di Milano (Italy); **Sandra O. Gollnick,** Roswell Park Cancer Institute (USA); **Yueqing Gu,** China Pharmaceutical Univ. (China); **Michael R. Hamblin,** Wellman Ctr. for Photomedicine (USA); **Tomas Hode,** Immunophotonics, Inc. (USA); **Yih-Chih Hsu,** Chung Yuan Christian Univ. (Taiwan); **Zheng Huang,** Univ. of Colorado Denver (USA); **Vyacheslav Kalchenko,** Weizmann Institute of Science (Israel); **Mladen Korbelik,** The BC Cancer Agency Research Ctr. (Canada); **Mark F. Naylor,** Dermatology Associates of San Antonio (USA); **Karl-Goran Tranberg,** CLS Ltd. (Sweden); **Valery V. Tuchin,** N.G. Chernyshevsky Saratov State Univ. (Russian Federation); **Xunbin Wei,** Shanghai Jiao Tong Univ. (China); **Da Xing,** South China Normal Univ. (China); **Zhihong Zhang,** Huazhong Univ. of Science and Technology (China); **Vladimir P. Zharov,** Univ. of Arkansas for Medical Sciences (USA)

MONDAY 9 FEBRUARY

SESSION 1

LOCATION: ROOM 252 (MEZZANINE) . . . . . MON 8:00 AM TO 10:05 AM

Light, Cancer, and Immune Responses - Past, Current, and Future

Session Chairs: **Tomas Hode,** Immunophotonics, Inc. (USA); **Michael R. Hamblin,** Wellman Ctr. for Photomedicine (USA)

8:00 am: **The pendulum of laser-tissue interactions swings between diagnostics and therapeutic/surgical techniques: a historical perspective** *(Invited Paper)*, Steven L. Jacques, Oregon Health & Science Univ. (USA) . . . . . [9324-1]

8:25 am: **Development of a novel cancer treatment from bench top to bedside** *(Invited Paper)*, Tomas Hode, Lu Alleruzzo, Joseph Raker, Samuel Lam, Peter Jenkins, Immunophotonics, Inc. (USA); Robert E. Nordquist, Wound Healing of Oklahoma, Inc. (USA); Wei R. Chen, Univ. of Central Oklahoma (USA) . . . . . [9324-2]

8:50 am: **Photodynamic therapy** *(Invited Paper)*, Tayyaba Hasan, Massachusetts General Hospital (USA) . . . . . [9324-3]

9:15 am: **Stimulation of anti-tumor immune response after photodynamic therapy for cancer** *(Invited Paper)*, Michael R. Hamblin, Wellman Ctr. for Photomedicine (USA) . . . . . [9324-4]

9:40 am: **Clinical experience with laser immunotherapy (LIT)** *(Invited Paper)*, Mark F. Naylor, Dermatology Associates of San Antonio (USA); Gabriela L. Ferrel, Hospital Nacional Edgardo Rebagliati Martins (Peru); Xiaosong Li, The First Affiliated Hospital of Chinese PLA General Hospital (China); Tomas Hode, Immunophotonics, Inc. (USA); Robert E. Nordquist, Wound Healing of Oklahoma, Inc. (USA); Wei R. Chen, Univ. of Central Oklahoma (USA) . . . . . [9324-5]

Coffee Break . . . . . Mon 10:05 am to 10:35 am

SESSION 2

LOCATION: ROOM 252 (MEZZANINE) . . . . . .MON 10:35 AM TO 12:15 PM

PDT and Immune Responses

Session Chairs: **Mladen Korbelik,** The BC Cancer Agency Research Ctr. (Canada); **Sandra O. Gollnick,** Roswell Park Cancer Institute (USA)

10:35 am: **Activity of glycated chitosan and other adjuvants to PDT vaccines** *(Invited Paper)*, Mladen Korbelik, Judit Banath, BC Cancer Agency (Canada); Wei R. Chen, Univ. of Central Oklahoma (USA) . . . . . [9324-6]

11:00 am: **Development of photodynamic therapy regimens that control primary tumor growth and inhibit secondary disease** *(Invited Paper)*, Sandra O. Gollnick, Roswell Park Cancer Institute (USA) . . . . . [9324-7]

11:25 am: **Non-ablative fractional laser in conjunction with microneedle arrays for improved cutaneous vaccination** *(Invited Paper)*, Mei X. Wu, Ji Wang, Bo Li, Harvard Medical School (USA) . . . . . [9324-8]

11:50 am: **ALA-PDT mediated DC vaccine for skin squamous cell carcinoma** *(Invited Paper)*, Jie Ji, Xiuli Wang, Zhixia Fan, Shanghai Dermatology Hospital (China); Wei R. Chen, Univ. of Central Oklahoma (USA); Haiyan Zhang, Shanghai Dermatology Hospital (China); Hongwei Wang, Huadong Hospital (China); Lei Shi, Shanghai Skin Diseases and STD Hospital (China) . . . . . [9324-9]

Lunch Break . . . . . .Mon 12:15 pm to 1:45 pm

SESSION 3

LOCATION: ROOM 258 (MEZZANINE) . . . . . MON 1:45 PM TO 2:45 PM

NOTE ROOM CHANGE

Laser Immunotherapy

Session Chairs: **Mark F. Naylor,** Dermatology Associates of San Antonio (USA); **Richard M. Levenson,** Univ. of California, Davis (USA)

1:45 pm: **Melanoma patients treated with laser immunotherapy (LIT) and T-cell stimulators (ipilimumab)**, Mark F. Naylor, Dermatology Associates of San Antonio (USA); Tomas Hode, Immunophotonics, Inc. (USA); Robert E. Nordquist, Wound Healing of Oklahoma, Inc. (USA); Wei R. Chen, Univ. of Central Oklahoma (USA) . . . . . [9324-10]

2:05 pm: **Translation of immunophotonic cancer therapy: from mouse to human to cat**, Richard M. Levenson, Univ. of California, Davis (USA); Tomas Hode, Immunophotonics, Inc. (USA). . . . . [9324-11]

2:25 pm: **Thermal cytotoxic effects of laser immunotherapy assisted with cyclophosphamide**, Cody F. Bahavar, Wei R. Chen, Joseph T. Acquaviva III, Feifan Zhou, Sheyla Rabei, Aamr Hasanjee, Univ. of Central Oklahoma (USA); Roman F. Wolf, The Univ. of Oklahoma Health Sciences Ctr. (USA) . . . [9324-12]

SESSION 4

LOCATION: ROOM 258 (MEZZANINE) . . . . . MON 2:45 PM TO 3:30 PM

Monitoring Immune Activities I

Session Chairs: **Zhihong Zhang,** Huazhong Univ. of Science and Technology (China); **Xunbin Wei,** Shanghai Jiao Tong Univ. (China)

2:45 pm: **Visualization of fluorescent model antigen-elicited specific immune response in vivo** *(Invited Paper)*, Zhihong Zhang, Huazhong Univ. of Science and Technology (China). . . . . [9324-13]

3:10 pm: **In vivo imaging of dynamic change of multiple immune cells in tumor microenvironment during immunotherapy**, Shuhong Qi, Zhihong Zhang, Huazhong Univ. of Science and Technology (China) . . . . . [9324-14]

Coffee Break . . . . . .Mon 3:30 pm to 4:00 pm

SESSION 5

LOCATION: ROOM 258 (MEZZANINE) . . . . . .MON 4:00 PM TO 5:50 PM

Monitoring Immune Activities II

Session Chairs: **Xunbin Wei,** Shanghai Jiao Tong Univ. (China); **Ekaterina I. Galanzha,** Univ. of Arkansas for Medical Sciences (USA)

4:00 pm: **Noninvasive and label-free detection of circulating melanoma cells by in vivo photoacoustic flow cytometry** *(Invited Paper)*, Xunbin Wei, Shanghai Jiao Tong Univ. (China) . . . . . [9324-15]

4:25 pm: **Ultrafast photoswitching of fluorescent proteins for tracking of single circulating cells in vivo** *(Invited Paper)*, Ekaterina I. Galanzha, Dmitry A. Nedosekin, Univ. of Arkansas for Medical Sciences (USA); Vladislav V. Verkhusha, Albert Einstein College of Medicine of Yeshiva Univ. (USA); Vladimir P. Zharov, Univ. of Arkansas for Medical Sciences (USA) . . . . . [9324-16]

4:50 pm: **Imaging tuberculosis cytosolic translocation with two-photon fluorescence resonance energy transfer microscopy**, Yassel Acosta, Qi Zhang, Hugues Ouelett, Jianjun Sun, Chunqiang Li, The Univ. of Texas at El Paso (USA) . . . . . [9324-17]

5:10 pm: **Quantitative characterization of neutrophil chemotaxis using micro-optical coherence tomography**, Kengyeh K. Chu, Mark E. Kusek, Lael Yonker, Massachusetts General Hospital (USA); Jin-hyeob Ryu, Massachusetts General Hospital (USA) and The Univ. of Tokyo (Japan); Bryan P. Hurley, Guillermo J. Tearney, Massachusetts General Hospital (USA). . [9324-18]

5:30 pm: **Evaluation of the effect of recombinant murine interleukin-12 on skin regeneration and bone marrow-derived cell trafficking**, Joanne Li, Andrew J. Bower, Univ. of Illinois at Urbana-Champaign (USA); Vladimir Vainstein, Zoya Gluzman-Poltorak, Neumedicines Inc. (USA); Eric J. Chaney, Marina Marjanovic, Univ. of Illinois at Urbana-Champaign (USA); Lena A. Basile, Neumedicines Inc. (USA); Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9324-19]

POSTERS-MONDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . MON 5:30 PM TO 7:30 PM

Conference attendees are invited to attend the BiOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Treating cutaneous squamous cell carcinoma using ALA PLGA nanoparticles-mediated PDT in a mouse model, Jie Ji, Xiaojie Wang, Xiuli Wang, Lei Shi, Shanghai Dermatology Hospital (China); Hongwei Wang, Huadong Hospital, Fudan Univ. (China) . . . . . [9324-29]

Temperature simulation of photothermal therapy in different size of tumors, Zhifang Li, Hui Li, Fujian Normal Univ. (China); Wei R. Chen, Univ. of Central Oklahoma (USA) . . . . . [9324-30]

Immunosuppressive effects of 365nm ultraviolet irradiation in human neutrophils in vitro, Leiting Pan, Nankai Univ. (China) . . . . . [9324-31]

The action of NIR (808nm) laser radiation and gold nanorods labeled with IgA and IgG human antibodies on methicillin-resistant and methicillin sensitive strains of staphylococcus aureus, Elena S. Tuchina, Pavel O. Petrov, Kristina V. Kozina, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Fulvio Ratto, Istituto di Fisica Applicata Nello Carrara (Italy); Sonia Centi, Univ. degli Studi di Firenze (Italy); Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy); Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) . . . . . [9324-32]

In vitro and in vivo antitumor efficacy of berberine-nanostructured lipid carriers against H22 tumor, Zhiping Wang, Guangdong Pharmaceutical Univ. (China); Junbiao Wu, Guangzhou Univ. of Chinese Medicine (China); Tongsheng Chen, South China Normal Univ. (China); Qun Zhou, Huazhong Univ. of Science and Technology (China); Yifei Wang, Jinan Univ. (China) . . . . . [9324-33]

Photo-nano-therapy for bactericidal using graphene oxide, Jie Wu, Jin Chao Gao M.D., Xian Pei Chen, Yu Jia Xie, Beijing Normal Univ. (China) . . . . [9324-34]

Fluorescent and metabolic imaging of an Octa-RGD probe for detecting binding affinity in xenograft tumor bearing mice, Shuang Sha, Qiaoya Lin, Anle Wang, Zhihong Zhang, Britton Chance Ctr. for Biomedical Photonics (China) . . . . . [9324-35]

Tumor redox metabolism correlation with the expression level of red fluorescent protein, Shuang Sha, Anle Wang, Qiaoya Lin, Zhihong Zhang, Britton Chance Ctr. for Biomedical Photonics (China) . . . . . [9324-36]

Assessment of antiretroviral drug metabolism within optically treated cell populations, Thulile Khanyile, Council for Scientific and Industrial Research (South Africa) and Univ. of the Witwatersrand (South Africa); Patience Mthunzi, Council for Scientific and Industrial Research (South Africa) . . . . . [9324-37]

Improving the signal analysis for in vivo photoacoustic flow cytometry, Xunbin Wei, Shanghai Jiao Tong Univ. (China) . . . . . [9324-38]

Effects of laser immunotherapy for the treatment of metastatic tumor cells, Cody F. Bahavar, Aamr Hasanjee, Feifan Zhou, Univ. of Central Oklahoma (USA); Rebaz A. Ahmed, Kurdistan Institution for Strategic Study and Scientific Research (Iraq); Sheyla Rabei, Univ. of Central Oklahoma (USA); Hong Liu, The Univ. of Oklahoma (USA); Wei R. Chen, Univ. of Central Oklahoma (USA) . . . . . [9324-39]

In vivo efficacy studies of immunologically modified carbon nanotubes and phototherapy against rat tumors, Joseph T. Acquaviva III, Cody F. Bahavar, Aamr Hasanjee, Fefian Zhou, Univ. of Central Oklahoma (USA); Roman F. Wolf, Eric W. Howard, The Univ. of Oklahoma Health Sciences Ctr. (USA); Wei R. Chen, Univ. of Central Oklahoma (USA) . . . . . [9324-40]

The combination of radiotherapy and immunotherapy using glycated chitosan as an immunological stimulant, Chun-Yuan Chang, Yi-Jang Lee, National Yang-Ming Univ. (Taiwan); Wei R. Chen, Univ. of Central Oklahoma (USA); Jyh-Der Leu, Taipei City Hospital (Taiwan) . . . . . [9324-41]

Combination therapy of potential gene and photodynamic therapy to enhance oral cancer therapeutic effect, Chia-Hsien Yeh, Chung Yuan Christian Univ. (Taiwan); Leaf Huang, Chung Yuan Christian Univ. (Taiwan) and The Univ. of North Carolina at Chapel Hill (USA); Gang Zheng, Univ. of Toronto (Canada); Yih-Chih Hsu, Chung Yuan Christian Univ. (Taiwan) . . . . . [9324-42]

DQE characterization of a high-energy in-line phase contrast prototype under different kVp and beam filtration, Di Wu, Molly Wong, Yuhua Li, The Univ. of Oklahoma (USA); Wei R. Chen, Univ. of Central Oklahoma (USA); Xizeng Wu, The Univ. of Alabama at Birmingham (USA); Hong Liu, The Univ. of Oklahoma (USA) . . . . . [9324-43]

TUESDAY 10 FEBRUARY

SESSION 6

LOCATION: ROOM 258 (MEZZANINE) . . . . . TUE 8:30 AM TO 10:00 AM

Nanotechnology and Immune Responses

Session Chairs: **Feifan Zhou,** Univ. of Central Oklahoma (USA); **Vyacheslav Kalchenko,** Weizmann Institute of Science (Israel)

8:30 am: **Photo-nano immunotherapy for breast metastatic cancer using synergistic SWNT-GC** *(Invited Paper)*, Feifan Zhou, Univ. of Central Oklahoma (USA); Rebaz A. Ahmed, Kurdistan Institution for Strategic Study and Scientific Research (Iraq); Hong Liu, The Univ. of Oklahoma (USA); Wei R. Chen, Univ. of Central Oklahoma (USA) . . . . . [9324-20]

8:55 am: **Multi-modal optical assessment of vascular changes induced by the immune reaction** *(Invited Paper)*, Vyacheslav Kalchenko, Yuri Kuznetsov, Weizmann Institute of Science (Israel); Igor V. Meglinski, Univ. of Otago (New Zealand); Alon Harmelin, Weizmann Institute of Science (Israel) . . . . . [9324-21]

9:20 am: **Detection of squamous carcinoma cells using EGFR-conjugated gold nanoparticles**, Wei-Yun Dai, Szetsen Lee, Yih-Chih Hsu, Chung Yuan Christian Univ. (Taiwan). . . . . [9324-22]

9:40 am: **Molecular nanoprobes for cancer imaging**, Jie Zheng, The Univ. of Texas at Dallas (USA) . . . . . [9324-23]

Coffee Break . . . . . Tue 10:00 am to 10:50 am

SESSION 7

LOCATION: ROOM 258 (MEZZANINE) . . . . . TUE 10:50 AM TO 12:15 PM

Novel Optical Technology

Session Chairs: **Zheng Huang,** Univ. of Colorado Denver (USA); **Patience Mthunzi,** CSIR National Laser Ctr. (South Africa)

10:50 am: **The effect of low level laser therapy on HIV-1 infected cells** *(Invited Paper)*, Patience Mthunzi, Council for Scientific and Industrial Research (South Africa); Fakazi C. Nhachissambe, Council for Scientific and Industrial Research (South Africa) and Univ. of KwaZulu-Natal (South Africa); Thulile Khanyile, Council for Scientific and Industrial Research (South Africa) and Univ. of the Witwatersrand (South Africa) . . . . . [9324-25]

11:15 am: **Selective delivery of antiretroviral drugs into live HIV-1 permissive cells using pulsed laser light**, Thulile Khanyile, Council for Scientific and Industrial Research (South Africa) and Univ. of the Witwatersrand (South Africa); Patience Mthunzi, Council for Scientific and Industrial Research (South Africa). . . . . [9324-26]

11:35 am: **Real-time monitoring of tumor response to preoperative radiochemotherapy for rectal carcinoma by nonlinear optical microscopy**, Lianhuang Li, Fujian Normal Univ. (China); Zhifen Chen, Department of Colorectal Surgery, The Affiliated Union Hospital of Fujian Medical University (China); Xingfu Wang, Department of Pathology, The First Affiliated Hospital of Fujian Medical University (China); Weizhong Jiang, Guoxian Guan, Department of Colorectal Surgery, The Affiliated Union Hospital of Fujian Medical University (China); Jianxin Chen, Fujian Normal Univ. (China). . . . . [9324-27]

11:55 am: **Optical coherence tomography for monitoring the process of skin cancer induced by UVB**, Shulian Wu, Yuxia Wang, Hui Li, Zheng Huang, Fujian Normal Univ. (China). . . . . [9324-28]

CONFERENCE 9325
LOCATION: ROOM 270 (MEZZANINE) AND ROOM 238 (MEZZANINE)

Saturday 7 February 2015 • Proceedings of SPIE Vol. 9325

Design and Performance Validation of Phantoms Used in Conjunction with Optical Measurement of Tissue VII

Conference Chairs: **David W. Allen,** National Institute of Standards and Technology (USA); **Jean-Pierre Bouchard,** INO (Canada)

Program Committee: **Anant Agrawal,** U.S. Food and Drug Administration (USA); **Gerald T. Fraser,** National Institute of Standards and Technology (USA); **Rongguang Liang,** College of Optical Sciences, The Univ. of Arizona (USA); **Robert J. Nordstrom,** National Cancer Institute (USA); **Ramesh Raghavachari,** U.S. Food and Drug Administration (USA); **Heidrun Wabnitz,** Physikalisch-Technische Bundesanstalt (Germany)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 270 (MEZZANINE) . . . . . SAT 8:20 AM TO 10:30 AM

Phantom Design, Construction, and Measurement

Session Chair: **David W. Allen,**
National Institute of Standards and Technology (USA)

8:20 am: **Dependence of optical scattering on mixing temperature and time in Intralipid-gelatin-water based hydrogel phantoms**, Puxiang Lai, Washington Univ. School of Medicine in St. Louis (USA); Xiao Xu, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9325-2]

8:40 am: **Fractal phantom design for mimicking spectral and spatial scattering in tissue**, Jeremy D. Rogers, Univ. of Wisconsin-Madison (USA) . . . . . [9325-3]

9:00 am: **Measurement of the optical properties of solid biomedical phantoms at NIST**, Paul Lemaillet, David W. Allen, Jeeseong C. Hwang, National Institute of Standards and Technology (USA). . . . . [9325-4]

9:20 am: **Solid switchable phantom for diffuse optical imaging**, Antonio Pifferi, Alessandro Torricelli, Rinaldo Cubeddu, Davide Contini, Sanathana Konugolu Venkata Sekar, Politecnico di Milano (Italy); Fabrizio Martelli, Univ. degli Studi di Firenze (Italy); Lorenzo Spinelli, Andrea Farina, Istituto di Fotonica e Nanotecnologie, CNR (Italy); Mikhail Mazurenka, Physikalisch-Technische Bundesanstalt (Germany) and Hannoversches Zentrum für Optische Technologien (Germany); Peter Pawlak, Heidrun Wabnitz, Physikalisch-Technische Bundesanstalt (Germany). . . . . [9325-5]

9:40 am: **Fabrication of anatomically tapered foveal pits for retinal phantoms for optical coherence tomography**, Gary C. F. Lee, Gennifer T. Smith, Monica N. Agrawal, Audrey K. Ellerbee, Stanford Univ. (USA) . . . [9325-6]

10:00 am: **Color accuracy and reproducibility in whole slide imaging scanners** *(Invited Paper)*, Prarthana Shrestha, Bas Hulsken, Philips Digital Pathology Solutions (Netherlands) . . . . . [9325-23]

Coffee Break . . . . . Sat 10:30 am to 10:50 am

SESSION 2

LOCATION: ROOM 270 (MEZZANINE) . . . . . SAT 10:50 AM TO 12:40 PM

3D, Multilayered, and Functional Phantoms

Session Chair: **Pascal Gallant,** INO (Canada)

10:50 am: **3D printing of tissue-simulating phantoms for standardized biomedical optical imaging** *(Invited Paper)*, Ronald X. Xu, Peng Liu, The Ohio State Univ. (USA). . . . . [9325-7]

11:20 am: **3D printed biomimetic vascular phantoms for assessment of hyperspectral imaging and diffuse reflectance systems**, Jianting Wang, Anthony Melchiorri, Univ. of Maryland, College Park (USA); Jessica C. Ramella-Roman, Florida International Univ. (USA); Scott A. Mathews, The Catholic Univ. of America (USA); James Coburn, U.S. Food and Drug Administration (USA); Brian S. Sorg, National Cancer Institute (USA); Yu Chen, Univ. of Maryland, College Park (USA); T. Joshua Pfefer, U.S. Food and Drug Administration (USA) . . . . . [9325-8]

11:40 am: **Characterization of new materials and methods for fabricating a 3D, disease-mimicking bladder tissue phantom**, Gennifer T. Smith, Kristen L. Lurie, Audrey K. Ellerbee, Stanford Univ. (USA) . . . . . [9325-9]

12:00 pm: **Fabrication of a multilayer optical tissue phantom simulating human skin structure**, Jihoon Park, Yonsei Univ. (Korea, Republic of); Myungjin Ha, Sung Kon Yu, Edalat Radfar, Eunkwon Jun, Nara Lee, Yonsei Univ (Korea, Republic of); Byungjo Jung, Yonsei Univ. (Korea, Republic of) . . . . . [9325-10]

12:20 pm: **Multilayered phantoms with tunable optical properties for a better understanding of light/tissue interactions**, Blandine Roig, Anne Koenig, François Perraut, CEA-LETI (France); Olivier Piot, Matrice Extracellulaire et Dynamique Cellulaire, CNRS, Univ. de Reims Champagne-Ardenne (France); Séverine Vignoud, CEA-LETI (France); Jonathan Lavaud, Institut Albert Bonniot (France); Michel Manfait, Matrice Extracellulaire et Dynamique Cellulaire, CNRS, Univ. de Reims Champagne-Ardenne (France); Jean-Marc Dinten, CEA-LETI (France) . . . . . [9325-11]

Lunch Break . . . . . Sat 12:40 pm to 2:10 pm

SESSION 3

LOCATION: ROOM 238 (MEZZANINE) . . . . . SAT 2:10 PM TO 3:10 PM

NOTE ROOM CHANGE

Standards and Phantoms in Biophotonics

Joint Session with Conferences 9315 and 9325

Session Chairs: **David W. Allen,** National Institute of Standards and Technology (USA); **Rongguang Liang,** College of Optical Sciences, The Univ. of Arizona (USA)

2:10 pm: **Making digital phantoms with spectral and spatial light modulators for quantitative applications of hyperspectral optical medical imaging devices**, Jeeseong C. Hwang, David W. Allen, Bonghwan Chon, Aniruddha Ray, National Institute of Standards and Technology (USA); David M. McClatchy III, Stephen C. Kanick, Brian W. Pogue, Dartmouth College (USA) . . . . . [9325-12]

2:30 pm: **Design and phantom-based validation of a bimodal ultrasound-photoacoustic imaging system for spectral detection of optical biomarkers**, William C. Vogt, Congxian Jia, Keith A. Wear, Brian S. Garra, T. Joshua Pfefer, U.S. Food and Drug Administration (USA) . . . . . [9315-1]

2:50 pm: **Oximetry system performance assessment with POM phantoms incorporating hemoglobin calibration standards and customized saturation levels**, Hyounguk Jang, Karam Singh, Univ. of Maryland, College Park (USA); T. Joshua Pfefer, U.S. Food and Drug Administration (USA); Yu Chen, Univ. of Maryland, College Park (USA). . . . . [9315-2]

CONFERENCE 9325
LOCATION: ROOM 270 (MEZZANINE)

POSTER SESSION AND COFFEE BREAK
LOCATION: HALL A (WITH BIOS EXPO) . . . . . SAT 3:00 PM TO 4:00 PM

Attendees are invited to view the conference posters, which will be available on Saturday. The poster session, with authors present, will be held from 3:00 to 4:00 PM on Saturday afternoon, in conjunction with the coffee break.

POSTER AUTHORS: Poster setup is scheduled from 12:00 PM (noon) on Saturday in South Hall A. Please plan to stand with your poster during the poster session on Saturday from 3:00 to 4:00 PM. Posters may remain on the boards both Saturday and Sunday but must be removed following the Sunday afternoon poster session/coffee break. Posters left on the boards after this time will be discarded.

Wide range imaging based on dual scanning handheld OCT probe, Hyeongeun Kim, Sungwon Shin, Yubin Son, Ulsan National Institute of Science and Technology (Korea, Republic of); Pil Un Kim, Oz-tec Co., Ltd. (Korea, Republic of); Woonggyu Jung, Ulsan National Institute of Science and Technology (Korea, Republic of) . . . . . [9325-13]

Effects of scattering and absorbing medium in the fluorescence conversion efficiency of physical tissue models, Suresh Anand, Sujatha Narayanan Unni, Indian Institute of Technology Madras (India) . . . . . [9325-15]

SESSION 4
LOCATION: ROOM 270 (MEZZANINE) . . . . . SAT 4:00 PM TO 4:40 PM

NOTE ROOM CHANGE

Optical Properties and Characterization of Phantoms

Session Chair: **Pascal Gallant,** INO (Canada)

4:00 pm: **Diffuse reflectance based inverse Monte Carlo model for the estimation of the dependent scattering of intralipid 20% using a simplified two fiber oblique geometry set up**, Michael Raju, Sujatha Narayanan Unni, Indian Institute of Technology Madras (India) . . . . . [9325-14]

4:20 pm: **Diffuse photon density wave measurements in comparison with the Monte Carlo simulations**, Vladimir L. Kuzmin, Saint Petersburg State Univ. (Russian Federation); David Diaz, Michael T. Neidrauer, Leonid A. Zubkov, Drexel Univ. (USA) . . . . . [9325-16]

BIOS HOT TOPICS
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

CONFERENCE 9326
LOCATION: ROOM 272 (MEZZANINE)

Sunday–Monday 8–9 February 2015 • Proceedings of SPIE Vol. 9326

Energy-based Treatment of Tissue and Assessment VIII

Conference Chair: **Thomas P. Ryan,** ArthroCare (USA)

Program Committee: **James E. Coad M.D.,** West Virginia Univ. (USA); **Chris J. Diederich,** Univ. of California, San Francisco (USA); **Paul J. Hoopes,** Dartmouth Medical School (USA); **Paul R. Stauffer,** Thomas Jefferson Univ. (USA); **Sharon L. Thomsen,** Pathology Consultant to Engineers and Physicists (USA); **John A. Pearce,** The Univ. of Texas at Austin (USA)

SUNDAY 8 FEBRUARY

SESSION 1
LOCATION: ROOM 272 (MEZZANINE) . . . . SUN 8:00 AM TO 10:00 AM

Keynote Session
Session Chair: **Thomas P. Ryan,** ArthroCare Corp. (USA)

8:00 am: **Practical pathology for thermal tissue applications** *(Keynote Presentation)*, James E. Coad, Jeffrey Vos, West Virginia Univ. (USA); Sharon Thomsen, Consultant (USA) . . . . . [9326-1]

8:30 am: **Coupling of physical characteristics of non-ionizing irradiation to specific mechanisms of cell death: are we there yet?** *(Keynote Presentation)*, Sharon Thomsen, Consultant (USA) . . . . . [9326-2]

9:00 am: **Utility and translatability of mathematical modeling, cell culture and small and large animal models in magnetic nanoparticle hyperthermia cancer treatment research** *(Keynote Presentation)*, P. Jack Hoopes, Geisel School of Medicine at Dartmouth College (USA) and Thayer School of Engineering at Dartmouth (USA); Alicia A. Petryk, Geisel School of Medicine at Dartmouth College (USA); John A. Pearce, The Univ. of Texas at Austin (USA); Thomas Ryan, FREEFALL Consulting Group LLC (USA) . . . . . [9326-3]

9:30 am: **Developing an open platform for evidence-based microwave thermal ablation treatment planning and validation** *(Keynote Presentation)*, Garron Deshazer, Damian E. Dupuy, Rhode Island Hospital (USA); Edward Walsh, Brown Univ. (USA); Punit Prakash, Kansas State Univ. (USA); David Glidden, Scott A. Collins, Madeleine L. Cook, Rhode Island Hospital (USA); Krishna Nand Kesheva Murthy, Brown Univ. (USA); Thomas P. Ryan, Consultant (USA); Benjamin B. Kimia, Brown Univ. (USA); Derek Merck, Rhode Island Hospital (USA) . . . . . [9326-4]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 2
LOCATION: ROOM 272 (MEZZANINE) . . . . . .SUN 10:30 AM TO 11:50 AM

Plasma Medicine/ Argon Plasma
Session Chair: **John A. Pearce,** The Univ. of Texas at Austin (USA)

10:30 am: **Antimicrobial outcomes in plasma medicine** *(Invited Paper)*, Thomas P. Ryan, Kenneth R. Stalder, Jean Woloszko, ArthroCare Corp. (USA) and Smith & Nephew, Inc. (USA). . . . . [9326-5]

10:50 am: **The differing behavior of electrosurgical devices made of various electrode materials operating under plasma conditions** *(Invited Paper)*, Kenneth R. Stalder, Thomas P. Ryan, Jonathan Gaspredes, Jean Woloszko, Smith & Nephew plc (USA) . . . . . [9326-6]

11:10 am: **Introduction of argon beam coagulation functionality to robotic procedures using the ABC D-Flex probe: equivalency with an existing laparoscopic instrument**, Renee A. Merchel, Kelli S. Barnes, Kenneth D. Taylor, ConMed Advanced Energy (USA) . . . . . [9326-7]

11:30 am: **Characterization and literature review of bowel perforation injuring using argon beam coagulation**, Kelli S. Barnes, Renee A. Merchel, Kenneth D. Taylor, ConMed Advanced Energy (USA) . . . . . [9326-8]

Lunch Break . . . . . Sun 11:50 am to 1:20 pm

SESSION 3
LOCATION: ROOM 272 (MEZZANINE) . . . . . .SUN 1:20 PM TO 3:00 PM

Vessel Sealing and Fusion
Session Chair: **Kenneth D. Taylor,** ConMed Electrosurgery (USA)

1:20 pm: **Numerical model study of radio frequency vessel sealing thermodynamics** *(Invited Paper)*, John A. Pearce, The Univ. of Texas at Austin (USA) . . . . . [9326-9]

1:50 pm: **The role of glycosaminoglycans in tissue adhesion during energy-based vessel sealing**, Eric A. Kramer, Nicholas S. Anderson, Univ. of Colorado at Boulder (USA); Kenneth D. Taylor, ConMed Electrosurgery (USA); Virginia L. Ferguson, Mark E. Rentschler, Univ. of Colorado at Boulder (USA) . . . . [9326-10]

2:10 pm: **A novel parameter for predicting arterial fusion and ablation in finite element models**, Douglas Fankell, Virginia L. Ferguson, Univ. of Colorado at Boulder (USA); Kenneth D. Taylor, ConMed Electrosurgery (USA); Mark E. Rentschler, Univ. of Colorado at Boulder (USA) . . . . . [9326-11]

2:35 pm: **A simplified, low power system for effective vessel sealing**, Allison B. Lyle, Jenifer S. Kennedy, Dale F. Schmaltz, JustRight Surgical, LLC (USA) . . . . . [9326-12]

Coffee Break . . . . . Sun 3:00 pm to 3:30 pm

SESSION 4
LOCATION: ROOM 272 (MEZZANINE) . . . . . .SUN 3:30 PM TO 5:30 PM

Thermal Therapy
Session Chair: **Punit Prakash,** Kansas State Univ. (USA)

3:30 pm: **Tissue healing response following hyperthermic vapor ablation in the porcine longissimus muscle**, John T. Grantham, Brian T. Grisez, Justin Famoso, West Virginia Univ. (USA); Michael F. Hoey, NxThera, Inc. (USA); Christopher M. Dixon, New York Medical College (USA); James E. Coad, West Virginia Univ. (USA) . . . . . [9326-13]

3:50 pm: **Development of an endoluminal high-intensity ultrasound applicator for image-guided thermal therapy of pancreatic tumors**, Matthew Adams, Univ. of California, Berkeley (USA) and Univ. of California, San Francisco (USA); Serena J. Scott, Vasant A. Salgaonkar, Peter D. Jones, Univ. of California, San Francisco (USA); Juan C. Plata-Camargo, Stanford Univ. (USA); Graham Sommer, Stanford Univ. Medical Ctr. (USA); Chris J. Diederich, Univ. of California, San Francisco (USA) and Univ. of California, Berkeley (USA) [9326-14]

4:10 pm: **Circumferential targeted renal sympathetic nerve denervation with preservation of the renal arterial wall using intra-luminal ultrasound**, Austin R. Roth, ReCor Medical, Inc. (USA). . . . . [9326-15]

4:30 pm: **Catheter-based high-intensity ultrasound for epicardial ablation of the left ventricle: device design and in vivo feasiblity**, Vasant A. Salgaonkar, Babak Nazer, Peter D. Jones, Yasuaki Tanaka, Univ. of California, San Francisco (USA); Bennett Ng, Univ. of California, San Francisco (USA) and Univ. of California, Berkeley (USA); Srikant Duggirala, Chris J. Diederich, Edward P. Gerstenfeld, Univ. of California, San Francisco (USA) . . . . . [9326-16]

4:50 pm: **Design and analysis of a conformal patch antenna for a wearable breast hyperthermia treatment system**, Sergio Curto, Manoshika Ramasamy, Kansas State Univ. (USA); Minyoung Suh, North Carolina State Univ. (USA); Punit Prakash, Kansas State Univ. (USA) . . . . . [9326-17]

5:10 pm: **Effect of the superposition of a static magnetic field orthogonal to an alternating magnetic field in hyperthermia therapy treatments**, Jose Bante-Guerra, Dianela J. Diaz-Bleis, Caridad G. Vales-Pinzón, Ivan Y. Forero-Sandoval, Juan D. Macias, Yolanda Freile-Pelegrin, Juan J. Alvarado-Gil, Ctr. de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional (Mexico) . . . . . [9326-20]

CONFERENCE 9326
LOCATION: ROOM 272 (MEZZANINE)

BIOS SUNDAY PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their ground-breaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

MONDAY 9 FEBRUARY

SESSION 5
LOCATION: ROOM 272 (MEZZANINE) . . . . . MON 8:00 AM TO 10:00 AM

Nanomedicine
Session Chair: **Chris J. Diederich,**
Univ. of California, San Francisco (USA)

8:00 am: **Similarities and differences in ablative and non-ablative iron oxide nanoparticle hyperthermia cancer treatment** *(Invited Paper)*, Alicia A. Petryk, Geisel School of Medicine at Dartmouth College (USA); Adwiteeya Misra, Elliot J. Kastner, Thayer School of Engineering at Dartmouth (USA); Courtney M. Mazur, Geisel School of Medicine at Dartmouth College (USA); P. Jack Hoopes, Geisel School of Medicine at Dartmouth College (USA) and Thayer School of Engineering at Dartmouth (USA) . . . . . [9326-21]

8:20 am: **Magnetic nanoparticle hyperthermia cancer treatment efficacy dependence on cellular and tissue level particle concentration and particle heating properties**, Alicia A. Petryk, Geisel School of Medicine at Dartmouth College (USA); Adwiteeya Misra, Thayer School of Engineering at Dartmouth (USA); Courtney M. Mazur, James D. Petryk, P. Jack Hoopes, Geisel School of Medicine at Dartmouth College (USA) . . . . . [9326-22]

8:40 am: **Alternating magnetic field optimization for IONP hyperthermia cancer treatment**, Elliot J. Kastner, Russell Reeves, James D. Petryk, Alicia A. Petryk, Adwiteeya Misra, William Bennett, Robert V. Stigliano, P. Jack Hoopes, Dartmouth College (USA) . . . . . [9326-23]

9:00 am: **Macroscopic and microscopic biodistribution of intravenously administered iron oxide nanoparticles**, Adwiteeya Misra, Thayer School of Engineering at Dartmouth (USA); Alicia A. Petryk, Geisel School of Medicine at Dartmouth College (USA); P. Jack Hoopes, Geisel School of Medicine at Dartmouth College (USA) and Thayer School of Engineering at Dartmouth (USA) . . . . . [9326-24]

9:20 am: **MRI guided energized-magnetic particle treatments**, Stephen Barry, Emanate Biotech (USA); Michael Garwood, Univ. of Minnesota, Twin Cities (USA); Paul R. Stauffer, Thomas Jefferson Univ. (USA); Alicia A. Petryk, Dartmouth Hitchcock Medical Ctr. (USA); Bo Lu, Thomas Jefferson Univ. (USA); P. Jack Hoopes, Dartmouth Hitchcock Medical Ctr. (USA) . . . . . [9326-25]

9:40 am: **Effect of radiation energy and intracellular iron dose on iron oxide nanoparticle enhancement of radiation cytotoxicity**, Courtney M. Mazur, Dartmouth College (USA) and Univ. of California, Berkeley (USA); Rendall R. Strawbridge, Alicia A. Petryk, Dartmouth College (USA); Ella S. Thompson, Dartmouth College (USA) and Emory Univ. (USA); P. Jack Hoopes, Dartmouth College (USA) and Thayer School of Engineering (USA). . . . . [9326-26]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

SESSION 6
LOCATION: ROOM 272 (MEZZANINE) . . . . . MON 10:30 AM TO 11:50 AM

Imaging
Session Chair: **P. Jack Hoopes D.V.M.,**
Geisel School of Medicine (USA)

10:30 am: **SWIFT-MRI imaging and quantitative assessment of IONPs in murine tumors following intra-tumor and systemic delivery**, Russell Reeves, Alicia A. Petryk, Geisel School of Medicine at Dartmouth College (USA); Elliot J. Kastner, Thayer School of Engineering at Dartmouth (USA); Jinjin Zhang, Hattie Ring, Michael Garwood, Univ. of Minnesota, Twin Cities (USA); P. Jack Hoopes, Geisel School of Medicine at Dartmouth College (USA) and Thayer School of Engineering at Dartmouth (USA) . . . . . [9326-27]

10:50 am: **Evaluate high intensity focused ultrasound ablation of prostate tumor with hyperpolarized 13C imaging biomarkers** , Jessie E. Lee, Univ. of California, San Francisco (USA) . . . . . [9326-28]

11:10 am: **Characterization of nanosecond pulse electrical field shock waves using advanced imaging techniques**, L. Chris Mimun, The Univ. of Texas at San Antonio (USA); Caleb C. Roth, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Ronald A. Barnes Jr., Dhiraj Kumar Sardar, The Univ. of Texas at San Antonio (USA); Hope T. Beier, Bennett L. Ibey, Air Force Research Lab. (USA) . . . . . [9326-29]

11:30 am: **Nonlinear imaging of lipid membrane alterations elicited by nanosecond pulsed electric fields**, Erick K. Moen, The Univ. of Southern California (USA); Gary L. Thompson, Oak Ridge Institute for Science & Education (USA); Andrea M. Armani, The Univ. of Southern California (USA); Hope T. Beier, Bennett L. Ibey, Air Force Research Lab. (USA) . . . . . [9326-30]

Lunch Break . . . . . Mon 11:50 am to 1:20 pm

SESSION 7
LOCATION: ROOM 272 (MEZZANINE) . . . . . MON 1:20 PM TO 3:00 PM

Simulations and Treatment Planning
Session Chair: **Kenneth R. Stalder,** ArthroCare Corp. (USA)

1:20 pm: **Multiple-antenna microwave ablation: analysis of non-parallel antenna implants**, Souvick Mukherjee, Sergio Curto, Nathan Albin, Bala Natarajan, Punit Prakash, Kansas State Univ. (USA) . . . . . [9326-31]

1:40 pm: **Three-dimensional finite-element analyses of multiple electrode bipolar RF global endometrial ablation**, Jia Hua Xiao, Cardea Medsystem Co., Ltd. (China); Tao Hu, Dept. of Mechanical Engineering (China) . . . . . [9326-32]

2:00 pm: **Finite element method (FEM) model of the mechanical stress on phospholipid membranes from shockwaves produced in nanosecond electric pulses (nsEP)**, Ronald A. Barnes Jr., The Univ. of Texas at San Antonio (USA); Caleb C. Roth, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Mehdi Shadaram, The Univ. of Texas at San Antonio (USA); Hope T. Beier, Bennett L. Ibey, Air Force Research Lab. (USA) . . . . . [9326-33]

2:20 pm: **Development of a fast 3D treatment planning platform for clinical interstitial microwave hyperthermia within free-hand obliquely implanted HDR catheters**, Vasant A. Salgaonkar, Serena J. Scott, Univ. of California, San Francisco (USA); Punit Prakash, Univ. of California, San Francisco (USA) and Kansas State Univ. (USA); I-Chow Hsu, Chris J. Diederich, Univ. of California, San Francisco (USA) . . . . . [9326-34]

2:40 pm: **Geometric study of treatment variability of percutaneous thermal ablation and its causes**, Krishna Nand Keshava Murthy, Benjamin B. Kimia, Brown Univ. (USA); Madeleine L. Cook, Damian E. Dupuy, Scott A. Collins, Derek Merck, Rhode Island Hospital (USA) . . . . . [9326-35]

Coffee Break . . . . . Mon 3:00 pm to 3:30 pm

SESSION 8

LOCATION: ROOM 272 (MEZZANINE) . . . . . MON 3:30 PM TO 5:10 PM

Electroporation and Nanopulse Effects

Session Chair: **Alicia A. Petryk,** Dartmouth College (USA)

3:30 pm: **The working mechanism of the 'nanoknife': hot or not?**, Rudolf M. Verdaasdonk, Hester J. Scheffer, Vrije Univ. Medical Ctr. (Netherlands); Willemien van den Bos, Jantien A. Vogel, Marc G. Besselink, Academisch Medisch Centrum (Netherlands); Martijn R. Meijerink, Vrije Univ. Medical Ctr. (Netherlands); Jean J. de la Rosette, Daniel M. de Bruin, Academisch Medisch Centrum (Netherlands); John H. Klaessens, Vrije Univ. Medical Ctr. (Netherlands). . . . . [9326-36]

3:50 pm: **External stimulation by nanosecond pulsed electric fields to enhance cellular uptake of nanoparticles**, Samantha K. Franklin, Air Force Research Lab. (USA) and The Univ. of Texas at San Antonio (USA); H ope T. Beier, Bennett L. Ibey, Air Force Research Lab. (USA); Kelly L. Nash, The Univ. of Texas at San Antonio (USA). . . . . [9326-37]

4:10 pm: **The role of PIP_2 and the IP_3/DAG pathway in intracellular calcium release and cell survival during nanosecond electric pulse exposures**, Zachary A. Steelman, Texas A&M Univ. (USA); Bennett L. Ibey, Gleb P. Tolstykh, Larry E. Estlack, Air Force Research Lab. (USA); Caleb C. Roth, The Univ. of Texas Health Science Ctr. at San Antonio (USA) . . . . . [9326-38]

4:30 pm: **Cells exposed to nanosecond electrical pulses exhibit biomarkers of mechanical stress**, Caleb C. Roth, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Ronald A. Barnes Jr., The Univ. of Texas at San Antonio (USA); Bennett L. Ibey, Hope T. Beier, Air Force Research Lab. (USA); Erick K. Moen, The Univ. of Southern California (USA); Randolph D. Glickman, The Univ. of Texas Health Science Ctr. at San Antonio (USA) . . . . . [9326-39]

4:50 pm: **The effects of nanosecond pulse electric fields on NIH-3T3 cells grown in 2D and 3D cultures**, Joshua E. Lee, North Carolina A&T State Univ. (USA); Caleb C. Roth, The Univ. of Texas Health Science Ctr. at San Antonio (USA); Hope T. Beier, Bennett L. Ibey, Air Force Research Lab. (USA) . [9326-40]

CONFERENCE 9327
LOCATION: ROOM 131 (EXHIBIT LEVEL)

Saturday–Sunday 7–8 February 2015 • Proceedings of SPIE Vol. 9327

COSPONSOR: THORLABS

Optical Elastography and Tissue Biomechanics II

Conference Chairs: **Kirill V. Larin,** Univ. of Houston (USA); **David D. Sampson,** The Univ. of Western Australia (Australia)

Program Committee: **Jeffrey C. Bamber,** Institute of Cancer Research (United Kingdom); **A. Claude Boccara,** Institut Langevin (France); **Stephen A. Boppart M.D.,** Univ. of Illinois at Urbana-Champaign (USA); **Brett E. Bouma,** Wellman Ctr. for Photomedicine (USA); **Zhongping Chen,** Beckman Laser Institute and Medical Clinic (USA); **Donald D. Duncan,** Portland State Univ. (USA); **Kishan Dholakia,** Univ. of St. Andrews (United Kingdom); **Daniel S. Elson,** Imperial College London (United Kingdom); **Mathias Fink,** Institut Langevin (France); **Brendan F. Kennedy,** The Univ. of Western Australia (Australia); **Sean J. Kirkpatrick,** Michigan Technological Univ. (USA); **Seemantini K. Nadkarni,** Harvard Medical School (USA); **Kentaro Nakamura,** Tokyo Institute of Technology (Japan); **Amy L. Oldenburg,** The Univ. of North Carolina at Chapel Hill (USA); **Francesco S. Pavone,** European Lab. for Non-linear Spectroscopy (Italy); **Andrew Pelling,** Univ. of Ottawa (Canada); **Gabriel Popescu,** Univ. of Illinois at Urbana-Champaign (USA); **Giuliano Scarcelli,** Harvard Medical School (USA); **Gijs van Soest,** Erasmus MC (Netherlands); **Victor X. D. Yang,** Ryerson Univ. (Canada); **Seok Hyun A. Yun,** Wellman Ctr. for Photomedicine (USA); **Ruikang K. Wang,** Univ. of Washington (USA); **Qifa Zhou,** The Univ. of Southern California (USA)

SATURDAY 7 FEBRUARY

WELCOME REMARKS

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . 8:50 AM TO 9:00 AM

Kirill V. Larin, Univ. of Houston (USA);
David D. Sampson, The Univ. of Western Australia (Australia)

SESSION 1

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . SAT 9:00 AM TO 10:00 AM

Keynote Session

Session Chairs: **Kirill V. Larin,** Univ. of Houston (USA);
David D. Sampson, The Univ. of Western Australia (Australia)

9:00 am: **MRI & mechanobiology: new science at the intersection of engineering and medicine** *(Keynote Presentation)*, Richard L. Ehman, Mayo Clinic (USA) . . . . . [9327-1]

9:40 am: **Noninvasive 3D elasticity mapping using phase-stabilized optical coherence elastography**, Manmohan Singh, Jiasong Li, Shang Wang, Michael D. Twa, Univ. of Houston (USA); Kirill V. Larin, Univ. of Houston (USA) and Baylor College of Medicine (USA) . . . . . [9327-2]

Coffee Break . . . . . Sat 10:00 am to 10:30 am

SESSION 2

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . SAT 10:30 AM TO 12:00 PM

Perspectives in Elastography

Session Chair: **Richard L. Ehman,** Mayo Clinic (USA)

10:30 am: **Ultrasound elastography: current systems, ongoing research and future potential** *(Invited Paper)*, Jeffrey C. Bamber, The Institute of Cancer Research (United Kingdom) and The Royal Marsden NHS Foundation Trust (United Kingdom). . . . . [9327-3]

11:00 am: **Amplitude-modulated ultrasound radiation force combined with phase-sensitive optical coherence tomography for shear wave elastography**, Thu-Mai Nguyen, Shaozhen Song, Bastien Arnal, Emily Y. Wong, Tueng T. Shen, Ruikang K. Wang, Matthew O'Donnell, Univ. of Washington (USA) . . . . . [9327-4]

11:20 am: **Localized loading to reduce artifacts in compression optical coherence elastography**, Philip Wijesinghe, Brendan F. Kennedy, David D. Sampson, The Univ. of Western Australia (Australia) . . . . . [9327-5]

11:40 am: **3D static and quasi-static elastography of biological samples using FF-OCT**, Amir Nahas, Maxime Pinsard, Institut Langevin (France); Stéphane Roux, Ecole Normale Supérieure de Cachan (France); A. Claude Boccara, Institut Langevin (France). . . . . [9327-6]

Lunch Break . . . . . Sat 12:00 pm to 1:30 pm

SESSION 3

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . SAT 1:30 PM TO 2:50 PM

Rheology and Speckle Methods

Session Chairs: **Seemantini K. Nadkarni,** Harvard Medical School (USA); **Sean J. Kirkpatrick,** Michigan Technological Univ. (USA)

1:30 pm: **Micro-scale mapping of tissue mechanical properties using laser speckle rheology**, Zeinab Hajjarian Kashany, Seemantini K. Nadkarni, Harvard Medical School (USA) . . . . . [9327-7]

1:50 pm: **Micro-elastometry using resonant acoustic spectroscopy with optical displacement sensor**, Ling Li, Charles R. Krebs, Alisa S. Wolberg, Amy L. Oldenburg, The Univ. of North Carolina at Chapel Hill (USA) . . . . [9327-8]

2:10 pm: **In vivo monitoring of external pressure induced hemodynamics in skin tissue using optical coherence tomography angiography**, Woo June Choi, Hequn Wang, Ruikang K. Wang, Univ. of Washington (USA) . . . . . [9327-9]

2:30 pm: **An endoscopic multi-exposure laser speckle contrast analysis system for vascular measurements**, Maria Tziraki, Imperial College London (United Kingdom); Lipei Song, Nankai Univ. (China); Daniel S. Elson, Imperial College London (United Kingdom) . . . . . [9327-10]

Coffee Break . . . . . Sat 2:50 pm to 3:20 pm

SESSION 4

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . SAT 3:20 PM TO 5:20 PM

Elastography and Biomechanics Applications

Session Chair: **Jeffrey C. Bamber,** The Royal Marsden NHS Foundation Trust (United Kingdom)

3:20 pm: **In vivo optical elastography: stress and strain imaging of human skin lesions**, Shaghayegh Es'haghian, Peijun Gong, Kelsey M. Kennedy, Philip Wijesinghe, David D. Sampson, Robert A. McLaughlin, Brendan F. Kennedy, The Univ. of Western Australia (Australia) . . . . . [9327-11]

3:40 pm: **Estimation of elastic parameters of ovarian tissue using phase stabilized swept source optical coherence tomography**, Sreyankar Nandy, Tianheng Wang, Hassan S. Salehi, Quing Zhu, Univ. of Connecticut (USA) . . . . . [9327-12]

4:00 pm: **Vascular wall stress during intravascular optical coherence tomography imaging**, Cuiru Sun, Ryerson Univ. (Canada); Victor X. D. Yang, Ryerson Univ. (Canada) and Sunnybrook Health Sciences Ctr. (Canada) and Univ. of Toronto (Canada) . . . . . [9327-13]

4:20 pm: **Quantitative shear wave imaging optical coherence tomography for noncontact mechanical characterization of myocardium**, Shang Wang, Baylor College of Medicine (USA) and Univ. of Houston (USA); Andrew L. Lopez III, Yuka Morikawa, Ge Tao, Baylor College of Medicine (USA); Jiasong Li, Univ. of Houston (USA); Irina V. Larina, Baylor College of Medicine (USA); James F. Martin, Baylor College of Medicine (USA) and Texas Heart Institute (USA); Kirill V. Larin, Univ. of Houston (USA) and Baylor College of Medicine (USA) [9327-14]

4:40 pm: **Brillouin microscopy for arterial biomechanical imaging**, Giuseppe Antonacci, Ryan Pedigri, Carl Paterson, Rob Krams, Peter Török, Imperial College London (United Kingdom) . . . . . [9327-15]

5:00 pm: **Visualization of elastic wave propagation induced by a mechanical pulse device for physiotherapy**, Rudolf M. Verdaasdonk, Ilja Reinten, John H. Klaessens, Albert J. van der Veen, Vrije Univ. Medical Ctr. (Netherlands); Pavel Novak, Storz Medical AG (Switzerland). . . . . [9327-16]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 5

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . SUN 9:00 AM TO 10:30 AM

Cell Mechanics

Session Chairs: **Kishan Dholakia,** Univ. of St. Andrews (United Kingdom); **Gabriel Popescu,** Univ. of Illinois at Urbana-Champaign (USA)

9:00 am: **Simultaneous optical and mechanical probes to investigate complex cellular responses to physical cues** *(Invited Paper)*, Kristina Haase, Zeinab Al-Rekabi, Louise Guolla, Ryan Hickey, Univ. of Ottawa (Canada); Dominique Tremblay, University of Ottawa (Canada); Andrew E. Pelling, Univ. of Ottawa (Canada) . . . . . [9327-17]

9:30 am: **High-resolution Brillouin microscopy for cell biomechanics**, Giuliano Scarcelli, Seok Hyun Yun, Harvard Medical School (USA) . . . . [9327-18]

9:50 am: **Cellular resolution optical elastography using phase-sensitive extended depth-of-field optical coherence microscopy**, Andrea Curatolo, The Univ. of Western Australia (Australia); Martin L. Villiger, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) and Massachusetts General Hospital (USA); Dirk Lorenser, Alex Fritz, Brendan F. Kennedy, David D. Sampson, The Univ. of Western Australia (Australia) . . . . . [9327-19]

10:10 am: **Mapping dynamic mechanical remodeling in 3D tumor models via particle tracking microrheology**, Dustin P. Jones, William Hanna, Gwendolyn M. Cramer, Hamid El Hamidi, Ljubica Petrovic, Jonathan P. Celli, Univ. of Massachusetts Boston (USA) . . . . . [9327-20]

Coffee Break . . . . . Sun 10:30 am to 11:00 am

SESSION 6

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . SUN 11:00 AM TO 12:40 PM

Compression Elastography and Brillouin Microscopy

Session Chairs: **Brendan F. Kennedy,** The Univ. of Western Australia (Australia); **Giuliano Scarcelli,** Wellman Ctr. for Photomedicine (USA)

11:00 am: **Full field OCT and tissue elasticity measurements: a critical view** *(Invited Paper)*, A. Claude Boccara, Amir Nahas, Institut Langevin (France) . . . . . [9327-21]

11:30 am: **Characterization of the biomechanics underlying mechanical indentation of in vivo skin using optical coherence elastography**, Pin-Chieh Huang, Ryan L. Shelton, Ryan M. Nolan, Adeel Ahmad, Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9327-22]

11:50 am: **High numerical aperture Brillouin microscopy** *(Invited Paper)*, Peter Török, Giuseppe Antonacci, Carl Paterson, Imperial College London (United Kingdom). . . . . [9327-23]

12:20 pm: **High speed assessment of fluid viscoelasticity in flow cytometry using nonlinear Brillouin spectroscopy**, Zhaokai Meng, Georgi I. Petrov, Vladislav V. Yakovlev, Texas A&M Univ. (USA) . . . . . [9327-24]

Lunch Break . . . . . Sun 12:40 pm to 2:10 pm

SESSION 7

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . SUN 2:10 PM TO 3:30 PM

Elastography of the Cornea

Session Chairs: **Ruikang K. Wang,** Univ. of Washington (USA); **Seok Hyun Yun,** Wellman Ctr. for Photomedicine (USA)

2:10 pm: **Biomechanics of cornea and Keratoconus in vivo with Brillouin microscopy**, Giuliano Scarcelli, Sebastien Besner, Harvard Medical School (USA); Seok Hyun Yun, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) . . . . . [9327-25]

2:30 pm: **Fluorescence spectroscopy of collagen crosslinking: non-invasive and in-situ evaluation of corneal stiffness**, Walfre Franco, Antonio Ortega-Martinez, Hong Zhu, Wellman Ctr. for Photomedicine (USA); Ruisheng Wang, Clarkson Univ. (USA); Irene E. Kochevar, Wellman Ctr. for Photomedicine (USA) . . . . . [9327-26]

2:50 pm: **Spatial mapping of the biomechanical properties of rabbit cornea after cross-linking using optical coherence elastography**, Jiasong Li, Manmohan Singh, Srilatha Vantipalli, Zhaolong Han, Michael D. Twa, Kirill V. Larin, Univ. of Houston (USA) . . . . . [9327-27]

3:10 pm: **Non-invasive estimation of corneal biomechanical properties using OCT-vibrography**, Imran B. Akca, Ernest W. Chang, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) and Massachusetts General Hospital (USA); Sabine Kling, Consejo Superior de Investigaciones Científicas (Spain); Giuliano Scarcelli, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) and Massachusetts General Hospital (USA); Susana Marcos, Consejo Superior de Investigaciones Científicas (Spain); Seok-Hyun Yun, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) and Massachusetts General Hospital (USA) . . . . . [9327-28]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 8

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . SUN 4:00 PM TO 5:20 PM

Loading and Measurement Methods

Session Chairs: **A. Claude Boccara,** Institut Langevin (France); **Zhongping Chen,** Beckman Laser Institute and Medical Clinic (USA)

4:00 pm: **Quantitative shear wave optical coherence elastography (SW-OCE) with acoustic radiation force impulses (ARFI) induced by phase array transducer**, Shaozhen Song, Nhan Minh Le, Univ. of Dundee (United Kingdom); Ruikang K. Wang, Univ. of Washington (USA); Zhihong Huang, Univ. of Dundee (United Kingdom). . . . . [9327-29]

4:20 pm: **Optical coherence elastography using beat-frequency acoustic radiation force**, Yueqiao Qu, Univ. of California, Irvine (USA); Teng Ma, The Univ. of Southern California (USA); Rui Li, Wenjuan Qi, Jiang Zhu, Univ. of California, Irvine (USA); Qifa Zhou, Koping Kirk Shung, The Univ. of Southern California (USA); Zhongping Chen, Univ. of California, Irvine (USA) . . . . [9327-30]

4:40 pm: **Combined correlation estimation of axial displacement in optical coherence elastography: assessment of axial displacement sensitivity performance relative to existing methods**, Alexander Grimwood, The Royal Surrey County Hospital NHS Trust (United Kingdom) and King's College London (United Kingdom); Jeffrey C. Bamber, Alessandro Messa, The Institute of Cancer Research (United Kingdom) . . . . . [9327-31]

5:00 pm: **Elasticity measurement using multi-channel optical coherence tomography estimation of shear-wave time of flight: a comparison of relative and absolute methods**, Eli Elyas, The Institute of Cancer Research (United Kingdom) and The Royal Marsden NHS Foundation Trust (United Kingdom); Alexander Grimwood, The Royal Surrey County Hospital NHS Trust (United Kingdom); Janine Erler, Thomas Cox, Univ. of Copenhagen (Denmark); Daniel J. Woods, Michelson Diagnostics Ltd. (United Kingdom); Peter Clowes, The Institute of Cancer Research (United Kingdom) and The Royal Marsden NHS Foundation Trust (Uganda); Jeffrey C. Bamber, The Institute of Cancer Research (United Kingdom) and The Royal Marsden NHS Foundation Trust (United Kingdom). . . . . [9327-32]

CONFERENCE 9327
LOCATION: ROOM 131 (EXHIBIT LEVEL)

POSTERS-SUNDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Mapping tissue shear modulus on Thiel soft-embalmed mouse skin with shear wave optical coherence elastography, Shaozhen Song, Joyce Joy, Univ. of Dundee (United Kingdom); Ruikang K. Wang, Univ. of Washington (USA); Zhihong Huang, Univ. of Dundee (United Kingdom) . . . . . [9327-33]

Assessment of the biomechanical properties of porcine cornea after UV cross-linking at different intraocular pressures, Jiasong Li, Manmohan Singh, Srilatha Vantipalli, Zhaolong Han, Chih Hao Liu, Michael D. Twa, Kirill V. Larin, Univ. of Houston (USA) . . . . . [9327-34]

Quantitative assessment of the biomechanical properties of tissue-mimicking phantoms by optical coherence elastography and numerical analyses, Zhaolong Han, Jiasong Li, Manmohan Singh, Chen Wu, Chih Hao Liu, Shang Wang, Narendran Sudheendran, Rita Idugboe, Michael D. Twa, Kirill V. Larin, Univ. of Houston (USA) . . . . . [9327-35]

Full field optical coherence tomography elastography of spheroids using after an osmotic pressure jump, Charles-Edouard Leroux, A. Claude Boccara, Institut Langevin (France) . . . . . [9327-36]

Measurement of tissue mechanical properties using the phase singularity of dynamic laser speckles, Jing Wang, Seemantini K. Nadkarni, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) and Massachusetts General Hospital (USA) . . . . . [9327-37]

Brillouin spectroscopy reveals changes in muscular viscoelasticity under muscular dystrophy, Zhaokai Meng, Vladislav V. Yakovlev, Texas A&M Univ. (USA) . . . . . [9327-38]

Elasticity measurement of nasal cartilage as a function of temperature using optical coherence elastography, Chih Hao Liu, M. N. Skryabina, Manmohan Singh, Jiasong Li, Chen Wu, Zhaolong Han, Rita Idugboe, Thomas Hsu, Emil N. Sobol, Michael D. Twa, Kirill V. Larin, Univ. of Houston (USA) . . . . . [9327-39]

Improving resolution and strain sensitivity in phase-sensitive compression optical coherence elastography, Lixin Chin, Philip Wijesinghe, Andrea Curatolo, Kelsey M. Kennedy, The Univ. of Western Australia (Australia); Martin L. Villiger, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) and Massachusetts General Hospital (USA); Robert A. McLaughlin, Brendan F. Kennedy, David D. Sampson, The Univ. of Western Australia (Australia) . . . . . [9327-40]

Noncontact depth-resolved micro-scale corneal elastography, Shang Wang, Baylor College of Medicine (USA) and Univ. of Houston (USA); Kirill V. Larin, Univ. of Houston (USA) and Baylor College of Medicine (USA) . . [9327-41]

A study on the properties of contact pressure induced by manually operated diffuse reflectance fiber optic probes, Maksimilijan Bregar, Miran Bürmen, Franjo Pernu?, Bo?tjan Likar, Univ. of Ljubljana (Slovenia) . . . . . [9327-42]

Fast low-noise Brillouin spectroscopy measurements of elasticity for corneal crosslinking, Michael Bukshtab, Avedro, Inc. (USA); Amit S. Paranjape, Avedro, Inc. (USA); Marc D. Friedman, David F. Muller, Avedro, Inc. (USA) . . . . . [9327-51]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their groundbreaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9328
LOCATION: ROOM 300 (ESPLANADE)

Monday–Wednesday 9–11 February 2015 • Proceedings of SPIE Vol. 9328

Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XIII

Conference Chairs: **Daniel L. Farkas,** Univ. of Southern California (USA), SMI (USA); **Dan V. Nicolau,** McGill Univ. (Canada); **Robert C. Leif,** Newport Instruments (USA)

Conference Co-Chairs: **James F. Leary,** Purdue Univ. (USA); **Attila Tarnok,** Univ. Leipzig (Germany); **Rebecca R. Richards-Kortum,** Rice Univ. (USA)

Program Committee: **Vadim Backman,** Northwestern Univ. (USA); **Christopher H. Contag,** Stanford Univ. School of Medicine (USA); **Paul M. W. French,** Imperial College London (United Kingdom); **Yuval Garini,** Bar-Ilan Univ. (Israel); **DaeGab Gweon,** KAIST (Korea, Republic of); **Charles P. Lin,** Wellman Ctr. for Photomedicine (USA); **Sacha Loiseau,** Mauna Kea Technologies (France); **Ramesh Raghavachari,** U.S. Food and Drug Administration (USA); **Sebastian Wachsmann-Hogiu,** Univ. of California, Davis (USA); **Warren S. Warren,** Duke Univ. (USA)

MONDAY 9 FEBRUARY

SESSION 1

LOCATION: ROOM 300 (ESPLANADE) . . . . . .MON 8:00 AM TO 12:20 PM

Functional Imaging

Session Chair: **Dan V. Nicolau,** McGill Univ. (Canada)

8:00 am: **Wide area fluorescent lifetime imaging of surgical specimens using two photon microscopy at MHz rates** *(Invited Paper)*, Michael G. Giacomelli, Massachusetts Institute of Technology (USA); Yuri Sheykin, Beth Israel Deaconess Medical Ctr. (USA); Jeffrey Brooker, Thorlabs Imaging Systems (USA); James L. Connolly, Beth Israel Deaconess Medical Ctr. (USA); Alex E. Cable, Thorlabs, Inc. (USA); James G. Fujimoto, Massachusetts Institute of Technology (USA) . . . . . [9328-1]

8:30 am: **Raman study for drug delivery applications and tissue imaging**, Symeon Papazoglou, Ioannis Theodorakos, National Technical Univ. of Athens (Greece); Maria Patitsa, Apostolos Klinakis, Biomedical Research Foundation, Academy of Athens (Greece); Ioanna Zergioti, Yannis S. Raptis, National Technical Univ. of Athens (Greece) . . . . . [9328-2]

8:50 am: **Determination of sub-diffraction-limited organelles and biomolecules using microsphere lenses in combination with fluorescence microscopy**, Hui Yang, Norman Moullan, Johan Auwerx, Martin A. M. Gijs, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9328-3]

9:10 am: **Intraoperative model based identification of tissue properties based on multimodal and multiscale experiments**, Daniel Claus, Univ. Stuttgart (Germany); Nicolas Schierbaum, Tilman E. Schäffer, Eberhard Karls Univ. Tübingen (Germany); Marijo Mlikota, Ulrich Weber, Siegfried Schmauder, Tanja Teutsch, Philipp Wittmüß, Christina Tarin, Petra Schumacher, Wolfgang Osten, Univ. Stuttgart (Germany); Sascha Hoffmann, Sara Brucker, Johannes Mischinger, Christian Schwentner, Arnulf Stenzl, Universitätsklinikum Tübingen (Germany) . . . . . [9328-4]

9:30 am: **Multi-parametric imaging of tumor spheroids with ultra-bright and tunable nanoparticle O2 probes**, Ruslan Dmitriev, Univ. College Cork (Ireland); Sergey Borisov, Technische Univ. Graz (Austria); James Jenkins, Dmitri B. Papkovsky, Univ. College Cork (Ireland) . . . . . [9328-5]

9:50 am: **Optical studies of oxidative stress in pulmonary artery endothelial cells**, Zahra Ghanian, Univ. of Wisconsin-Milwaukee (USA); Annie Eis, Ganesh Kondouri, Medical College of Wisconsin (USA); Mahsa Ranji, Univ. of Wisconsin-Milwaukee (USA) . . . . . [9328-6]

Coffee Break . . . . . Mon 10:10 am to 10:40 am

10:40 am: **Cholesterol efflux monitoring in macrophage form cells by using fluorescence lifetime imaging**, Young Sik Song, Dug Young Kim, Yonsei Univ. (Korea, Republic of); Won sang Hwang, Yonsei Univ (Korea, Republic of) . . . . . [9328-7]

11:00 am: **A multi-wavelength (u.v. to visible) laser system for early detection of oral cancer**, Stephen P. Najda, Piotr Perlin, Mike Leszczynski, TopGaN sp. z o.o. (Poland); Thomas J. Slight, Wyn Meredith, Compound Semiconductor Technologies Global Ltd. (United Kingdom); M. Schemmann, FOCE International Technoloy (Netherlands); Harry Moseley, J. Woods, R. Valentine, Peter Mossey, E. Theaker, Univ. of Dundee (United Kingdom); Gillian Mimnagh, W. Mimnagh, 2M Engineering Ltd. (Netherlands) . . . . . [9328-8]

11:20 am: **Quantifying the optical properties of turbid media using polarization sensitive hyperspectral imaging (SkinSpect): two-layer optical phantom studies,** Fartash Vasefi, Nicholas MacKinnon, SMI (USA); Rolf Saager, Anthony J. Durkin, Beckman Laser Institute and Medical Clinic (USA); Robert Chave, SMI (USA); Daniel L. Farkas, SMI (USA) . . . . . [9328-71]

11:40 am: **Qualitative and quantitative comparison of colonic microendoscopy image features to histopathology**, Sandra P. Prieto, Amy J. Powless, Aneeka A. Majid, Univ. of Arkansas (USA); Jonathan A. Laryea, Jason S. Mizell, Keith Lai, Univ. of Arkansas for Medical Sciences (USA); Timothy J. Muldoon, Univ. of Arkansas (USA) . . . . . [9328-10]

12:00 pm: **Light Shift from Ultraviolet to Near Infrared Light: Cerenkov Luminescence with Gold Nanocluster – Near Infrared (AuNc-NIR) Conjugates**, Su Woong Yoo, Hyoyoung Mun, Gyungseok Oh, Youngjae Ryu, Min-Gon Kim, Euiheon Chung, Gwangju Institute of Science and Technology (Korea, Republic of). . . . . [9328-11]

Lunch Break . . . . . .Mon 12:20 pm to 1:50 pm

SESSION 2

LOCATION: ROOM 300 (ESPLANADE) . . . . . .MON 1:50 PM TO 3:10 PM

Optical Manipulation

Session Chair: **Dan V. Nicolau,** McGill Univ. (Canada)

1:50 pm: **Software-aided automatic cell optoporation system**, Hans Georg Breunig, Saarland Univ. (Germany) and JenLab GmbH (Germany); Ana Batista, Aisada Uchugonova, Saarland Univ. (Germany); Karsten König, Saarland Univ. (Germany) and JenLab GmbH (Germany) . . . . . [9328-12]

2:10 pm: **Trapping of single extracellular vesicles in the evanescent field of an optical cavity**, Edwin van der Pol, Frank A. W. Coumans, Academisch Medisch Centrum (Netherlands); John Wilke, Christopher Earhart, Brian DiPaolo, Robert Hart, Bernardo Cordovez, Optofluidics (USA); Guus Sturk, Rienk Nieuwland, Ton G. van Leeuwen, Academisch Medisch Centrum (Netherlands) . . . . . [9328-13]

2:30 pm: **Multimodal optical phenotyping of cancer cells**, Lena Kastl, Björn Budde, Michael Isbach, Christina E. Rommel, Björn Kemper, Jürgen Schnekenburger, Westfälische Wilhelms-Univ. Münster (Germany) . . . . . [9328-14]

2:50 pm: **Bartonella henselae infects mature human erythrocytes**, Gislaine Vieira-Damiani, Marilene Neves A. da Silva, Univ. Estadual de Campinas (Brazil); Marna E. Ericson, Kalpna Gupta, Univ. of Minnesota, Twin Cities (USA); Vitor B. Pelegati, André A. de Thomaz, Mariana O. Baratti, Hernandes F. Carvalho, Carlos L. Cesar, Paulo Eduardo Neves Ferreira Velho, Univ. Estadual de Campinas (Brazil) . . . . . [9328-15]

Coffee Break . . . . . .Mon 3:10 pm to 3:40 pm

CONFERENCE 9328
LOCATION: ROOM 300 (ESPLANADE)

SESSION 3
LOCATION: ROOM 300 (ESPLANADE) . . . . . .MON 3:40 PM TO 4:20 PM

Microarrays

Session Chair: **Dan V. Nicolau,** McGill Univ. (Canada)

3:40 pm: **Quantification of direct spotting versus microcontact printing (μCP) for controlled deposition of protein(s) in different experimental conditions**, Kathryn F. A. Clancy, Dan V. Nicolau, McGill Univ. (Canada) . . . . . [9328-16]

4:00 pm: **Lens-free imaging of cancer cell migration in diverse microenvironments**, Evelien Mathieu, IMEC (Belgium); Colin D. Paul, Johns Hopkins Univ. (USA); Richard Stahl, Geert Vanmeerbeeck, Veerle Reumers, Chengxun Liu, IMEC (Belgium); Konstantinos Konstantopoulos, Johns Hopkins Univ. (USA); Liesbet Lagae, IMEC (Belgium). . . . . [9328-17]

SESSION 4
LOCATION: ROOM 300 (ESPLANADE) . . . . . .MON 4:20 PM TO 6:00 PM

Spectral and Multiparameter Imaging I

Session Chair: **Daniel L. Farkas,**
Univ. of Southern California (USA), SMI (USA)

4:20 pm: **Estimating skin blood saturation by selecting a subset of hyperspectral imaging data**, Maria Ewerlöf, E. Göran Salerud, Tomas Strömberg, Marcus Larsson, Linköping Univ. (Sweden). . . . . [9328-18]

4:40 pm: **A preliminary study on a dual-modality OPT / micro-CT system**, Yujie Yang, Dong Di, Liangliang Shi, Jun Wang, Institute of Automation (China); Hui Hui, Xin Yang, Key Lab. of Molecular Imaging (China); Jie Tian, Institute of Automation (China) . . . . . [9328-19]

5:00 pm: **Hyperspectral imaging to monitor simultaneously multiple protein subtypes and live track their spatial dynamics: a new platform to screen drugs for CNS diseases**, Stephane Marcet, Photon etc. Inc. (Canada); Simon Labrecque, Institut Univ. en Santé Mentale de Quebec (Canada); Jean-Philippe Sylvestre, Francesca Mangiarini, Marc Verhaegen, Photon etc. Inc. (Canada); Paul De Koninck, Institut Univ. en Santé Mentale de Quebec (Canada); Sébastien Blais-Ouellette, Photon etc. Inc. (Canada). . . . . [9328-20]

5:20 pm: **Second harmonic generation (SHG) imaging demonstrated a strong dependence of the collagen hydrogels' structures on the types and concentrations of ions**, Xuye Lang, Julia G. Lyubovitsky, Univ. of California, Riverside (USA) . . . . . [9328-21]

5:40 pm: **Towards early malaria diagnosis using surface enhanced Raman spectroscopy**, Keren Chen, Clement Yuen, Aniweh Yaw, Peter Preiser, Quan Liu, Nanyang Technological Univ. (Singapore) . . . . . [9328-22]

POSTERS-MONDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . MON 5:30 PM TO 7:30 PM

Conference attendees are invited to attend the BiOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Ex-vivo holographic microscopy and spectroscopic analysis of head and neck cancer, Stephen Holler, Robert Wurtz, Kelsey Auyeung, Kris Auyeung, Milan Paspaley-Grbavac, Brigid Mulroe, Fordham Univ. (USA); Maximiliano R. Sobrero, Brett A. Miles, Mount Sinai School of Medicine (USA). . . . . [9328-55]

Investigating the correlation between white matter and microvasculature changes in aging using large scale optical coherence tomography and confocal fluorescence imaging combined with tissue sectioning, Alexandre Castonguay, Ecole Polytechnique de Montréal (Canada); Pramod Avti, Mohammad Moeini, Philippe Pouliot, Samuel Bélanger, Frédéric Lesage, Ecole Polytechnique de Montréal (Canada) and Institut de Cardiologie de Montréal (Canada) . . . . . [9328-56]

Plastic fiber optics for micro-imaging of fluorescence signals in living cells, Takashi Sakurai, Toyohashi Univ. of Technology (Japan); Mitsuo Natsume, Denkosha Corp. (Japan); Kowa Koida, Toyohashi Univ. of Technology (Japan). . . . . [9328-58]

Formation and evolution of atherosclerosis: a multiscale study, Natalya O. Chelnokova, Anastasiya A. Golyadkina, Irina V. Kirillova, Elena L. Kossovich, Asel V. Polienko, Dmitry A. Zayarskiy, N.G. Chernyshevsky Saratov State Univ. (Russian Federation). . . . . [9328-59]

Complex dielectric properties of anhydrous polycrystalline glucose in the terahertz region, Ping Sun, Beijing Normal Univ. (China); Wei Liu, Capital Normal Univ. (China); Yun Zou, Qiongzhen Jia, Jiayu Li, Beijing Normal Univ. (China) . . . . . [9328-60]

Determination of biological activity from florescence lifetime measurements, Florian Rudek, Tobias Baselt, Benjamin Lempe, Christopher Taudt, Peter Hartmann, Westsächsische Hochschule Zwickau (Germany) . . . . . [9328-61]

Evaluation of apoptotic and proliferation biomarker expression in UV-exposed human keratinocytes using sphingomyelin treatment, Lily H. Laiho, Andrea Argouarch, Erin Fong, Leah Dixon, Kristina Bishard, Kevin Campbell, Leo Banuelos, Kristina Cardenas, Kathleen De Guzman, California Polytechnic State Univ., San Luis Obispo (USA) . . . . . [9328-62]

Wound collagen monitoring with low-cost noninvasive led system, Rui Liu, Zhengtuo Zhao, Mengyang Zhou, Univ. of Michigan-Dearborn (USA); V. N. Du Le, Qiyin Fang, McMaster Univ. (Canada); Joe Fu-jiou Lo, Univ. of Michigan-Dearborn (USA) . . . . . [9328-63]

Tomographic reconstruction of melanin structures of optical coherence tomography via the finite-difference time-domain simulation, Shi-Hao Huang, National Taiwan Univ. (Taiwan); Shiang-Jiu Wang, Snow. H Tseng, National Taiwan Univ (Taiwan) . . . . . [9328-64]

Monitor RNA synthesis in live cell nuclei by using two-photon excited fluorescence lifetime imaging microscopy, Xiao Peng, Shenzhen Univ. (China); Yan Wang, Shenzhen Univ. (China) and Univ. at Buffalo (USA); Jing Qi, Wei Yan, Junle Qu, Shenzhen Univ. (China) . . . . . [9328-66]

Microscopic imaging of resin-bonded dentin using Cryo-FIB/TEM system, Turki A Bakhsh, King Abdulaziz University (Saudi Arabia) . . . . . [9328-69]

TUESDAY 10 FEBRUARY

SESSION 5
LOCATION: ROOM 300 (ESPLANADE) . . . . . .TUE 8:00 AM TO 12:10 PM

Spectral and Multiparameter Imaging II

Session Chair: **Daniel L. Farkas,**
Univ. of Southern California (USA), SMI (USA)

8:00 am: **Characterization of connective tissue progenitors through phase contrast and multicolor fluorescence time-lapse microscopy**, Edward Kwee, Cleveland Clinic Lerner Research Institute (USA) and Case Western Reserve Univ. (USA); Kimerly Powell, The Ohio State Univ. (USA); George Muschler, Cleveland Clinic Lerner Research Institute (USA). . . . . [9328-23]

8:20 am: **Subcellular imaging of mechanical and chemical properties using Brillouin and Raman microspectroscopies**, Vladislav V. Yakovlev, Texas A&M Univ. (USA) . . . . . [9328-24]

8:40 am: **Novel common path interferometer design for high-throughput widefield spectral imaging**, Dushan N. Wadduwage, National Univ. of Singapore (Singapore) and Singapore-MIT Alliance for Research and Technology (Singapore); Vijay Raj Singh, SMART-Singapore MIT Alliance for Research & Technology (Singapore); Heejin Choi, Zahid Yaqoob, Massachusetts Institute of Technology (USA); Paul T. Matsudaira, National Univ. of Singapore (Singapore); Peter T. C. So, Massachusetts Institute of Technology (USA) . . . . . [9328-25]

9:00 am: **Imaging infrared spectroscopy for protein changes in fixation-free liver tumor detection**, James V. Coe, Zhaomin Chen, Ran Li, Ryan Butke, Barrie Miller, Charles L. Hitchcock, Heather C. Allen, Stephen P. Povoski, Edward W. M. Martin Jr., The Ohio State Univ. (USA) . . . . . [9328-26]

9:20 am: **In vivo bioluminescence tomography based on multi-view projection and 3D surface reconstruction**, Shuang Zhang, Northeastern Univ. (China); Jie Tian, Kun Wang, Institute of Automation (China); Chengcai Leng, Nanchang Hangkong Univ. (China) and Institute of Automation (China); Kexin Deng, Insitute of Automation (China); Yifang Hu, Beijing Jiaotong Univ. (China) . . . . . [9328-27]

9:40 am: **Raman spectroscopy and chemometric analysis of non-penetrating peripheral nerve damage in swine: a tool for spectral pathology of nerve disease**, Katherine E. Cilwa, Naval Medical Research Ctr. (USA); Tiffani Slaughter, Eric Elster, Uniformed Services Univ. of the Health Sciences (USA); Jonathan Forsberg, Nicole J. Crane, Naval Medical Research Ctr. (USA) . . . . . [9328-28]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

10:30 am: **Comparison of linear (hyperspectral) and nonlinear (pump-probe) absorption microscopy of melanin**, Jesse W. Wilson, Sanghamitra Deb, Francisco E. Robles, Christopher P. Dall, Lejla Vajzovic, Gargi Vora, Duke Univ. (USA); Rebecca C. Stacy, Massachusetts Eye and Ear Infirmary (USA) and Massachusetts General Hospital (USA); Maria A. Selim, Prithvi Mruthyunjaya, Douglas S. Tyler, Martin C. Fischer, Warren S. Warren, Duke Univ. (USA) . . . . . [9328-29]

10:50 am: **Design of high resolution FT-IR spectroscopic imaging instruments for improved breast cancer detection** *(Invited Paper)*, Rohith Reddy, Massachusetts General Hospital (USA) and Harvard Medical School (USA); David Mayerich, Univ. of Illinois at Urbana-Champaign (USA); Michael J. Walsh, Univ. of Illinois at Chicago (USA); Rohit Bhargava, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9328-30]

11:10 am: **High-SNR static Fourier-transform imaging spectrometer based on differential structure**, Peng Jin, Shuai Shuai Zhu, Yu Zhang, Jie Lin, Harbin Institute of Technology (China) . . . . . [9328-31]

11:30 am: **Precise monitoring of chemical changes through localization analysis of dynamic spectra**, Zachary J. Smith, UC Davis Medical Ctr. (USA); Marcos E. de Oliveira, Univ. Federal Fluminense (Brazil); Che-Wei Chang, Latevi S. Lawson, Florian Knorr, Univ. of California, Davis (USA); Renato E. de Araujo, Univ. Federal de Pernambuco (Brazil); Stephen M. Lane, Sebastian Wachsmann-Hogiu, Univ. of California, Davis (USA) . . . . . [9328-32]

11:50 am: **Label-free live cell measurement of nanoscale cellular architecture**, Scott Gladstein, S. Thompson, Luay Almassalha, Greta Bauer, John E. Chandler, Yolanda Stypula-Cyrus, Hariharan Subramanian, Igal Szleifer, Vadim Backman, Northwestern Univ. (USA) . . . . . [9328-67]

Lunch Break . . . . . Tue 12:10 pm to 1:40 pm

SESSION 6

LOCATION: ROOM 300 (ESPLANADE) . . . . . TUE 1:40 PM TO 3:10 PM

Biomedical Imaging using a DMD or Other MEMS Array

Joint Session with Conferences 9328 and 9376

Session Chairs: **Michael R. Douglass,** Texas Instruments Inc. (USA); **Robert C. Leif,** Newport Instruments (USA)

1:40 pm: **High-speed phase modulation using the DLP: Application in imaging through complex media** *(Invited Paper)*, Eyal Niv, Antonio M. Caravaca-Aguirre, Donald B. Conkey, Rafael Piestun, Univ. of Colorado at Boulder (USA) . . . . . [9376-9]

2:10 pm: **Parallel acquisition of Raman spectra from a 2-D multifocal array using a modulated multifocal detection scheme**, Lingbo Kong, James W. Chan, Univ. of California, Davis (USA). . . . . [9328-33]

2:30 pm: **DMD-based open-loop wavefront shaping technique: Turbidity suppression in biological tissues**, Mooseok Jang, Haowen Ruan, Haojiang Zhou, California Institute of Technology (USA); Daifa Wang, BeiHang Univ. (China); Changhuei Yang, California Institute of Technology (USA) . . . . [9376-10]

2:50 pm: **Head mounted DMD for visual stimulation in freely moving rats: A novel tool for visual neuroscience research**, Yossi Mandel, Tamar Arens-Arad, Nairouz Farah, Alex Zlotnik, Zeev Zalevsky, Bar-Ilan Univ. (Israel) . . . . . [9376-11]

Coffee Break . . . . . Tue 3:10 pm to 3:40 pm

SESSION 7

LOCATION: ROOM 300 (ESPLANADE) . . . . . TUE 3:40 PM TO 4:50 PM

Biomedical Imaging with Advanced Microscopy using a DMD or other MEMS Array

Joint Session with Conferences 9328 and 9376

Session Chairs: **Michael R. Douglass,** Texas Instruments Inc. (USA); **Robert C. Leif,** Newport Instruments (USA)

3:40 pm: **Generation 3 programmable array microscope (PAM) for high speed, large format optical sectioning** *(Invited Paper)*, Anthony H. de Vries, Stephan Kramer, Donna J. Arndt-Jovin, Thomas M. Jovin, Max-Planck-Institut für Biophysikalische Chemie (Germany) . . . . . [9376-12]

4:10 pm: **In vivo confocal imaging of the retina using patterned illumination**, Mathivanan Damodaran, Kari V. Vienola, Rotterdam Ophthalmic Institute (Netherlands) and Vrije Univ. Amsterdam (Netherlands); Boy Braaf, Vrije Univ. Amsterdam (Netherlands); Koenraad A. Vermeer, Rotterdam Ophthalmic Institute (Netherlands); Mattijs de Groot, Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands) . . . . . [9376-13]

4:30 pm: **Non-mydriatic confocal retinal imaging using a digital light projector**, Matthew S. Muller, Aeon Imaging, LLC (USA); Jason J. Green, Karthikeyan Baskaran, Indiana Univ. (USA); Allen Ingling, Jeffrey Clendenon, Thomas J. Gast, Aeon Imaging, LLC (USA); Ann E. Elsner, Indiana Univ. (USA) . . . . . [9376-14]

WEDNESDAY 11 FEBRUARY

SESSION 8

LOCATION: ROOM 300 (ESPLANADE) . . . . . WED 8:00 AM TO 11:40 AM

Cytomics and Histomics I

Session Chair: **Robert C. Leif,** Newport Instruments (USA)

8:00 am: **Advanced flow cytometric analysis of nanoparticle targeting to rare leukemic stem cells in peripheral human blood in a defined model system** *(Invited Paper)*, Christy L. Cooper, James F. Leary, Purdue Univ. (USA) . . . . . [9328-34]

8:30 am: **Combined LIBS-Raman for remote detection and characterization of biological samples**, Aaron S. Anderson, Samuel Clegg, Harshini Mukundan, Los Alamos National Lab. (USA) . . . . . [9328-35]

8:50 am: **Wide-band signal based photo-acoustic imaging method using band-limited transducers**, Meng Cao, Chen Zhu, Nanjing University (China); Jie Yuan, Nanjing Univ. (China); Sidan Du, Nanjing Univ (China); Xiaojun Liu, Nanjing Univ. (China); Guan Xu, Xueding Wang, Paul L. Carson, Univ. of Michigan Medical School (USA) . . . . . [9328-36]

9:10 am: **Parallel flow cytometer using radiofrequency-tagged emission**, Eric D. Diebold, Brandon W. Buckley, Claire Lifan Chen, Ata Mahjoubfar, Bahram Jalali, Univ. of California, Los Angeles (USA) . . . . . [9328-37]

9:30 am: **Quantification of cell surface receptor expression in live tissue culture media using a dual-tracer stain and rinse approach**, Xiaochun Xu, Lagnojita Sinha, Aparna Singh, Cynthia S. Yang, Jialing Xiang, Kenneth M. Tichauer, Illinois Institute of Technology (USA). . . . . [9328-39]

9:50 am: **Non-linear optical flow cytometry using a scanned, Bessel beam light-sheet** *(Invited Paper)*, Bradley B. Collier, Samir Awasthi, Deborah K. Lieu, James W. Chan, Univ. of California, Davis (USA) . . . . . [9328-40]

Coffee Break . . . . . Wed 10:10 am to 10:40 am

10:40 am: **Progress on an implementation of MIFlowCyt in XML**, Robert C. Leif, Stephanie H. Leif, Newport Instruments (USA). . . . . [9328-41]

11:00 am: **Measuring oxygen tension modulation, induced by a new pre-radiotherapy therapeutic, in a mammary window chamber mouse model**, Rachel L. Schafer, Arthur F. Gmitro, The Univ. of Arizona (USA) . . . . . [9328-42]

11:20 am: **Label-free cardiac contractility monitoring for drug screening applications based on compact high-speed lens-free imaging**, Thomas Pauwelyn, Veerle Reumers, Geert Vanmeerbeeck, Richard Stahl, IMEC (Belgium); Stefan Janssens, KU Leuven, Dept of Cardiovascular Sciences (Belgium); Liesbet Lagae, IMEC (Belgium) and KU Leuven, Solid State Physics and Magnetism Section (Belgium); Dries Braeken, Andy Lambrechts, IMEC (Belgium) . . . . . [9328-43]

Lunch Break . . . . . Wed 11:40 am to 1:30 pm

CONFERENCE 9328
LOCATION: ROOM 300 (ESPLANADE)

SESSION 9
LOCATION: ROOM 300 (ESPLANADE) . . . . . WED 1:30 PM TO 2:50 PM

Instrumentation

Session Chair: **Robert C. Leif,** Newport Instruments (USA)

1:30 pm: **Optical cell cleaning by NIR femtosecond lasers**, Aisada Uchugonova, Univ. des Saarlandes (Germany); Hans Georg Breunig, Univ. des Saarlandes (Germany) and JenLab GmbH (Germany); Ana Batista, Univ. des Saarlandes (Germany); Karsten König, Univ. des Saarlandes (Germany) and JenLab GmbH (Germany) . . . . . [9328-44]

1:50 pm: **Dynamics of cell and tissue growth acquired by means of 25 mm^2 to 10 cm^2 lensfree imaging**, Fabien Momey, CEA Grenoble (France); Jean-Guillaume Coutard, MINATEC (France); Thomas Bordy, Fabrice P. Navarro Y Garcia, CEA-LETI (France); Mathilde Menneteau, Jean-Marc Dinten, Cédric Allier, MINATEC (France) . . . . . [9328-45]

2:10 pm: **Label-free analysis of single and multiple cells with a 2D light scattering static cytometer**, Shanshan Liu, Linyan Xie, Shandong Univ. (China); Yan Yang, Shandong Univ (China); Xu Qiao, Kun Song, Shandong Univ. (China); Beihua Kong, Qilu Hospital of Shandong Univ. (China); Xuantao Su, Shandong Univ. (China). . . . . [9328-46]

2:30 pm: **Microscope-on-chip: combining lens-free microscopy with integrated photonics**, Richard Stahl, Dries Vercruysse, Tom Claes, Jeonghwan Song, Geert Vanmeerbeeck, Xavier Rottenberg, Andy Lambrechts, IMEC (Belgium) . . . . . [9328-47]

SESSION 10
LOCATION: ROOM 300 (ESPLANADE) . . . . . WED 2:50 PM TO 3:30 PM

Regenerative Medicine

Session Chair: **Attila Tarnok,** Univ. Leipzig (Germany)

2:50 pm: **System for tracking transplanted limbal epithelial stem cells in the treatment of corneal stem cell deficiency**, Joseph Boadi, Stephen J. Matcher, Sheila MacNeil, The Univ. of Sheffield (United Kingdom); Virender S. Sangwan, LV Prasad Eye Institute (India). . . . . [9328-48]

3:10 pm: **Human oral mucosal epithelial cell sheets imaging with high-resolution phase-diversity homodyne OCT**, Naoko Senda, Kentaro Osawa, Hitachi, Ltd. (Japan) . . . . . [9328-49]

Coffee Break . . . . . .Wed 3:30 pm to 4:00 pm

SESSION 11
LOCATION: ROOM 300 (ESPLANADE) . . . . . WED 4:00 PM TO 6:00 PM

Cytomics and Histomics II

Session Chair: **Robert C. Leif,** Newport Instruments (USA)

4:00 pm: **Using neural networks for high-speed blood cell classification in a holographic-microscopy flow-cytometry system**, Bendix Schneider, Univ. Gent (Belgium); Geert Vanmeerbeeck, Liesbet Lagae, Richard Stahl, IMEC (Belgium); Peter Bienstman, Univ. Gent (Belgium) . . . . . [9328-50]

4:20 pm: **High throughput cellular time-stretch imaging on a spinning planar platform**, Anson H. L. Tang, Antony C. S. Chan, Yeung P., Belle S. M. Kwok, Barbara P. Chan, Edmund Y. Lam, Kenneth K. Y. Wong, Kevin K. Tsia, The Univ. of Hong Kong (Hong Kong, China) . . . . . [9328-51]

4:40 pm: **On tracking spinal disc cells**, Katherine P. Dempsey, Ka Po Lam, James B. Richardson, Sharon Owen, Keele Univ. (United Kingdom) . . . [9328-52]

5:00 pm: **Fast and robust identification of single bacteria in environmental matrices by Raman spectroscopy**, Jean-Charles Baritaux, CEA-LETI (France); Emmanuelle Schultz, MINATEC (France); Anne-Catherine Simon, Anne-Gaelle Bourdat, Isabelle Espagnon, Patricia Laurent, Jean-Marc Dinten, Commissariat à l'Énergie Atomique (France) . . . . . [9328-53]

5:20 pm: **Effects of cholesterol depletion on membrane nanostructure in MCF-7 cells by atomic force microscopy**, Yuhua Wang, Ningcheng Jiang, Fujian Normal Univ. (China). . . . . [9328-54]

5:40 pm: **Frequency-domain fluorescence lifetime imaging system (pco.flim) based on a in-pixel dual tap control CMOS image sensor**, Gerhard A Holst, Robert Franke, PCO AG (Germany). . . . . [9328-70]

CONFERENCE 9329
LOCATION: ROOM 308 (ESPLANADE)

Sunday–Tuesday 8–10 February 2015 • Proceedings of SPIE Vol. 9329

Multiphoton Microscopy in the Biomedical Sciences XV

Conference Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA); **Peter T. C. So,** Massachusetts Institute of Technology (USA); **Karsten König,** Univ. des Saarlandes (Germany)

Program Committee: **Wolfgang Becker,** Becker & Hickl GmbH (Germany); **Alberto Diaspro,** Istituto Italiano di Tecnologia (Italy); **Chen-Yuan Dong,** National Taiwan Univ. (Taiwan); **Kevin W. Eliceiri,** Univ. of Wisconsin-Madison (USA); **Scott Fraser,** California Institute of Technology (USA); **Paul M. W. French,** Imperial College London (United Kingdom); **Hans C. Gerritsen,** Utrecht Univ. (Netherlands); **Enrico Gratton,** Univ. of California, Irvine (USA); **Min Gu,** Swinburne Univ. of Technology (Australia); **Stefan W. Hell,** Max-Planck-Institut für Biophysikalische Chemie (Germany); **Paul J. Campagnola,** Univ. of Wisconsin-Madison (USA); **Satoshi Kawata,** Osaka Univ. (Japan); **Fu-Jen Kao,** National Yang-Ming Univ. (Taiwan); **Arnd K. Krueger,** Spectra-Physics®, a Newport Corp. Brand (USA); **Joseph R. Lakowicz,** Univ. of Maryland School of Medicine (USA); **Steve M. McDonald,** Coherent, Inc. (USA); **Angelika C. Rueck,** Univ. Ulm (Germany); **Junle Qu,** Shenzhen Univ. (China); **Steven S. Vogel,** National Institutes of Health (USA); **Paul W. Wiseman,** McGill Univ. (Canada); **X. Sunney Xie,** Harvard Univ. (USA); **Bernhard Zimmermann,** Carl Zeiss Jena GmbH (Germany); **Warren R. Zipfel,** Cornell Univ. (USA); **Chris Xu,** Cornell Univ. (USA)

COSPONSORS:

SUNDAY 8 FEBRUARY

OPENING REMARKS

LOCATION: ROOM 308 (ESPLANADE) . . . . . 8:15 AM TO 8:30 AM

Session Chair: **Ammasi Periasamy,** Univ. of Virginia (USA)

SESSION 1

LOCATION: ROOM 308 (ESPLANADE) . . . SUN 8:30 AM TO 10:00 AM

Keynote Session

Session Chair: **Ammasi Periasamy,** Univ. of Virginia (USA)

8:30 am: **Some new directions for multiphoton processes and their biomedical applications** *(Keynote Presentation)*, Paras N. Prasad, Univ. at Buffalo (USA) . . . . . [9329-1]

9:00 am: **Multiphoton microscopy in brain imaging** *(Keynote Presentation)*, Francesco S. Pavone, European Lab. for Non-linear Spectroscopy (Italy) . . . . . [9329-2]

9:30 am: **Fluorescence lifetime imaging: techniques and applications** *(Keynote Presentation)*, Wolfgang Becker, Becker & Hickl GmbH (Germany) . . . . . [9329-3]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 2

LOCATION: ROOM 308 (ESPLANADE) . . . . . SUN 10:30 AM TO 12:25 PM

FLIM/FRET/FCS I

Session Chair: **Angelika C. Rueck,** Univ. Ulm (Germany)

10:30 am: **Fluorescence polarization and fluctuation analysis (FPFA): a method for simultaneously measuring fluorescence lifetime, time-resolved anisotropy, fluorophore concentration, molecular brightness, and lateral diffusion times** *(Invited Paper)*, Tuan A. Nguyen, Jithesh V. Veetil, Pabak Sarkar, Steven S. Vogel, National Institutes of Health (USA) . . . . [9329-4]

10:50 am: **Recent advances in pattern matching based multi-species FLIM analysis** *(Invited Paper)*, Benedikt Krämer, PicoQuant GmbH (Germany); Thomas Niehörster, Anna Löschberger, Julius-Maximilians-Univ. Würzburg (Germany); Marcelle König, Paja Reisch, Matthias Patting, Felix Koberling, PicoQuant GmbH (Germany); Ingo Gregor, Georg-August-Univ. Göttingen (Germany); Markus Sauer, Julius-Maximilians-Univ. Würzburg (Germany); Rainer Erdmann, PicoQuant GmbH (Germany) . . . . . [9329-5]

11:10 am: **Application of quantitative fluorescence imaging techniques for investigating intracellular interactions and dynamics of HIV-1 proteins**, Yves Mely, Halina Anton, Nedal Taha, Marianna Sholokh, Salah El Meshri, Univ. de Strasbourg (France); Pascal Didier, Univ. of Strasbourg (France); Emmanuel Boutant, Ludovic Richert, Eleonore Real, Univ. de Strasbourg (France); Hugues de Rocquigny, Univ. of Strasbourg (France) . . . . . [9329-6]

11:25 am: **New dimensions in TCSPC FLIM: recording transient lifetime effects, spatial mosaics, simultaneous FLIM/PLIM**, Hauke Studier, Wolfgang Becker, Becker & Hickl GmbH (Germany) . . . . . [9329-7]

11:40 am: **Fiber-optic two-photon endomicroscopic fluorescence lifetime and fluorescence correlation spectroscopy imaging**, Wenxuan Liang, Johns Hopkins Univ. (USA); Guanghan Meng, Shanghai Jiao Tong Univ. (China); Gunnsteinn Hall, Johns Hopkins Univ. (USA); Ming-Jun Li, Corning Incorporated (USA); Xingde Li, Johns Hopkins Univ. (USA) . . . . . [9329-8]

11:55 am: **Observing conformational dynamics of single membrane transporters in a fast anti-Brownian electrokinetic trap**, Bertram Su, Thomas Heitkamp, Universitätsklinikum Jena (Germany); Monika G. Düser, Nawid Zarrabi, Univ. Stuttgart (Germany); Michael Börsch, Friedrich-Schiller-Univ. Jena (Germany) and Abbe Ctr. of Photonics Jena (Germany) . . . . . [9329-9]

12:10 pm: **Imaging of oxygenation in 3D tissue models with multi-modal phosphorescent probes**, Dmitri B. Papkovsky, Ruslan Dmitriev, Univ. College Cork (Ireland); Sergey Borisov, Graz University of Technology (Austria) [9329-97]

Lunch Break . . . . . Sun 12:25 pm to 1:30 pm

SESSION 3

LOCATION: ROOM 308 (ESPLANADE) . . . . . SUN 1:30 PM TO 3:05 PM

FLIM/FRET/FCS II

Session Chair: **Michael Börsch,**
Friedrich-Schiller-Univ. Jena (Germany)

1:30 pm: **Cell metabolism, FLIM and PLIM and applications** *(Invited Paper)*, Angelika C. Rueck, Sviatlana Kalinina, Univ. Ulm (Germany) . . . . . [9329-10]

1:50 pm: **Flavin fluorescence lifetime imaging of living peripheral blood mononuclear cells on micro and nano-structured surfaces**, Tibor Teplicky, International Laser Ctr. (Slovakia) and Univ. of Ss. Cyril and Methodius (Slovakia); Julia Horilova, International Laser Ctr. (Slovakia) and Pavol Jozef Safarik Univ. (Slovakia); Jaroslav Bruncko, International Laser Ctr. (Slovakia); Cecile Gladine, Unité de Nutrition Humaine, Clermont Univ., Univ. d'Auvergne (France); Ingrid Lajdova, Slovak Medical Univ. (Slovakia); Anton Mateasik, Dusan Chorvat Jr., Alzbeta Marcek Chorvatova, International Laser Ctr. (Slovakia) . . . . . [9329-11]

2:05 pm: **Characterization of porcine eye based on autofluorescence lifetime imaging**, Ana Batista, Univ. de Coimbra (Portugal) and Saarland Univ. (Germany); Hans Georg Breunig, Univ. des Saarlandes (Germany) and JenLab GmbH (Germany); Aisada Uchugonova, Univ. des Saarlandes (Germany); António Miguel Morgado, Univ. de Coimbra (Portugal); Karsten König, Univ. des Saarlandes (Germany) and JenLab GmbH (Germany) . . . . . [9329-12]

2:20 pm: **Time-resolved anisotropy imaging with a single detector**, Vladislav I. Shcheslavskiy, Wolfgang Becker, Becker & Hickl GmbH (Germany). . [9329-13]

2:35 pm: **Time-resolved spectral imaging: better photon economy, higher accuracy**, Farzad Fereidouni, Univ. of California, Davis (USA); Keimpe Reitsma, Micro-Key BV (Netherlands); Gerhard A. Blab, Hans C. Gerritsen, Utrecht Univ. (Netherlands) . . . . . [9329-14]

2:50 pm: **TCSPC FLIM for clinical applications: technical solutions and first results**, Alexander Jelzow, Wolfgang Becker, Becker & Hickl GmbH (Germany); Yoshihiko Katayama, Heidelberg Engineering GmbH (Germany); Karsten König, Univ. des Saarlandes (Germany); Dietrich Schweitzer, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9329-15]

Coffee Break . . . . . Sun 3:05 pm to 3:30 pm

SESSION 4

LOCATION: ROOM 308 (ESPLANADE) . . . . . SUN 3:30 PM TO 5:25 PM

Technology Development and Application I

Session Chair: **Karsten König,** Univ. des Saarlandes (Germany)

3:30 pm: **Smart 2PE** *(Invited Paper)*, Alberto Diaspro, Istituto Italiano di Tecnologia (Italy) and Univ. degli Studi di Genova (Italy) and Nikon Imaging Ctr. at Fondazione Istituto Italiano di Tecnologia (Italy); Paolo Bianchini, Francesca Cella Zanacchi, Martì Duocastella, Luca L. Lanzanò, Giuseppe Vicidomini, Istituto Italiano di Tecnologia (Italy) . . . . . [9329-16]

3:50 pm: **Deep two-photon microscopic imaging through brain tissue using the second singlet state from fluorescent agent** *(Invited Paper)*, Lingyan Shi, The City College of New York (USA) . . . . . [9329-17]

4:10 pm: **Next generation laser sources for non-linear imaging**, Darryl McCoy, Coherent Scotland Ltd. (United Kingdom); Marco Arrigoni, Nigel Gallaher, Coherent, Inc. (USA) . . . . . [9329-18]

4:25 pm: **Latest advances in ultra-fast laser sources for multi photon microscopy**, Phil Smith, Newport Corp. (USA) . . . . . [9329-19]

4:40 pm: **Two-photon excited fluorescence microendoscopic imaging using a GRIN lens**, Wei Yan, Xiao Peng, Shenzhen Univ. (China); Danying Lin, Shenzhen Univ (China); Qi Wang, Jian Gao, Jie Zhou, Bing Yu, Junle Qu, Shenzhen Univ. (China); Hanben Niu, Shenzhen Univ (China) . . . . . [9329-20]

4:55 pm: **Two-photon excited fluorescence emission from hemoglobin**, Qiqi Sun, Yan Zeng, Wei Zhang, Hong Kong Univ. of Science and Technology (Hong Kong, China); Wei Zheng, Shenzhen Institute of Advanced Technology (China); Yi Luo, Univ. of Science and Technology of China (China); Jianan Qu, Hong Kong Univ. of Science and Technology (Hong Kong, China) . . . . . [9329-21]

5:10 pm: **In vivo pump-probe microscopy of melanoma: characterizing shifts in excited state photodynamics with respect to invasiveness and chemotherapy response**, Jesse W. Wilson, Simone Degan, Christina S. Gainey, Tanya Mitropoulos, Mary Jane Simpson, Sanghamitra Deb, Christopher P. Dall, Yasmine Tameze, Jennifer Zhang, Warren S. Warren, Duke Univ. (USA) . . . . . [9329-22]

POSTERS-SUNDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Session Chairs: **Holly Aaron,** Univ. of California, Berkeley (USA); **Steven S. Vogel,** National Institutes of Health (USA); **Jesse W. Wilson,** Duke Univ. (USA); **Kevin W. Eliceiri,** Univ. of Wisconsin-Madison (USA)

Super resolution brain imaging by using a two-photon fluorescence microscopy with harmonic modulation, Szu-Yu Lee, National Taiwan Univ. (Taiwan); Chi-Kuang Sun, National Taiwan Univ. (Taiwan) and Academia Sinica (Taiwan) and Molecular Imaging Ctr. (Taiwan) . . . . . [9329-73]

Fiber based ultra-short pulse delivery for nonlinear spectroscopy and microscopy using high energy solitons, Sarah Saint-Jalm, Esben R. Andresen, Institut Fresnel (France); Abdelkrim Bendahmane, PhLAM (France); Alexandre Kudlinski, Lab. de Physique des Lasers, Atomes et Molécules (France); Hervé Rigneault, Institut Fresnel (France) . . . . . [9329-74]

Interferometric second harmonic generation imaging of biological tissues, Charles-André Couture, Maxime Rivard, Institut National de la Recherche Scientifique (Canada); Konstatin Popov, Univ. of Ottawa (Canada); Mathieu Laliberté, Anthony Bertrand-Grenier, Institut National de la Recherche Scientifique (Canada); Amir Miri, McGill Univ. (Canada); François Martin, Henri Pépin, Institut National de la Recherche Scientifique (Canada); Luc Mongeau, McGill Univ. (Canada); Christian Pfeffer, Ludwig-Maximilians-Univ. (Germany); Cameron Brown, Univ. of Oxford (United Kingdom); Lora Ramunno, Univ. of Ottawa (Canada); François Légaré, Institut National de la Recherche Scientifique (Canada) . . . . . [9329-75]

FRAP (fluorescence recovery after photobleaching) imaging using SLM-controlled doughnut spots, Yi Xue, Christopher J. Rowlands, Peter T. C. So, Massachusetts Institute of Technology (USA) . . . . . [9329-76]

New insights and system designs for temporally-focused multiphoton optogenetics, Tom Mayblum, Adi Schejter, Technion-Israel Institute of Technology (Israel); Hod Dana, Janelia Farm Research Campus, Howard Hughes Medical Institute (USA); Shy Shoham, Technion-Israel Institute of Technology (Israel) . . . . . [9329-77]

Effects of anesthesia on the cerebral capillary blood flow in young and old mice, Mohammad Moeini, Ecole Polytechnique de Montréal (Canada) and Montréal Heart Institute (Canada); Maryam S. Tabatabaei, Ecole Polytechnique de Montréal (Canada) and Montreal Heart Institute (Canada); Samuel Bélanger, Pramod Avti, Alexandre Castonguay, Philippe Pouliot, Frédéric Lesage, Ecole Polytechnique de Montréal (Canada) and Montréal Heart Institute (Canada) . . . . . [9329-78]

Determination of the spectral dependence of reduced scattering and quantitative SHG imaging for detection of fibrillar changes in ovarian cancer, Kirby R. Campbell, Paul J. Campagnola, Karissa B. Tilbury, Univ. of Wisconsin-Madison (USA). . . . . [9329-79]

Quantitative metabolic imaging captures cellular heterogeneity in head and neck cancer organoids, Amy T. Shah, Alex J. Walsh, Melissa C. Skala, Vanderbilt Univ. (USA) . . . . . [9329-80]

A modular two-photon microscope for simultaneous imaging of distant cortical areas in vivo, Fabian F. Voigt, Jerry L. Chen, Roland Krueppel, Fritjof Helmchen, Univ. Zürich (Switzerland) . . . . . [9329-81]

Fluorescence lifetime imaging in the near-infrared region, Wolfgang Becker, Vladislav I. Shcheslavskiy, Becker & Hickl GmbH (Germany) . . . . . [9329-82]

False positives in SRS imaging of lipid droplets: identification and reduction, Xuesong Li, Wen Jiun Lam, Yan Hao, Qiqi Sun, Sicong He, Yan Zeng, Ho Yi Mak, Jianan Qu, Hong Kong Univ. of Science and Technology (Hong Kong, China) . . . . . [9329-83]

Classification and recognition of texture collagen obtaining by multiphoton microscope with neural network analysis tool, Shulian Wu, Hui Li, Xiaoman Zhang, Fujian Normal Univ. (China); Yudian Huang, Pathology Department of the Fuzhou First Hospital Affiliated to Fujian Medical University (China) . . . . . [9329-84]

Improvement of the spatial resolution in multiphoton microscopy by saturated excitation of fluorescence , Anh Dung Nguyen, François Duport, Univ. Libre de Bruxelles (Belgium); Frédérique Vanholsbeeck, The Univ. of Auckland (New Zealand); Serge Goldman, Philippe Emplit, Simon-Pierre Gorza, Univ. Libre de Bruxelles (Belgium) . . . . . [9329-85]

Quantitative 3D molecular cutaneous absorption in human skin using label free nonlinear microscopy, Xueqin Chen, Institut Fresnel (France); Sébastien Grégoire, Florian Formanek, Jean-Baptiste Galey, L'Oréal (France); Hervé Rigneault, Institut Fresnel (France) . . . . . [9329-86]

Statistical analysis on activation and photo-bleaching of step-wise multi-photon activation fluorescence of melanin, Zetong Gu, Zhenhua Lai, Xi Zhang, Northeastern Univ. (USA); Jihao Yin, Beihang Univ. (China); Charles A. DiMarzio, Northeastern Univ. (USA). . . . . [9329-87]

Apertureless confocal scanning microscopy under temporally controlled femtosecond pulse illumination, Dhiman Das, Soumendra N. Bandyopadhyaya, Debabrata Goswami, Indian Institute of Technology Kanpur (India). . . . . [9329-88]

Multi-photon laser scanning omnidirectional imaging with tunable frame rate, Dapeng Zhang, Jiyi Cheng, Shih-Chi Chen, The Chinese Univ. of Hong Kong (Hong Kong, China) . . . . . [9329-89]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their groundbreaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9329
LOCATION: ROOM 308 (ESPLANADE)

MONDAY 9 FEBRUARY

SESSION 5
LOCATION: ROOM 308 (ESPLANADE) . . . . . .MON 8:30 AM TO 9:35 AM

Technology Development and Application II
Session Chair: **Aisada Uchugonova,** Univ. des Saarlandes (Germany)

8:30 am: **Multiphoton tomography on astronauts** *(Invited Paper)*, Karsten König, JenLab GmbH (Germany) and Univ. des Saarlandes (Germany); Martin Weinigel, JenLab GmbH (Germany); Nicole Gerlach, Ulrike Heinrich, DermaTronnier GmbH & Co. KG (Germany) . . . . . [9329-23]

8:50 am: **Targeted illumination in 3D for excitation and stimulation**, Elijah Y. Yew, Peter T. C. So, Massachusetts Institute of Technology (USA). . . . [9329-24]

9:05 am: **Breast cancer staging through nonlinear endomicroscopy**, Gunnsteinn Hall, Wenxuan Liang, Lu Jiang, Kristine Glunde, Xingde Li, Johns Hopkins Univ. (USA) . . . . . [9329-25]

9:20 am: **Study of acetowhitening mechanisms in live mammalian cells with label-free subcellular-level multimodal nonlinear optical microscopy**, Jian Lin, Sengkhoon Teh, Wei Zheng, Zi Wang, Zhiwei Huang, National Univ. of Singapore (Singapore). . . . . [9329-26]

AWARD PRESENTATION
LOCATION: ROOM 308 (ESPLANADE) . . . . . 9:35 AM TO 10:05 AM

JenLab Young Investigator Award Papers Presentation
Session Chair: **Ammasi Periasamy,** Univ. of Virginia (USA)

Coffee Break . . . . . Mon 10:05 am to 10:30 am

SESSION 6
LOCATION: ROOM 308 (ESPLANADE) . . . . . MON 10:30 AM TO 12:05 PM

Technology Development and Application III
Session Chair: **Peter T. C. So,**
Massachusetts Institute of Technology (USA)

10:30 am: **Optical reprogramming with ultrashort femtosecond laser pulses** *(Invited Paper)*, Aisada Uchugonova, Univ. des Saarlandes (Germany); Hans Georg Breunig, Univ. des Saarlandes (Germany) and JenLab GmbH (Germany); Ana Batista, Karsten König, Univ. des Saarlandes (Germany) . . . . . [9329-27]

10:50 am: **Compact fixed wavelength femtosecond oscillators for multi-photon imaging**, Tommi Hakulinen, Spectra Physics (Austria); Ruben Zadoyan, Tommaso Baldacchini, Newport Corp. (USA); Tilman Franke, FEI Munich GmbH (Germany) . . . . . [9329-28]

11:05 am: **Novel applications of melanin pump-probe imaging: correlating structural and chemical variation with MC1R gene expression and the onset of Parkinson's disease**, Sanghamitra Deb, Christopher P. Dall, Francisco E. Robles, Christina S. Gainey, Jesse W. Wilson, Warren S. Warren, Duke Univ. (USA); Nicole A. Kukutsch, Leiden Univ. Medical Ctr. (Netherlands) . . . . . [9329-29]

11:20 am: **Femtosecond pulse shaping enables molecular imaging using optical Kerr-effect dynamics**, Francisco E. Robles, Martin C. Fischer, Warren S. Warren, Duke Univ. (USA) . . . . . [9329-30]

11:35 am: **Integration of femtosecond fiber laser and endoscopy**, Huda Yousif, Hussein E. Kotb, Majid Naji, Univ. of Ottawa (Canada); Mohamed A. Abdelalim, Univ. of Ottawa (Canada) and Electronics Research Institute (Egypt); Sangeeta Murugkar, Carleton Univ. (Canada); Hanan Anis, Univ. of Ottawa (Canada) . . . . . [9329-31]

11:50 am: **Multiphoton light-sheet microscopy using wavelength mixing: fast multicolor imaging of the beating Zebrafish heart with low photobleaching**, Pierre Mahou, Lab. d'Optique et Biosciences, Ecole Polytechnique (France) and Univ. of Cambridge (United Kingdom); Julien Vermot, Univ. de Strasbourg (France); Emmanuel Beaurepaire, Lab. d'Optique et Biosciences, Ecole Polytechnique (France); Willy Supatto, Lab. d'Optique et Biosciences, Ecole Polytechnique (France) . . . . . [9329-32]

Lunch Break . . . . . .Mon 12:05 pm to 1:30 pm

SESSION 7
LOCATION: ROOM 308 (ESPLANADE) . . . . . MON 1:30 PM TO 2:50 PM

SHG/THG Microscopy I
Session Chair: **Chen-Yuan Dong,** National Taiwan Univ. (Taiwan)

1:30 pm: **Combined wavelength dependent 3D SHG imaging, optical scattering and texture analysis to characterize changes collagen architecture and development of a classification system in human ovarian cancer** *(Invited Paper)*, Paul J. Campagnola, Karissa B. Tilbury, Kirby R. Campbell, Bruce L. Wen, Kevin W. Eliceiri, Vikas Singh, Manish Patankar, Univ. of Wisconsin-Madison (USA) . . . . . [9329-33]

1:50 pm: **Two- and three-photon excited fluorescence microscopy of erythrocytes using sub-50fs Ti:sapphire and Yb lasers**, Marcos M. Dantus, Ilyas Saytashev, Michigan State Univ. (USA) . . . . . [9329-34]

2:05 pm: **Combining wide-field assessment with nonlinear optical microscopy: possibilities for multimodal imaging in epithelial (pre)cancer**, Rahul Pal, Jinping Yang, Gracie Vargas, The Univ. of Texas Medical Branch (USA) . . . . . [9329-35]

2:20 pm: **Four wave mixing microscopy: a high potential nonlinear imaging method**, Tobias Ehmke, Andreas Knebl, Friedrich-Schiller-Univ. Jena (Germany); Alexander Heisterkamp, Leibniz Univ. Hannover (Germany) . . . . . [9329-36]

2:35 pm: **Revealing starch denaturation with SHG microscopy**, Nirmal Mazumder, Fu-Jen Kao, National Yang-Ming Univ. (Taiwan) . . [9329-145]

AWARD PRESENTATION . . . . . 2:50 PM TO 3:05 PM

Student Poster Session Competition
Session Chair: **Ammasi Periasamy,** Univ. of Virginia (USA)

PRIZE DONATED BY:

Becker and Hickl, Carl Zeiss Microscopy, LLC, Chroma Tech, Coherent Inc., ISS Inc., Leica Microsystems, Newport Corporation, Princeton Instruments, Semrock, Veroptics

Graduate students and postdoctoral fellows with accepted posters can participate in the poster session competition of the conference on Multiphoton Microscopy in the Biomedical Sciences. There is a cash award for the winner(s). The participants should mention that their submission is for the "Students Poster Session Competition (SPSCMP)." The participants should follow the rules and regulations of SPIE or submission of their abstract and manuscript.

JenLab Young Investigator Award

PRIZE DONATED BY:

JenLab GmbH

UPDATED JENLAB YOUNG INVESTIGATOR AWARD RULES:

We are pleased to announce that a prize in the amount of $2,000.00 will be awarded to a graduate student, postdoc, or scientist under the age of 32 within conference 9329: Multiphoton Microscopy in the Biomedical Sciences XV.

To be eligible to receive the award, participants must be both the primary author and presenter of an accepted abstract in the Poster Session. Two authors will be selected for oral presentation and the award will be presented to one of the oral presenters. The participants should follow the rules and regulations of SPIE for submission of their abstract and manuscript for review by the selection committee.

Coffee Break . . . . . .Mon 3:05 pm to 3:30 pm

SESSION 8

LOCATION: ROOM 308 (ESPLANADE) . . . . . MON 3:30 PM TO 5:35 PM

SHG/THG Microscopy II

Session Chair: **Paul J. Campagnola,** Univ. of Wisconsin-Madison (USA)

3:30 pm: **Label-free second order susceptibility imaging of collagen** *(Invited Paper)*, Chen-Yuan Dong, Chiu-Mei Hsueh, Ya-Der Huang, Hsuan-Shu Lee, National Taiwan Univ. (Taiwan) . . . . . [9329-38]

3:50 pm: **Influence of pulse width on photodamage and inflammation during intravital autofluorescence 2-photon microscopy of murine intestinal mucosa**, Gereon Hüttmann, Lisa Krapf, Regina Orzekowsky-Schroeder, Norbert Koop, Alfred Vogel, Antje Klinger, Univ. zu Lübeck (Germany) . [9329-39]

4:05 pm: **Yb-fiber laser for multimodal imaging**, Ilyas Saytashev, Michigan State Univ. (USA); Bingwei Xu, Marcos M. Dantus, Biophotonic Solutions, Inc. (USA) . . . . . [9329-40]

4:20 pm: **Label-free multi-photon imaging of Barrett esophagus**, Seyed Soroush Mehravar, College of Optical Sciences, The Univ. of Arizona (USA); Philip Usera, Hemant Chatrath, Nasser Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA); Bhaskar Banerjee, The Univ. of Arizona College of Medicine (USA); Khanh Q. Kieu, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9329-41]

4:35 pm: **Non-linear imaging and characterization of atherosclerotic arterial tissue using combined SHG and FLIM microscopy**, Riccardo Cicchi, Istituto Nazionale di Ottica (Italy) and European Lab. for Non-linear Spectroscopy (Italy); Christian Matthaeus, Leibniz-Institut für Photonische Technologien e.V. (Germany); Enrico Baria, Univ. degli Studi di Firenze (Italy); Marta Lange, European Lab. for Non-linear Spectroscopy (Italy); Tobias Meyer, Leibniz-Institut für Photonische Technologien e.V. (Germany); Annika Lattermann, Universitätsklinikum Jena (Germany); Benjamin Dietzek, Leibniz-Institut für Photonische Technologien e.V. (Germany) and Abbe Ctr. of Photonics Jena (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Bernhard R. Brehm, Katholische Klinikum Koblenz (Germany); Juergen Popp, Leibniz-Institut für Photonische Technologien e.V. (Germany) and Abbe Ctr. of Photonics Jena (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Francesco S. Pavone, European Lab. for Non-linear Spectroscopy (Italy) and Univ. degli Studi di Firenze (Italy) . . . . . [9329-42]

4:50 pm: **Biomaterial discrimination using wavelength-dependent SHG excitation efficiency**, Stephen J. Matcher, Nicola H. Green, Robin M. Delaine-Smith, Gwendolen C. Reilly, Hannah Askew, Xuesong Hu, The Univ. of Sheffield (United Kingdom). . . . . [9329-43]

5:05 pm: **Discontinuous sampling in beam-scanning microscopy**, Ryan D. Muir, Paul D. Schmitt, Emma L. DeWalt, Shane Z. Sullivan, Ximeng You, Garth J. Simpson, Purdue Univ. (USA) . . . . . [9329-44]

5:20 pm: **Second harmonic generation imaging in tissue engineering and cartilage pathologies**, Magnus B. Lilledahl, Norwegian Univ. of Science and Technology (Norway); Magnus Ø. Olderøy, Norwegian Ctr. for Stem Cell Research (Norway); Andreas Finnøy, Norwegian Univ. of Science and Technology (Norway); Kristin Olstad, Norwegian Univ. of Life Sciences (Norway); Jan E. Brinchman, Norwegian Ctr. for Stem Cell Research (Norway). . . [9329-45]

TUESDAY 10 FEBRUARY

SESSION 9

LOCATION: ROOM 308 (ESPLANADE) . . . . . TUE 8:00 AM TO 9:55 AM

Biomedical Applications of Coherent Raman I

Session Chair: **Xiaoliang S. Xie,** Harvard Univ. (USA)

8:00 am: **Stimulated Raman scattering microscopy of chemical tags in live cells** *(Invited Paper)*, YanYi Huang, Xing Chen, Peking Univ. (China). . . [9329-46]

8:20 am: **Bioorthogonal vibrational imaging of dynamic metabolism of living systems** *(Invited Paper)*, Wei Min, Columbia Univ. (USA). . . . . [9329-47]

8:40 am: **Visualization and quantification of peripheral myelin degeneration in amyotrophic lateral sclerosis (ALS) mouse model (SOD1G93A) and patients with stimulated Raman scattering (SRS)**, Wenlong Yang, Feng Tian, Harvard Univ. (USA); Daniel Mordes, Harvard Univ. (USA) and Massachusetts General Hospital (USA); Naoki Suzuki, Satomi Suzuki, Kevin Eggan, Xiaoliang S. Xie, Harvard Univ. (USA) . . . . . [9329-48]

8:55 am: **Probing myelin morphology and organization with label-free microscopy**, Alicja Gasecka, Institut Univ. en Santé Mentale de Quebec, Univ. Laval (Canada) and Institut Fresnel (Canada); Pierre Gravel, Institut Univ. en Santé Mentale de Quebec, Univ. Laval (Canada) and Univ. du Québec (Canada); Raphael Turcotte, Wellman Ctr. for Photomedicine (USA); Steve Begin, Daniel Cote, Ctr. de Recherche de l'Univ. Laval Robert-Giffard (Canada) and Institut Univ. en Santé Mentale de Quebec, Univ. Laval (Canada) . . . . . [9329-49]

9:10 am: **Visualizing murine meibomian glands physiology and pathology using coherent anti-stokes Raman scattering (CARS) microscopy and multi-photon microscopy (MPM)**, Joachim Pruessner, Univ. zu Lübeck (Germany) and Wellman Ctr. for Photomedicine (USA); Reginald Birngruber, Univ. zu Lübeck (Germany); Conor L. Evans, Wellman Ctr. for Photomedicine (USA) . . . . . [9329-50]

9:25 am: **Local organization of lipids in myelinated axons probed by polarization resolved coherent anti-stokes Raman scattering nonlinear microscopy**, Paulina Gasecka, Naveen K. Balla, Julien Duboisset, Patrick Ferrand, Hervé Rigneault, Sophie Brasselet, Institut Fresnel (France) . . [9329-51]

9:40 am: **Monitoring lipid accumulation in the green microalga botryococcus braunii with frequency-modulated stimulated Raman scattering**, Chun-Chin Wang, Dayananda Chandrappa, Nicholas Smirnoff, Julian Moger, Univ. of Exeter (United Kingdom) . . . . . [9329-52]

Coffee Break . . . . . Tue 9:55 am to 10:25 am

SESSION 10

LOCATION: ROOM 308 (ESPLANADE) . . . . . TUE 10:25 AM TO 12:00 PM

Biomedical Applications of Coherent Raman II

Session Chair: **Daniel Cote,**
Ctr. de Recherche de l'Univ. Laval Robert-Giffard (Canada)

10:25 am: **Label-free functional imaging of membrane potential by stimulated Raman scattering microscopy** *(Invited Paper)*, Bin Liu, Key Lab. of Science and Technology on Tunable Laser, Harbin Institute of Technology (China); Hyeon Jeong Lee, Interdisciplinary Life Science Program, Purdue Univ. (USA); Delong Zhang, ChienSheng Liao, Purdue Univ. (USA); Yuanqin Xia, Key Lab. of Science and Technology on Tunable Laser, Harbin Institute of Technology (China); Ji-Xin Cheng, Purdue Univ. (USA) . . . . . [9329-53]

10:45 am: **Detection of human brain tumors with SRS microscopy**, Daniel A. Orringer, Univ. of Michigan Health System (USA); Minbiao Ji, Harvard Univ. (USA); Spencer Lewis, Sandra Camelo-Piragua, Univ. of Michigan Health System (USA); Xiaoliang S. Xie, Harvard Univ. (USA) . . . . . [9329-54]

11:00 am: **Imaging human melanoma using coherent anti-stokes Raman scattering (CARS) and multiphoton microscopy (MPM)**, Hequn Wang, Sam Osseiran, Elisabeth Roider, Vivien Igras, David E. Fisher, Conor L. Evans, Wellman Ctr. for Photomedicine (USA) . . . . . [9329-55]

11:15 am: **Histology in vivo: chemical contrast combined with clinical multimodal multiphoton tomograpy**, Martin Weinigel, JenLab GmbH (Germany) and Univ. of Technology, Ilmenau (Germany); Hans Georg Breunig, Saarland Univ. (Germany) and JenLab GmbH (Germany); Karsten Koenig, JenLab GmbH (Germany) and Univ. des Saarlandes (Germany) . . . . . [9329-56]

11:30 am: **Mechanically-induced protein structural changes in fibrin hydrogels using B-CARS microscopy**, Sapun H. Parekh, Frederik Fleissner, Mischa Bonn, Max-Planck-Institut für Polymerforschung (Germany). . . [9329-57]

11:45 am: **Simultaneous quadruple modal nonlinear optical imaging for gastric diseases diagnosis and characterization**, Zi Wang, Wei Zheng, Jian Lin, Zhiwei Huang, National Univ. of Singapore (Singapore). . . . . [9329-58]

Lunch Break . . . . . Tue 12:00 pm to 1:45 pm

CONFERENCE 9329
LOCATION: ROOM 308 (ESPLANADE)

SESSION 11
LOCATION: ROOM 308 (ESPLANADE) . . . . . TUE 1:30 PM TO 3:25 PM

Coherent Raman Technical Development I
Session Chair: **Ji-Xin Cheng,** Purdue Univ. (USA)

1:45 pm: **Hyperspectral stimulated Raman scattering imaging of drug-cell and drug-drug interaction** *(Invited Paper)*, Dan Fu, Harvard Univ. (USA); Jing Zhou, Novartis Institutes for Biomedical Research, Inc. (USA); Xiaoliang S. Xie, Harvard Univ. (USA) . . . . . [9329-59]

2:05 pm: **In vivo microsecond scale vibrational spectroscopy imaging by modulation multiplexed stimulated Raman scattering** *(Invited Paper)*, ChienSheng Liao, Pu Wang, Ping Wang, Robert Oglesbee, Ji-Xin Cheng, Purdue Univ. (USA) . . . . . [9329-60]

2:20 pm: **Resolution and contrast enhancement in label-free microscopy**, Alicja Gasecka, Institut Univ. en Santé Mentale de Quebec, Univ. Laval (Canada) and Institut Fresnel (Canada); Amy Daradich, Harold Dehez, Institut Univ. en Santé Mentale de Quebec, Univ. Laval (Canada); Michel Piche, Univ. Laval (Canada); Daniel Cote, Ctr. de Recherche de l'Univ. Laval Robert-Giffard (Canada) and Institut Univ. en Santé Mentale de Quebec, Univ. Laval (Canada) . . . . . [9329-61]

2:35 pm: **Fast spectrum extraction from SRS spectral images by independent component analysis with image compression and post sampling**, Yasuyuki Ozeki, The Univ. of Tokyo (Japan) . . . . . [9329-62]

2:50 pm: **Nonlinear optical microscopy and optical coherence tomography platform for label-free functional biophotonic imaging**, Angelika Unterhuber, Medizinische Univ. Wien (Austria); Sunil Kumar, Weizmann Institute of Science (Israel); Tschackad Kamali, Boris Hermann, Rene Werkmeister, Medizinische Univ. Wien (Austria); Yaron Silberberg, Weizmann Institute of Science (Israel); Wolfgang Drexler, Medizinische Univ. Wien (Austria) . . . . . [9329-64]

3:05 pm: **CARS/FWM and scanning probe microscopy of nanostructures** *(Invited Paper)*, Annika M. Enejder, Michael Stührenberg, Nisha Rani Agarwal, Mahesh Namboodiri, Juris Kiskis, Chalmers Univ. of Technology (Sweden) . . . . . [9329-65]

Coffee Break . . . . . Tue 3:25 pm to 3:55 pm

SESSION 12
LOCATION: ROOM 308 (ESPLANADE) . . . . . TUE 3:55 PM TO 5:50 PM

Coherent Raman Technical Development II
Session Chair: **Annika M. Enejder,**
Chalmers Univ. of Technology (Sweden)

3:55 pm: **Background-free stimulated Raman spectroscopy and microscopy** *(Invited Paper)*, Hervé Rigneault, Esben Andresen, Pascal Berto, Institut Fresnel (France) . . . . . [9329-66]

4:15 pm: **Pushing the limits of coherent Raman spectroscopic imaging** *(Invited Paper)*, Marcus T. Cicerone, Charles H. Camp Jr., Brandon Blakely, Young Lee, National Institute of Standards and Technology (USA) . . . . [9329-67]

4:35 pm: **Fiber-laser platform for coherent Raman scattering**, Christian W. Freudiger, Invenio Imaging Inc. (USA); Wenlong Yang, Gary R. Holtom, Harvard Univ. (USA); Jay Trautman, Invenio Imaging Inc. (USA); Khanh Q. Kieu, The Univ. of Arizona (USA); Sunney Xie, Harvard Univ. (USA) . . . . . [9329-68]

4:50 pm: **Optimized coherent Raman scattering microscopy with a novel tunable dual-wavelength lightsource**, Ingo Rimke, APE GmbH (Germany); Gregor Hehl, Univ. Stuttgart (Germany); Marcus Beutler, Peter Volz, Edlef Büttner, APE GmbH (Germany); Andreas Volkmer, Univ. Stuttgart (Germany) . . . . . [9329-69]

5:05 pm: **Towards low-noise fiber sources for coherent Raman microscopy**, Erin S. Lamb, Hanzhang Pei, Frank W. Wise, Cornell Univ. (USA) . . . . . [9329-70]

5:20 pm: **Optimized signal-to-noise ratio with shot noise limited detection in Stimulated Raman Scattering microscopy**, Miriam J. B. Moester, Freek Ariese, Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands) . . . . [9329-71]

5:35 pm: **Detecting polymeric nanoparticles with coherent anti-stokes Raman scattering microscopy in tissues exhibiting fixative-induced autoflourescence**, Natalie L. Garrett, Univ. of Exeter (United Kingdom); Lisa Godfrey, Univ. College London (United Kingdom); Aikaterini Lalatsa, Univ. of Portsmouth (United Kingdom); D. R. Serrano, Univ. Complutense de Madrid (Spain); Ijeoma F. Uchegbu, Andreas G. Schatzlein, Univ. College London (United Kingdom); Julian Moger, Univ. of Exeter (United Kingdom) . . . . [9329-72]

CONFERENCE 9330
LOCATION: ROOM 304 (ESPLANADE)

Monday–Thursday 9–12 February 2015 • Proceedings of SPIE Vol. 9330

Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXII

Conference Chairs: **Thomas G. Brown,** Univ. of Rochester (USA); **Carol J. Cogswell,** Univ. of Colorado at Boulder (USA); **Tony Wilson,** Univ. of Oxford (United Kingdom)

Program Committee: **Martin Booth,** Univ. of Oxford (United Kingdom); **G. J. Brakenhoff,** Univ. van Amsterdam (Netherlands); **José-Angel Conchello,** Harvard Univ. (USA); **Charles A. DiMarzio,** Northeastern Univ. (USA); **Raimund J. Ober,** The Univ. of Texas at Dallas (USA); **Chrysanthe Preza,** Univ. of Memphis (USA); **Monika Ritsch-Marte,** Innsbruck Medical Univ. (Austria)

MONDAY 9 FEBRUARY

POSTERS-MONDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . MON 5:30 PM TO 7:30 PM

Conference attendees are invited to attend the BiOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Auto-tracking of focal plane based on a tunable lens in digital holographic microscopy, Ju Wan Kim, Jeong Heon Han, Jonghyun Eom, Byeong Ha Lee, Gwangju Institute of Science and Technology (Korea, Republic of) . . . . [9330-39]

Computed tomography of refractive index by low-coherence interferometry, Yi Wang, Northeastern Univ. at Qinhuangdao (China); Zhenhe Ma, Northeastern University (China); Hongxian Zhou, Northeastern Univ. (China) . . . . . [9330-50]

A novel method for image denoising of fluorescence molecular imaging based on fuzzy C-Means clustering, Jie Tian, Institute of Automation (China); Yu An, Jie Liu, Beijing Jiaotong Univ. (China); Chongwei Chi, Jinzuo Ye, Yamin Mao, Xin Yang, Institute of Automation (China); Shixin Jiang, The department of Biomedical Engineering, School of Computer and Information Technology, Beijing Jia (China) . . . . . [9330-51]

Reversibly switchable fluorescence microscopy, Junjie Yao, Washington Univ. in St. Louis (USA); Daria M. Shcherbakova, Albert Einstein College of Medicine of Yeshiva Univ. (USA); Chiye Li, Washington Univ. in St. Louis (USA); Arie Krumholz, Ramon A. Lorca, Erin Reinl, Sarah K. England, Washington Univ. School of Medicine in St. Louis (USA); Vladislav V. Verkhusha, Albert Einstein College of Medicine of Yeshiva Univ. (USA); Lihong V. Wang, Washington Univ. in St. Louis (USA). . . . . [9330-52]

Optical Coherence Detection with Stimulated Emission _ a feasibility study, Chun-hui Yu, Shen-Shou M. Chung, National Yang-Ming Univ. (Taiwan); Wen-Chuan Kuo, National Yang-Ming University, Institute of Biophotonics (Taiwan); Fu-Jen Kao, National Yang-Ming Univ. (Taiwan) . . . . . [9330-53]

High-resolution imaging of biological tissue with full-field optical coherence tomography, Yue Zhu, Wanrong Gao, Nanjing Univ. of Science and Technology (China) . . . . . [9330-54]

Wide-field sectioning with the aid of undersampled scanning microscopy, Yubo Duan, Nanguang Chen, National Univ. of Singapore (Singapore) . [9330-55]

Development of large FOV 3D scanner based on confocal microscopy, Hyeong-Jun Jeong, Dae-Gab Gweon, KAIST (Korea, Republic of); Min Kook Ko, Dentium Co., Ltd. (Korea, Republic of); Dukho Do, Jiheun Ryu, Jayul Kim, KAIST (Korea, Republic of). . . . . [9330-56]

A software tool for STED-AFM correlative super-resolution microscopy, Sami V. Koho, Takahiro Deguchi, Univ. of Turku (Finland); Madis Löhmus, Laboratory of Biophysics, University of Turku (Finland); Tuomas Näreoja, Karolinska Institutet (Finland); Pekka E. Hänninen, Univ. of Turku (Finland). . . . . [9330-57]

Swept-source phase microscopy based on acousto-optic wavelength swept laser, Soonwoo Cho, Gahee Han, Hyung Seok Lee, Hwi Don Lee, Seung Won Jun, Chang-Seok Kim, Pusan National Univ. (Korea, Republic of) . . . . . [9330-58]

Tomographic STED microscopy to study bone resorption, Takahiro Deguchi, Sami V. Koho, Univ. of Turku (Finland); Tuomas Näreoja, Karolinska Institutet (Finland); Juha Peltonen, Pekka E. Hänninen, Univ. of Turku (Finland) . [9330-59]

single-channel stereoscopic video imaging modality based on a transparent rotating deflector, Edalat Radfar, Jihoon Park, Eunkwon Jun, Myungjin Ha, Sangyeob Lee, Yonsei Univ. (Korea, Republic of); SungKon Yu, SeulGi Jang, Bio-Optics Lab., departman of bio medical engineering, Yonsei University (Korea, Republic of); Byungjo Jung, Yonsei Univ. (Korea, Republic of) . . . . . [9330-60]

Resolution analysis in compressive multidimensional microscopy, Angel D. Rodriguez, Pere Clemente Pesudo, Eva Salvador Balaguer, Esther Irles, Enrique Tajahuerce, Fernando Soldevila Torres, Jesús Saez Lancis, Univ. Jaume I (Spain). . . . . [9330-61]

A high-precision vibrating section method for blockface imaging, Tao Jiang, Dongli Xu, Hui Gong, Huazhong Univ. of Science and Technology (China) . . . . . [9330-62]

Imaging 3D collagen fiber orientation in cellular and tissue levels using Brillouin and Raman spectroscopies, Zhaokai Meng, Vladislav V. Yakovlev, Texas A&M Univ. (USA). . . . . [9330-63]

Fourier ptychography for multimodality imaging, Siyuan Dong, Kaikai Guo, Pariksheet Nanda, Guoan Zheng, Univ. of Connecticut (USA) . . . . . [9330-65]

Dual-beam, crossed line-scanning fluorescence microscope with confocal resolution, Hyun-Woo Jeong, Hyung-Jin Kim, Korea Univ. (Korea, Republic of); Jung Eun, Seungjin Heo, Mikyoung Lim, Yong-Hoon Cho, KAIST (Korea, Republic of); Beop-Min Kim, Korea Univ. College of Health Sciences (Korea, Republic of) . . . . . [9330-66]

TUESDAY 10 FEBRUARY

SESSION 1

LOCATION: ROOM 304 (ESPLANADE) . . . . . TUE 8:00 AM TO 10:10 AM

Instrumental Methods: Coherence and Illumination

Session Chair: **Thomas G. Brown,** Univ. of Rochester (USA)

8:00 am: **Optical coherence engineering for microscopy** *(Invited Paper)*, L. Waller, H. Liu, J. Zhong, Z. Liu, L. Tian, Univ. of California, Berkeley (USA) . . . . . [9330-1]

8:30 am: **Lensfree on-chip imaging using synthetic aperture**, Wei Luo, Alon Greenbaum, Yibo Zhang, Aydogan Ozcan, Univ. of California, Los Angeles (USA) . . . . . [9330-2]

8:50 am: **Development of cellular resolution Gabor-domain optical coherence microscopy for biomedical applications**, Patrice Tankam, Univ. of Rochester (USA); Anand P. Santhanam, Univ. of California, Los Angeles (USA); Jungeun Won, Univ. of Rochester (USA); Cristina Canavesi, LighTopTech Corp. (USA); Jannick P. Rolland, Univ. of Rochester (USA) . . . . . [9330-3]

9:10 am: **Large field of view full field optical coherence tomography for fingerprint imaging**, Egidijus Auksorius, Jean-Marie Chassot, A. Claude Boccara, Institut Langevin (France). . . . . [9330-4]

CONFERENCE 9330
LOCATION: ROOM 304 (ESPLANADE)

9:30 am: **High brightness LED for confocal microscopy**, Ali Vakili, Northeastern Univ. (USA); Daxi Xiong, Key Lab. of Medical Optics, Suzhou Institute of Biomedical Engineering and Technology (China); Milind Rajadhyaksha, Memorial Sloan-Kettering Cancer Ctr. (USA); Charles A. DiMarzio, Northeastern Univ. (USA) . . . . . [9330-5]

9:50 am: **Limited angle diffraction tomography with optically controlled projection generation**, Arkadiusz Ku?, Wojciech Krauze, Malgorzata Kujawinska, Warsaw Univ. of Technology (Poland) . . . . . [9330-6]

Coffee Break . . . . . Tue 10:10 am to 10:40 am

SESSION 2

LOCATION: ROOM 304 (ESPLANADE) . . . . . TUE 10:40 AM TO 12:00 PM

Innovative Instrumental Methods

Session Chair: **Carol J. Cogswell,** Univ. of Colorado at Boulder (USA)

10:40 am: **Development of a DMD-based fluorescence microscope**, Nadya Chakrova, Sjoerd Stallinga, Bernd Rieger, Technische Univ. Delft (Netherlands) . . . . . [9330-7]

11:00 am: **Multi-channel beam-scanning imaging at kHz frame rates by Lissajous trajectory microscopy**, Justin A. Newman, Shane Z. Sullivan, Ryan D. Muir, Suhas Sreehari, Charles A. Bouman, Garth J. Simpson, Purdue Univ. (USA) . . . . . [9330-8]

11:20 am: **Synchronous-digitization for video rate polarization modulated beam scanning second harmonic generation microscopy**, Shane Z. Sullivan, Emma L. DeWalt, Paul D. Schmitt, Ryan D. Muir, Garth J. Simpson, Purdue Univ. (USA) . . . . . [9330-9]

11:40 am: **A new calibration tool to simply and quickly monitor and follow the performances of fluorescence microscopes**, Arnaud Royon, Gautier Papon, Argolight (France) . . . . . [9330-10]

Lunch Break . . . . . Tue 12:00 pm to 1:30 pm

SESSION 3

LOCATION: ROOM 304 (ESPLANADE) . . . . . TUE 1:30 PM TO 3:10 PM

Innovative Modes in Multidimensional Microscopy

Session Chair: **Laura Waller,** Univ. of California, Berkeley (USA)

1:30 pm: **Full-field interferometric confocal microscopy using a VCSEL array**, Brandon Redding, Yaron Bromberg, Yale Univ. (USA); Michael A. Choma, Yale School of Medicine (USA); Hui Cao, Yale Univ. (USA) . . . . . [9330-11]

1:50 pm: **A novel multimodal laser-scanning microscope control system**, Zhenhua Lai, Zetong Gu, Stephen Karasek, James McLean, Xi Zhang, Charles A. DiMarzio, Northeastern Univ. (USA). . . . . [9330-12]

2:10 pm: **Resolving power in direct oblique plane imaging**, Jeongmin Kim, Univ. of California, Berkeley (USA); Tongcang Li, Purdue Univ. (USA); Yuan Wang, Xiang Zhang, Univ. of California, Berkeley (USA) . . . . . [9330-13]

2:30 pm: **Multiplexed structured illumination microscopy for simultaneous, sub-diffraction resolution fluorescent and quantitative phase imaging**, Shwetadwip Chowdhury, Joseph A. Izatt, Duke Univ. (USA) . . . . . [9330-14]

2:50 pm: **CMOS image sensor for multi-beam multi-functional confocal microscopy**, Keiichiro Kagawa, Hiromi Nieda, Yuki Nishioka, Taishi Takasawa, Min-Woong Seo, Keita Yasutomi, Shoji Kawahito, Shizuoka Univ. (Japan). . . . . [9330-15]

Coffee Break . . . . . Tue 3:10 pm to 3:40 pm

SESSION 4

LOCATION: ROOM 304 (ESPLANADE) . . . . . TUE 3:40 PM TO 5:20 PM

Instrumental Methods: Biology & Medicine

Session Chair: **Alexander Jesacher,** Medizinische Univ. Innsbruck (Austria)

3:40 pm: **In vivo hemozoin malaria-pigment localization and distribution in red blood cell by multimodal microscopy system imaging**, Nicolas Spegazzini, Rishikesh Pandey, Jeon Woong Kang, Massachusetts Institute of Technology (USA); Ishan Barman, Johns Hopkins Univ. (USA); Ramachandra R. Dasari, Peter T. C. So, Massachusetts Institute of Technology (USA) . . [9330-16]

4:00 pm: **Application of optical coherence elastography to monitor wound healing processing**, Guangying Guan, Chunhui Li, Yuting Ling, Fan Zhang, Ana Schor, Univ. of Dundee (United Kingdom); Ruikang K. Wang, Univ. of Washington (USA); Zhihong Huang, Univ. of Dundee (United Kingdom) [9330-17]

4:20 pm: **Pump probe microscopy of human hair**, Naveen K. Balla, Patrick Ferrand, Institut Fresnel (France); Florian Formanek, L'Oréal (France); Jean-Baptiste Galey, L'Oréal Recherche et Innovation (France); Lucien Bildstein, Hervé Rigneault, Institut Fresnel (France) . . . . . [9330-18]

4:40 pm: **Multi-color, real-time focal modulation microscopy for 3D imaging of blood flow in zebrafish**, Shilpa Pant, Nanguang Chen, National Univ. of Singapore (Singapore). . . . . [9330-19]

5:00 pm: **High-speed volumetric confocal imaging for tracking calcium dynamics in C. elegans neurons**, Ki Hyun Kim, Sudip Mondal, Adela Ben-Yakar, The Univ. of Texas at Austin (USA) . . . . . [9330-20]

WEDNESDAY 11 FEBRUARY

SESSION 5

LOCATION: ROOM 304 (ESPLANADE) . . . . . WED 8:00 AM TO 9:50 AM

Innovative Instrumental Methods: 3D Imaging

Session Chair: **Thomas G. Brown,** Univ. of Rochester (USA)

8:00 am: **3D information from 2D scans in a camera-based confocal microscope** *(Invited Paper)*, Alexander Jesacher, Monika Ritsch-Marte, Medizinische Univ. Innsbruck (Austria); Rafael Piestun, Univ. of Colorado at Boulder (USA) . . . . . [9330-21]

8:30 am: **Rapid tracking of particles in three dimensions using a simple EPIC microscope setup without changing focus**, Jiun-Yann Yu, Ramzi N. Zahreddine, Robert H. Cormack, Carol J. Cogswell, Univ. of Colorado at Boulder (USA) . . . . . [9330-22]

8:50 am: **3D microscope imaging robust to restoration artifacts introduced by optically thick specimens**, Nurmohammed Patwary, Sharon V. King, Chrysanthe Preza, The Univ. of Memphis (USA). . . . . [9330-23]

9:10 am: **High-throughput on-chip analysis of 3D swimming patterns of animal sperms using holographic lensfree imaging**, Ting-Wei Su, Inkyum Choi, Jiawen Feng, Kalvin Huang, Wei Luo, Aydogan Ozcan, Univ. of California, Los Angeles (USA). . . . . [9330-24]

9:30 am: **Simultaneous multiplane imaging for 3D confocal microscopy using high-speed z-scanning multiplexing**, Marti Duocastella, Giuseppe Viccidomini, Alberto Diaspro, Istituto Italiano di Tecnologia (Italy) . . . . . [9330-25]

Coffee Break . . . . . Wed 9:50 am to 10:40 am

SESSION 6

LOCATION: ROOM 304 (ESPLANADE) ..... WED 10:40 AM TO 12:00 PM

Multidimensional Image Reconstruction and Analysis

Session Chair: **Katherine Creath,** Optineering (USA)

10:40 am: **Quantitative imaging of intact cardiac tissue using remote focusing microscopy**, Alexander D. Corbett, Rebecca A. B. Burton, Gil Bub, Tony Wilson, Univ. of Oxford (United Kingdom) . . . . . [9330-27]

11:00 am: **3D widefield light microscope image reconstruction without dyes**, Sean Larkin, Lickenbrock Technologies, LLC (USA); Jeffrey Larson, Illinois Institute of Technology (USA); Charles Holmes, Lickenbrock Technologies, LLC (USA); Marcella Vaicik, Michael Turturro, Illinois Institute of Technology (USA); Alexander Jurkevich, Sunilima Sinha, Toshihiko Ezashi, Univ. of Missouri (USA); Georgia Papavasiliou, Eric Brey, Illinois Institute of Technology (USA); Tim Holmes, Lickenbrock Technologies, LLC (USA) . . . . . [9330-28]

11:20 am: **A block-based forward imaging model for improved sample volume representation in computational optical sectioning microscopy**, Sreya Ghosh, Chrysanthe Preza, The Univ. of Memphis (USA) . . . . . [9330-29]

11:40 am: **A robust simulation and reconstruction platform of fluorescence molecular tomography**, Shixin Jiang, Jie Liu, Yu An, Beijing Jiaotong Univ. (China); Yamin Mao, Xin Yang, Chongwei Chi, Jie Tian, Institute of Automation (China) . . . . . [9330-30]

Lunch Break . . . . . .Wed 12:00 pm to 1:30 pm

SESSION 7

LOCATION: ROOM 304 (ESPLANADE) .....WED 1:30 PM TO 3:10 PM

Computational Models

Session Chair: **Raimund J. Ober,** The Univ. of Texas at Dallas (USA)

1:30 pm: **Computational modeling of STED microscopy through multiple biological cells under one- and two-photon excitation**, Andrew E. Mark, Mitchell A. Davis, Matthew S. Starosta, Andrew K. Dunn, The Univ. of Texas at Austin (USA) . . . . . [9330-31]

1:50 pm: **Fast calculation of the best focus position**, Vitalii V. Bezzubik, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Gleb V. Vdovin, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) and Flexible Optical B.V. (Netherlands); Nikolai R. Belashenkov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) [9330-32]

2:10 pm: **Nonlinear optical output of atomic systems via numerical simulation of time-dependent Schrodinger equation, stimulated by laser sources in and out of resonance conditions within the non-perturbative regime**, Stephen Karasek, Charles A. DiMarzio, Northeastern Univ. (USA) . . . . . [9330-33]

2:30 pm: **A new analytical model to optimize phase-sensitive detection in photothermal optical coherence tomography systems**, Maryse Lapierre-Landry, Jason M. Tucker-Schwartz, Melissa C. Skala, Vanderbilt Univ. (USA) . . . . . [9330-34]

2:50 pm: **Single frame polarimetric microscopy**, Thomas G. Brown, Univ. of Rochester (USA) . . . . . [9330-35]

Coffee Break . . . . . .Wed 3:10 pm to 3:40 pm

SESSION 8

LOCATION: ROOM 304 (ESPLANADE) ..... WED 3:40 PM TO 4:40 PM

Multifocal Methods and Extended Depth of Focus

Session Chair: **Charles A. DiMarzio,** Northeastern Univ. (USA)

3:40 pm: **Standing-wave excitation of fluorescence in a laser-scanning microscope allows precise contour mapping of the red blood cell membrane**, Rumelo Amor, Univ. of Strathclyde (United Kingdom); Sumeet Mahajan, Univ. of Southampton (United Kingdom); William B. Amos, MRC Lab. of Molecular Biology (United Kingdom); Gail McConnell, Univ. of Strathclyde (United Kingdom). . . . . [9330-36]

4:00 pm: **An information-theoretic approach to designing the plane spacing for multifocal plane microscopy**, Amir Tahmasbi, The Univ. of Texas at Dallas (USA) and The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); Sripad Ram, Jerry Chao, Anish V. Abraham, The Univ. of Texas at Dallas (USA); E. Sally Ward, The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA); Raimund J. Ober, The Univ. of Texas at Dallas (USA) and The Univ. of Texas Southwestern Medical Ctr. at Dallas (USA) . . . . . [9330-37]

4:20 pm: **Extending depth of field in confocal microscopy by tunable acoustic gradient-index lens**, Kuo-Jen Hsu, National Taiwan Univ. (Taiwan) and National Tsing Hua Univ. (Taiwan); Kuan-Yu Li, National Taiwan Univ. (Taiwan); Yung-Hsin Shih, Hen-Yi Lin, Yen-Yin Lin, National Tsing Hua Univ. (Taiwan); Shi-Wei Chu, National Taiwan Univ. (Taiwan); Ann-Shyn Chiang, National Tsing Hua Univ. (Taiwan) and Academia Sinica (Taiwan) . . . . . [9330-38]

THURSDAY 12 FEBRUARY

SESSION 9

LOCATION: ROOM 304 (ESPLANADE) ..... THU 8:30 AM TO 10:10 AM

Quantitative Phase Imaging

Session Chair: **Sharon V. King,** The Univ. of Memphis (USA)

8:30 am: **Method of live cells tomography based on phase shifting lateral shearing interferometric microscopy**, Gennady G. Levin, Mikhail I. Latushko, Gennady N. Vishnyakov, All-Russian Research Institute for Optical and Physical Measurement (Russian Federation). . . . . [9330-40]

8:50 am: **An integrated approach to determine prior information for improved wide-field imaging models from computational interference microscopy**, Md Shohag Hossain, Sharon V. King, Chrysanthe Preza, The Univ. of Memphis (USA) . . . . . [9330-41]

9:10 am: **Analysis of dissected tissues with digital holographic microscopy: Quantification of inflammation mediated tissue alteration, influence of sample preparation and reliability of numerical autofocussing**, Björn Kemper, Philipp Lenz, Dominik Bettenworth, Westfälische Wilhelms-Univ. Münster (Germany); Philipp Krausewitz, Department of Medicine B, University of Muenster (Germany); Dirk Domagk, Steffi Ketelhut, Westfälische Wilhelms-Univ. Münster (Germany) . . . . . [9330-42]

9:30 am: **Dual-modality wide-field photothermal quantitative phase microscopy and depletion of cell populations**, Nir A. Turko, Itay Barnea, Omry Blum, Rafi Korenstein, Natan T. Shaked, Tel Aviv Univ. (Israel) . . [9330-43]

9:50 am: **Three wavelength phase shift interferometry for quantitative cell microscopy**, Glenn W. Pagano, Christopher Mann, Northern Arizona Univ. (USA) . . . . . [9330-44]

Coffee Break . . . . . Thu 10:10 am to 10:40 am

SESSION 10

LOCATION: ROOM 304 (ESPLANADE) ..... THU 10:40 AM TO 12:00 PM

Computational Methods

Session Chair: **Thomas G. Brown,** Univ. of Rochester (USA)

10:40 am: **Image reconstruction for structured-illumination microscopy with low signal level**, Kaiqin Chu, NSF Ctr. for Biophotonics Science and Technology (USA); Zachary J. Smith, Univ. of California, Davis (USA); Sebastian Wachsmann-Hogiu, NSF Ctr. for Biophotonics Science and Technology (USA) . . . . . [9330-45]

11:00 am: **Dark-field illuminated fiber bundle endoscopy with iterative l1-min image reconstruction for honeycomb pattern removal**, Xuan Liu, Lijun Zhang, Mitchell Kirby, Michigan Technological Univ. (USA); Divyaansh Raj, Livingston high school (USA); Shaohai Qi, The First Affiliated Hospital of Sun Yat-Sen Univ. (China); Feng Zhao, Michigan Technological Univ. (USA) [9330-46]

11:20 am: **Two-dimensional compressive sensing in spectral domain optical coherence tomography**, Daguang Xu, Yong Huang, Jin U. Kang, Johns Hopkins Univ. (USA) . . . . . [9330-47]

11:40 am: **Graphics processing unit-accelerated real-time compressive sensing spectral domain optical coherence tomography**, Daguang Xu, Yong Huang, Jin U. Kang, Johns Hopkins Univ. (USA). . . . . [9330-48]

CONFERENCE 9331
LOCATION: ROOM 307 (ESPLANADE)

Saturday–Sunday 7–8 February 2015 • Proceedings of SPIE Vol. 9331

Single Molecule Spectroscopy and Superresolution Imaging VIII

Conference Chairs: **Jörg Enderlein,** Georg-August-Univ. Göttingen (Germany); **Ingo Gregor,** Georg-August-Univ. Göttingen (Germany); **Zygmunt Karol Gryczynski,** Univ. of North Texas Health Science Ctr. at Fort Worth (USA), Texas Christian Univ. at Fort Worth (USA); **Rainer Erdmann,** PicoQuant GmbH Berlin (Germany); **Felix Koberling,** PicoQuant GmbH (Germany)

Program Committee: **Sohail Ahmed,** A*STAR Institute of Medical Biology (Singapore); **Michael Börsch,** Friedrich-Schiller-Univ. Jena (Germany); **Christian Eggeling,** Univ. of Oxford (United Kingdom); **Paul M. W. French,** Imperial College London (United Kingdom); **Ewa M. Goldys,** Macquarie Univ. (Australia); **Johan Hofkens,** Katholieke Univ. Leuven (Belgium); **Zhen-Li Huang,** Huazhong Univ. of Science and Technology (China); **Thomas R. Huser,** Univ. Bielefeld (Germany); **Maria Teresa Neves-Petersen,** International Iberian Nanotechnology Lab. (Portugal); **Markus Sauer,** Univ. Bielefeld (Germany); **Shimon Weiss,** Univ. of California, Los Angeles (USA); **Andong Xia,** Institute of Chemistry (China)

SATURDAY 7 FEBRUARY

WELCOME REMARKS

LOCATION: ROOM 307 (ESPLANADE) . . . . . 9:00 AM TO 9:10 AM

Rainer Erdmann, PicoQuant GmbH Berlin (Germany)

SESSION 1

LOCATION: ROOM 307 (ESPLANADE) . . . . . SAT 9:10 AM TO 10:30 AM

Fluorescence Correlation Spectroscopy

Session Chair: **Rainer Erdmann,** PicoQuant GmbH Berlin (Germany)

9:10 am: **Multifocus fluorescence correlation spectroscopy**, Vit Dolezal, Lars Kreutzburg, Renate Holzhause, Lennart Lohmann, Univ. zu Lübeck (Germany); Richard Börner, Univ. zu Lübeck (Switzerland); Christian G. Hübner, Univ. zu Lübeck (Germany) . . . . . [9331-1]

9:30 am: **Emission of superradiant photon pairs from dyes coupled to Ag nanoantennas**, Vladimir P. Drachev, Univ. of North Texas (USA); David Lyvers, Univ. of North Texas (USA) and UES, Inc. (USA); Ricardo Lopez, Univ. of North Texas (USA). . . . . [9331-2]

9:50 am: **Characterization of cis and trans internucleosomal interactions of H3 and H4 tails in tetranucleosomes by florescent fluctuation spectroscopy**, Nathan P. Nurse, Chongli Yuan, Purdue Univ. (USA) . . . [9331-3]

10:10 am: **Plasmonic nanoantennas for enhanced single molecule analysis at micromolar conentrations**, Hervé Rigneault, Deep Punj, Jérôme Wenger, Institut Fresnel (France); Mathieu Mivelle, Niek F. Van Hulst, Maria F. Garcia-Parajo, Thomas Van Zanten, ICFO - Institut de Ciències Fotòniques (Spain) . . . . . [9331-4]

Coffee Break . . . . . .Sat 10:30 am to 11:00 am

SESSION 2

LOCATION: ROOM 307 (ESPLANADE) . . . . . SAT 11:00 AM TO 12:40 PM

Single Molecule Tracking

Session Chair: **Ingo Gregor,** Georg-August-Univ. Göttingen (Germany)

11:00 am: **Motion of chromosomal loci and the mean-squared displacement of a fractional Brownian motion in the presence of static and dynamic errors**, Mikael P. Backlund, William E. Moerner, Stanford Univ. (USA) . . [9331-5]

11:20 am: **Single particle tracking through highly scattering media with multiplexed two-photon excitation**, Evan P. Perillo, Yen-Liang Liu, Cong Liu, Hsin-Chih Yeh, Andrew K. Dunn, The Univ. of Texas at Austin (USA) . . . [9331-6]

11:40 am: **Observing bimolecular interactions with single-molecule tracking microscopy**, Cong Liu, Yen-Liang Liu, Evan P. Perillo, Quincy Zhuang, Andrew K. Dunn, Hsin-Chih Yeh, The Univ. of Texas at Austin (USA) . . . [9331-7]

12:00 pm: **Single-molecule exploration of photoprotective mechanisms in light-harvesting complexes**, Hsiang-Yu Yang, Gabriela S. Schlau-Cohen, Stanford Univ. (USA); Michal Gwizdala, Vrije Univ. Amsterdam (Netherlands); Tjaart Krüger, Univ. of Pretoria (South Africa); Pengqi Xu, Roberta Croce, Rienk van Grondelle, Vrije Univ. Amsterdam (Netherlands); William E. Moerner, Stanford Univ. (USA) . . . . . [9331-8]

12:20 pm: **Dynamic carbon nanotube tracking by independent target restoration microscopy of cells**, Nicolas Spegazzini, Rishikesh Pandey, Jeon Woong Kang, Massachusetts Institute of Technology (USA); Ishan Barman, Johns Hopkins Univ. (USA); Ramachandra R. Dasari, Peter T. C. So, Massachusetts Institute of Technology (USA) . . . . . [9331-9]

Lunch Break . . . . . .Sat 12:40 pm to 2:10 pm

SESSION 3

LOCATION: ROOM 307 (ESPLANADE) . . . . . SAT 2:10 PM TO 3:25 PM

Nanoscopy and Superresolution Microscopy I

Session Chair: **Felix Koberling,** PicoQuant GmbH (Germany)

2:10 pm: **Optical nanoscopy 2.0** *(Keynote Presentation)*, Alberto Diaspro, Istituto Italiano di Tecnologia (Italy) and Univ. degli Studi di Genova (Italy); Paolo Bianchini, Francesca Cella Zanacchi, Giuseppe Vicidomini, Colin J. R. Sheppard, Luca L. Lanzanò, Marti Duocastella, Marta d'Amora, Gustavo De Miguel, Istituto Italiano di Tecnologia (Italy); Ranieri Bizzarri, Lab. NEST, Consiglio Nazionale delle Ricerche (Italy) . . . . . [9331-10]

2:45 pm: **Multi-color quantum dot stochastic optical reconstruction microscopy (qSTORM)**, Kayvan F. Tehrani, Jianquan Xu, Peter A. Kner, The Univ. of Georgia (USA) . . . . . [9331-11]

3:05 pm: **3D-superlocalization microscopy and tracking of single membrane proteins in living bacteria**, Anja Renz, Marc Renz, Universitätsklinikum Jena (Germany); Michael Börsch, Friedrich-Schiller-Univ. Jena (Germany) and Abbe Ctr. of Photonics Jena (Germany) . . . . . [9331-12]

Coffee Break . . . . . .Sat 3:25 pm to 3:55 pm

SESSION 4

LOCATION: ROOM 307 (ESPLANADE) . . . . . SAT 3:55 PM TO 5:40 PM

New Developments in Methods and Systems

Session Chair: **Joerg Enderlein,**
Georg-August-Univ. Göttingen (Germany)

3:55 pm: **Multiple-pulse pumping with time-gating for ultrasensitive detection and imaging**, Joseph D. Kimball, Sangram Raut, Texas Christian Univ. (USA); Rafal Fudala, Ryan Rich, Ignacy Gryczynski, Julian Borejdo, Univ. of North Texas Health Science Ctr. (USA); Hung Doan, Texas Christian Univ. (USA); Karol Gryczynski, Badri Maliwal, Univ. of North Texas Health Science Ctr. (USA); Zygmunt Gryczynski, Texas Christian Univ. (USA) . . . . . [9331-13]

4:15 pm: **Multidimensional fluorescence analysis: recent advances with pattern matching** *(Invited Paper)*, Benedikt Krämer, PicoQuant GmbH (Germany); Thomas Niehörster, Anna Löschberger, Julius-Maximilians-Univ. Würzburg (Germany); Marcelle König, Paja Reisch, Matthias Patting, Felix Koberling, PicoQuant GmbH (Germany); Ingo Gregor, Georg-August-Univ. Göttingen (Germany); Markus Sauer, Julius-Maximilians-Univ. Würzburg (Germany); Rainer Erdmann, PicoQuant GmbH (Germany) . . . . . [9331-14]

4:40 pm: **Photothermal Imaging of Individual Carbon Nanofibers with Optical Microresonators**, Kevin D. Heylman, Kassandra A. Knapper, Univ. of Wisconsin-Madison (USA); Erik H Horak, University of Wisconsin Madison (USA); Randall H. Goldsmith, Univ. of Wisconsin-Madison (USA) . . . . . [9331-15]

5:00 pm: **Mapping the mouse connectome: progress towards a high-throughput super-resolution nanoscope**, Christopher J. Rowlands, Yi Xue, Edward S. Boyden, Peter T. C. So, Massachusetts Institute of Technology (USA) . . . . . [9331-16]

5:20 pm: **Single-acquisition super-resolution microscopy: 40% resolution improvements at millisecond time scales**, Craig Snoeyink, Texas Tech Univ. (USA) . . . . . [9331-17]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 5

LOCATION: ROOM 307 (ESPLANADE) . . . . . SUN 8:50 AM TO 10:10 AM

Nanoscopy and Superresolution Microscopy II

Session Chair: **Ingo Gregor,** Georg-August-Univ. Göttingen (Germany)

8:50 am: **Nanohole arrays allow the measurement and correction of spatial nonuniformities and spectral effects in 3D single-molecule localization**, Alexander R. von Diezmann, Matthew D. Lew, Maurice Y. Lee, Stanford Univ. (USA); Andreas Gahlmann, Univ. of Virginia (USA); William E. Moerner, Stanford Univ. (USA) . . . . . [9331-18]

9:10 am: **Rapid super-resolution line scanning microscopy using virtually structured detection**, Rongwen Lu, Yanan Zhi, Benquan Wang, Qiuxiang Zhang, Xincheng Yao, The Univ. of Alabama at Birmingham (USA) . . . . [9331-19]

9:30 am: **Image-scanning microscopy**, Joerg Enderlein, Georg-August-Univ. Göttingen (Germany) . . . . . [9331-57]

9:50 am: **Fluorophore photoswitching heterogeneity and its relation to image quality achieved through single molecule localization microscopy**, Amy M. Bittel, Isaac Saldivar, Oregon Health & Science Univ. (USA); Nicholas Dolman, Thermo Fisher Scientific Inc. (USA); Andrew K. Nickerson, Li-Jung Lin, Xiaolin Nan, Summer L. Gibbs, Oregon Health & Science Univ. (USA) . . . . . [9331-21]

Coffee Break . . . . . Sun 10:10 am to 10:40 am

SESSION 6

LOCATION: ROOM 307 (ESPLANADE) . . . . . SUN 10:40 AM TO 12:30 PM

Nanoscopy and Superresolution Microscopy III

Session Chair: **Rainer Erdmann,** PicoQuant GmbH Berlin (Germany)

10:40 am: **Extracting information from single molecules in 3D super-resolution imaging and from dynamical processes in solution** *(Keynote Presentation)*, William E. Moerner, Stanford Univ. (USA) . [9331-23]

11:30 am: **Realization of super-resolution imaging by microlens assisted laser scanning microscopy**, Kuan-Yu Li, Yun-Ju Liu, Yang Tsao, National Taiwan Univ. (Taiwan); Kung-Hsuan Lin, Academia Sinica (Taiwan); Chih-Wei Chang, Shi-Wei Chu, National Taiwan Univ. (Taiwan). . . . . [9331-22]

11:50 am: **Image-scanning microscopy (ISM) and stochastic sptical fluctuation imaging (SOFI): making it easy and user-friendly**, Ingo Gregor, Dirk Haehnel, Simon C. Stein, Anja Huss, Joerg Enderlein, Georg-August-Univ. Göttingen (Germany) . . . . . [9331-24]

12:10 pm: **A new method to achieve tens of nm axial super-localisation based on conical diffraction PSF shaping**, Clément Fallet, Maxime Dubois, Stephane Oddos, Julien Caron, Bioaxial (France); Jean-Yves Tinevez, Spencer L. Shorte, Institut Pasteur (France); Gabriel Y. Sirat, Roger Persson, Bioaxial (France) . . . . . [9331-25]

Lunch Break . . . . . Sun 12:30 pm to 2:00 pm

SESSION 7

LOCATION: ROOM 307 (ESPLANADE) . . . . . SUN 2:00 PM TO 3:25 PM

Nanoscopy and Superresolution Microscopy IV

Session Chair: **Zygmunt Karol Gryczynski,** Univ. of North Texas Health Science Ctr. at Fort Worth (USA), Texas Christian Univ. at Fort Worth (USA)

2:00 pm: **Extended resolution structured illumination imaging of dynamic process in living cells** *(Invited Paper)*, Dong Li, Lin Shao, Eric Betzig, Howard Hughes Medical Institute (USA) . . . . . [9331-26]

2:25 pm: **Video-rate super-resolution fluorescence microscopy using all-optical two-photon image scanning microscopy**, Ingo Gregor, Martin Spiecker, Joerg Enderlein, Georg-August-Univ. Göttingen (Germany) . . . . . [9331-27]

2:45 pm: **Video-rate nanoscopy using sCMOS camera-specific single-molecule localization algorithms**, Fang Huang, Yale School of Medicine (USA); Tobias M. P. Hartwich, Yu Lin, Joerg Bewersdorf, Yale Univ. (USA) . . . . . [9331-28]

3:05 pm: **Stimulated emission depletion microscopy to study amyloid fibril formation**, Pierre Mahou, Nathan Curry, Dorothea Pinotsi, Gabriele S. Kaminski Schierle, Clemens Kaminski, Univ. of Cambridge (United Kingdom) . . . [9331-29]

YOUNG INVESTIGATOR AWARD

LOCATION: ROOM 307 (ESPLANADE) . . . . . 3:25 PM TO 3:35 PM

Presentation of the PicoQuant Young Investigator Award

Session Chair: **Zygmunt K. Gryczynski,** Univ. of North Texas Health Science Ctr. at Fort Worth (USA), Texas Christian Univ. at Fort Worth (USA)

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Coffee Break . . . . . Sun 3:35 pm to 4:05 pm

SESSION 8

LOCATION: ROOM 307 (ESPLANADE) . . . . . SUN 4:05 PM TO 5:30 PM

Nanoscopy and Superresolution Microscopy V

Session Chair: **Felix Koberling,** PicoQuant GmbH (Germany)

4:05 pm: **Optimization of image acquisition for high-speed single molecule switching nanoscopy in live cells** *(Invited Paper)*, Fang Huang, Yale School of Medicine (USA); Yu Lin, Joerg Bewersdorf, Yale Univ. (USA). . . . . [9331-30]

4:30 pm: **Fast scanning gated STED microscopy in living cells**, Edward Allgeyer, Francesca Bottanelli, Yale School of Medicine (USA); Emil B. Kromann, Yale Univ. (USA); Travis J. Gould, Bates College (USA); Joerg Bewersdorf, Yale School of Medicine (USA). . . . . [9331-31]

4:50 pm: **The importance of the photon arrival-times in STED microscopy**, Luca L. Lanzanò, Alberto Diaspro, Marco Castello, Istituto Italiano di Tecnologia (Italy); Christian Eggeling, Univ. of Oxford (United Kingdom); Giuseppe Vicidomini, Istituto Italiano di Tecnologia (Italy) . . . . . [9331-32]

5:10 pm: **Superresolution imaging of cells with stimulated emission depletion nonlinear structured illumination (STED-SIM)**, Han Zhang, Yu Li, Ming Zhao, College of Optical Sciences, The Univ. of Arizona (USA); Leilei Peng, College of Optical Sciences, The Univ. of Arizona (USA) and The Univ. of Arizona (USA) . . . . . [9331-33]

CONFERENCE 9331
LOCATION: ROOM 307 (ESPLANADE)

POSTERS-SUNDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Dithienylethene-based fluorescence molecular photoswitches for photoswitching nanoimaging, Ming-Qiang Zhu, Huazhong Univ. of Science and Technology (China). . . . . [9331-34]

Coherent structured illumination imaging method with isotropic resolution enhancement, Joo Hyun Park, Eun Seong Lee, Korea Research Institute of Standards and Science (Korea, Republic of); Sang-Won Lee, Jae Yong Lee, Korea Research Institute of Standards and Science (Korea, Republic of) and Korea Univ. of Science and Technology (Korea, Republic of) . . . . . [9331-35]

Enhancement of the Förster resonance energy transfer efficiency in genetically encoded tagRFP-KFP fuse protein, Maria G. Khrenova, Lomonosov Moscow State Univ. (Russian Federation) and Bach Institute of Biochemistry (Russian Federation); Tatiana V. Ivashina, Institute of Biochemistry and Physiology of Plants and Microorganisms (Russian Federation); Alexander V. Nemukhin, Lomonosov Moscow State Univ. (Russian Federation); Alexander P. Savitsky, A.N. Bach Institute of Biochemistry (Russian Federation). . [9331-36]

Direct comparing the performance of low-light cameras in super-resolution localization microscopy, Zhen-Li Huang, Shaoqun Zeng, Zhe Hu, Zeyu Zhao, Luchang Li, Britton Chance Ctr. for Biomedical Photonics (China) . . . . [9331-37]

Autofluorescence based visualization of proteins from unstained native-PAGE, Manjunath Siddaramaiah, Bola Sadashiva S. Rao, Kapaettu Satyamoorthy, Krishna Kishore Mahato, Manipal Univ. (India). . . . . [9331-39]

High-density high-resolution label locating for 3D super-resolution microscopy, Craig Snoeyink, Texas Tech Univ. (USA) . . . . . [9331-40]

Investigating field carcinogenesis using x-ray florescence microscopy, Scott T. Young, Andrew J. Radosevich, Wenli Wu, Northwestern Univ. (USA); Stefan Vogt, Argonne National Lab. (USA); Luay Almassalha, Northwestern Univ. (USA); Qiaoling Jin, Si Chen, Argonne National Lab. (USA); Tatjana Paunesku, Gayle Woloschak, Vadim Backman, Northwestern Univ. (USA) . . . . . [9331-42]

Mapping DNA: Lac repressor interaction with ultra-fast optical tweezers, Carina Monico, Univ. of Oxford (United Kingdom); Alessia Tempestini, Francesco Vanzi, Francesco S. Pavone, Marco Capitanio, Univ. degli Studi di Firenze (Italy) . . . . . [9331-43]

An automated tool for 3D tracking of single molecules in living cells, Lucia Gardini, Marco Capitanio, Francesco S. Pavone, Univ. degli Studi di Firenze (Italy) . . . . . [9331-44]

Two-dimension wide-field super-resolution surface plasmon microscopy by dynamically modulated optical vortex, Shibiao Wei, Nankai Univ. (China); Changjun Min, Institute of Micro and Nano Optics (China) and Key Lab. of Optoelectronic Devices and Systems (China); Xiaocong Yuan, Key Lab. of Optoelectronic Devices and Systems (China). . . . . [9331-47]

A new detector approach for time-resolved widefield microscopy, Yury Prokazov, Werner Zuschratter, Leibniz Institute for Neurobiology Magdeburg (Germany); Claus A. M. Seidel, Heinrich-Heine-Univ. Düsseldorf (Germany); Sebastian Tannert, PicoQuant GmbH (Germany); Ottmar Jagutzki, RoentDek Handels GmbH (Germany); Bernhard H. Mueller, ProxiVision GmbH (Germany); Rainer Erdmann, PicoQuant GmbH (Germany); Michael Beeck, Best Systeme GmbH (Germany); Suren Felekyan, Ralf Kuehnemuth, Heinrich-Heine-Univ. Düsseldorf (Germany); Evgeny Turbin, Leibniz Institute for Neurobiology Magdeburg (Germany) . . . . . [9331-48]

Enhanced molecular rotor for single molecule detection, Hana Jaafari, Texas Christian Univ. (USA); Ryan Rich, Univ. of North Texas Health Science Ctr. at Fort Worth (USA); Sangram Raut, Joseph Kimball, Texas Christian Univ. (USA); Rafal Fudala, Ignacy Gryczynski, Univ. of North Texas Health Science Ctr. at Fort Worth (USA); Hung Doan, Texas Christian Univ. (USA); Julian Borejdo, Univ. of North Texas Health Science Ctr. at Fort Worth (USA); Nicholas Smith, Texas Christian Univ. (USA); Ilkay Bora, Texas Christian Univ. (USA) and Univ. of Copenhagen (Denmark); Bo Laurson, Univ. of Copenhagen (Denmark); Sergei Dzyuba, Texas Christian Univ. (USA); and Zygmunt Gryczynski, Texas Christian Univ. (USA) and Univ. of Copenhagen (Denmark) . . . . . [9331-58]

BIOS SUNDAY PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their groundbreaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9332
LOCATION: ROOM 305 (ESPLANADE)

Monday and Wednesday–Thursday 9, 11–12 February 2015 • Proceedings of SPIE Vol. 9332

Optical Diagnostics and Sensing XV: Toward Point-of-Care Diagnostics

Conference Chair: **Gerard L. Coté,** Texas A&M Univ. (USA)

Program Committee: **Brent D. Cameron,** The Univ. of Toledo (USA); **Werner Gellermann,** The Univ. of Utah (USA); **Jürgen M. Lademann,** Charité Universitätsmedizin Berlin (Germany); **Kristen C. Maitland,** Texas A&M Univ. (USA); **Michael J. McShane,** Texas A&M Univ. (USA); **Kenith E. Meissner,** Swansea Univ. (United Kingdom); **Aydogan Ozcan,** Univ. of California, Los Angeles (USA); **Babak Shadgan M.D.,** The Univ. of British Columbia (Canada); **Kexin Xu,** Tianjin Univ. (China); **Shaoqun Zeng,** Britton Chance Ctr. for Biomedical Photonics (China)

MONDAY 9 FEBRUARY

POSTERS-MONDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . MON 5:30 PM TO 7:30 PM

Conference attendees are invited to attend the BiOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Sample to answer visualization pipeline for low-cost point-of-care blood cell counting, Suzanne Smith, Council for Scientific and Industrial Research (South Africa); Thegaran Naidoo, Commonwealth Scientific and Industrial Research Organisation (South Africa); Emlyn Davies, Louis Fourie, Zandile Nxumalo, Hein Swart, Philip Marais, Kevin Land, Pieter Roux, Council for Scientific and Industrial Research (South Africa) . . . . . [9332-30]

Hyperspectral imaging for detection of cholesterol in human skin, Matija Milanic, Lise L. Randeberg, Norwegian Univ. of Science and Technology (Norway) . . . . . [9332-31]

Phase resolved Doppler OCT for microvascular anastomosis surgical evaluation and prediction, Yong Huang, Johns Hopkins Univ. (USA); Dedi Tong, Johns Hopkins Univ. (USA) and Beijing Jishuitan Hospital (China); Shan Zhu, Lehao Wu, Qi Mao, Zuhaib Ibrahim, W. P. Andree Lee, Gerald Brandacher, Jin U. Kang, Johns Hopkins Univ. (USA) . . . . . [9332-32]

Determination of in vivo skin moisture level by near-infrared reflectance spectroscopy, Inga Saknite, Janis Spigulis, Univ. of Latvia (Latvia) . . . [9332-33]

An optical cavity based biosensor using differential detection for point-of-care diagnostics, SaiHim Cho, Cody Joy, Joshua Brake, Seunghyun Kim, LeTourneau Univ. (USA) . . . . . [9332-34]

Raman spectroscopy of tear fluid with paper substrate for point-of-care therapeutic drug monitoring, Moe Yokoyama, Takahiro Nishimura, Kenji Yamada, Michiko Kido, Hieyong Jeong, Yuko Ohno, Osaka Univ. (Japan). . . . . [9332-35]

Biomedical applications of laser-induced breakdown spectroscopy (LIBS), Unnikrishnan V. K., Rajesh Nayak, Sujatha Bhat, Stanley Mathew, Vasedevan B. Kartha, Santhosh Chidangil, Manipal Univ. (India). . . . . [9332-36]

Multivariate optical computing for fluorochrome discrimination, Ryan J. Priore, Joseph A. Swanstrom, CIRTEMO (USA) . . . . . [9332-37]

Measurement of contrast of phantom and in vivo subsurface blood vessels using two near-infrared imaging systems, Jeremy Hebden, Aysha Alkhaja, Univ. College London (United Kingdom); Laure Mahe, Univ. Claude Bernard Lyon 1 (France); Samuel Powell, Nicholas L. Everdell, Univ. College London (United Kingdom). . . . . [9332-38]

WEDNESDAY 11 FEBRUARY

SESSION 1

LOCATION: ROOM 305 (ESPLANADE) . . . . . WED 8:00 AM TO 10:00 AM

Optical Approaches for Aqueous Fluid Monitoring

Session Chair: **Zane A. Arp,** GlaxoSmithKline (USA)

8:00 am: **Attenuated total reflection Fourier transform infrared (ATR-FTIR) spectroscopy as a bedside diagnostic tool for detecting renal disease biomarkers in fresh urine samples**, Katherine V. Oliver, Univ. College London (United Kingdom); Faith Matjiu, Cameron Davey, Shabbir Moochhala, Robert J. Unwin, The Royal Free Hospital (United Kingdom); Peter R. Rich, Univ. College London (United Kingdom) . . . . . [9332-1]

8:20 am: **Time-resolved fluorescence detection enables dramatical reduction of tracer concentrations for renal function monitoring**, Felix Koberling, Volker Buschmann, PicoQuant GmbH (Germany); Cathleen Fichtner, Ruprecht-Karls-Univ. Heidelberg (Germany); Deborah Herdt, Daniel Schock-Kusch, Hochschule Mannheim (Germany); Sabine Neudecker, Anatoli Shmarlouski, Yury Shulhevich, Dzmitry Stsepankou, Norbert Gretz, Jürgen Hesser, Ruprecht-Karls-Univ. Heidelberg (Germany); Matthias Raedle, Hochschule Mannheim (Germany); Rainer Erdmann, PicoQuant GmbH (Germany) . . . . . [9332-2]

8:40 am: **Biomarkers of chronic kidney disease in the urine of diabetic/hypertensive patients by means of Raman spectroscopy**, Elzo E. S. Vieira, Jeyse A. M. Bispo, Adriana B. Fernandes, Landulfo Silveira Jr., Univ. Camilo Castelo Branco (Brazil) . . . . . [9332-3]

9:00 am: **Rapid urinary tract infection diagnosis and antibiogram, directly from urine samples, using surface enhanced Raman spectroscopy**, Katerina Hadjigeorgiou, Univ. of Cyprus (Cyprus); Evdokia Kastanos, Univ. of Nicosia (Cyprus); Costas Pitris, Univ. of Cyprus (Cyprus) . . . . . [9332-4]

9:20 am: **Sensitivity advantage of mid-infrared spectroscopy using a wavelength-tunable external cavity-laser relative to an FTIR instrument**, Stephen J. Matcher, David T. D. Childs, Dmitry G. Revin, Ihtesham U. Rehman, Richard A. Hogg, John W. Cockburn, The Univ. of Sheffield (United Kingdom). . . . . [9332-5]

9:40 am: **Gold sputtered Bluray disks as novel and cost effective sensors for surface enhanced spectroscopy**, Michel K. Nieuwoudt, Auckland UniServices Ltd. (New Zealand); Jake W. Martin, Xindi Wang, Nina I. Novikova, Jenny Malmstrom, Cather M. Simpson, David E. Williams, The Univ. of Auckland (New Zealand) . . . . . [9332-6]

Coffee Break . . . . . Wed 10:00 am to 10:30 am

CONFERENCE 9332
LOCATION: ROOM 305 (ESPLANADE)

SESSION 2
LOCATION: ROOM 305 (ESPLANADE) . . . . . WED 10:30 AM TO 11:50 AM

Glucose Monitoring Using Optics

Session Chair: **Brent D. Cameron,** The Univ. of Toledo (USA)

10:30 am: **Long term response of a Concanavalin A based fluorescence glucose sensor**, Andrea K. Locke, Texas A&M Univ. (USA); Brian M. Cummins, North Carolina State Univ. (USA); Alexander A. Abraham, Gerard L. Coté, Texas A&M Univ. (USA) . . . . . [9332-7]

10:50 am: **Ex-vivo glucose sensors using micro-dialysis: importance of on-line recovery rate determination by multi-analyte infrared spectrometry**, Herbert M. Heise, Fachhochschule Südwestfalen (Germany); Thorsten Vahlsing, Fachhochschule Südwestfalen (Germany) and RWTH Aachen (Germany); Sven Delbeck, Janpeter Budde, Lars Cocchieri, Fachhochschule Südwestfalen (Germany); Steffen Leonhardt, RWTH Aachen (Germany); Dieter Ihrig, Fachhochschule Südwestfalen (Germany) . . . . . [9332-8]

11:10 am: **Low-cost high performance readout system for fiber-optic biosensors**, Dag R. Hjelme, Sør-Trøndelag Univ. College (Norway) and Norwegian Univ. of Science and Technology (Norway); Håkon Strømstad, Sør-Trøndelag Univ. College (Norway) . . . . . [9332-9]

11:30 am: **SERS based sensing of glycated albumin in serum samples**, Rishikesh Pandey, Nicolas Spegazzini, Jeon Woong Kang, Massachusetts Institute of Technology (USA); Ishan Barman, Johns Hopkins Univ. (USA); Gary Horowitz, Harvard Medical School (USA); Ramachandra R. Dasari, Peter T. C. So, Massachusetts Institute of Technology (USA) . . . . . [9332-10]

Lunch Break . . . . . .Wed 11:50 am to 1:20 pm

SESSION 3
LOCATION: ROOM 305 (ESPLANADE) . . . . . WED 1:20 PM TO 3:00 PM

In vitro Optical Blood Monitoring

Session Chair: **Wei-Chuan Shih,** Univ. of Houston (USA)

1:20 pm: **Comparing multiple nanoparticles with SERS** , Brian Walton, Gerard L. Coté, Texas A&M Univ. (USA) . . . . . [9332-11]

1:40 pm: **Mannan modified polyethylene sinter bodies for the rapid diagnosis of borreliosis in diagnostic pipette tip**, Mohammed A. Alasel, Michael Keusgen, Philipps-Univ. Marburg (Germany) . . . . . [9332-12]

2:00 pm: **Stamping surface-enhanced Raman spectroscopy for label-free, multiplexed, molecular sensing and imaging**, Wei-Chuan Shih, Ming Li, Univ. of Houston (USA). . . . . [9332-13]

2:20 pm: **Direct measurement of hemoglobin concentration of erythrocytes using photothermal angular light scattering**, Ui-Han Kim, Dong-Hak Lee, Hun Kim, Su-Ho Ryu, Soocheol Kim, Chulmin Joo, Yonsei Univ. (Korea, Republic of) . . . . . [9332-14]

2:40 pm: **Gold-nanoshells as surface plasmon resonance (SPR) sensors**, Sathiyamoorthy Krishnan, Michael C. Kolios, Ryerson Univ. (Canada) . [9332-15]

Coffee Break . . . . . .Wed 3:00 pm to 3:30 pm

SESSION 4
LOCATION: ROOM 305 (ESPLANADE) . . . . . WED 3:30 PM TO 5:10 PM

In vivo Optical Monitoring of Blood and Blood Biomarkers

Session Chair: **Patrick D. O'Neal,** Louisiana Tech Univ. (USA)

3:30 pm: **Non-invasive in vivo monitoring of circulating amphotericin b using multi-wavelength photoplethysmography**, Pratik Adhikari, Louisiana Tech Univ. (USA); Wakako M. Eklund, Pediatrix Medical Group of Tennessee, P.C. (USA); Patrick D. O'Neal, Louisiana Tech Univ. (USA) . . . . . [9332-16]

3:50 pm: **Venous pooling and drainage affects photoplethysmographic signals at different vertical hand positions**, Michelle Hickey, Justin Phillips, Panicos Kyriacou, City Univ. London (United Kingdom). . . . . [9332-17]

4:10 pm: **Novel multi wavelength sensor concept to detect total hemoglobin concentration, methemoglobin and oxygen saturation**, Ulrich Timm, Helge Gewiss, Jens Kraitl, Univ. Rostock (Germany); Kirstin Stuepmann, German Red Cross (Germany); Michael Hinz, Sebastian Koball, University of Rostock (Germany); Hartmut Ewald, Univ. Rostock (Germany) . . . . . [9332-18]

4:30 pm: **Laser speckle imaging device for the assessment of peripheral microcirculation**, Bruce Yang, Tyler B. Rice, Sean White, Laser Associated Sciences, LLC (USA) . . . . . [9332-19]

4:50 pm: **Optical diagnosis of acute scrotum in children**, Babak Shadgan, The Univ. of British Columbia (Canada); A. M. Kajbafzadeh, Tehran Univ. of Medical Sciences (Iran, Islamic Republic of); Andrew J. Macnab, Lynn Stothers, Mark Nigro, The Univ. of British Columbia (Canada) . . . . . [9332-20]

THURSDAY 12 FEBRUARY

SESSION 5
LOCATION: ROOM 305 (ESPLANADE) . . . . . THU 8:20 AM TO 10:00 AM

Optical Systems for Remote Monitoring Globally

Session Chair: **Gerard L. Coté,** Texas A&M Univ. (USA)

8:20 am: **Google glass based immunochromatographic diagnostic test analysis**, Steve W. Feng, Romain Caire, Bingen Cortazar, Mehmet Turan, Andrew Wong, Aydogan Ozcan, Univ. of California, Los Angeles (USA) [9332-21]

8:40 am: **Integrated elastic microscope device**, Steve Lee, David Wright, The Australian National Univ. (Australia) . . . . . [9332-22]

9:00 am: **Development of a mobile phone microscope image processing app for the Android OS**, Kermit Sikindi, Karin M. Ennser, Swansea Univ. (United Kingdom). . . . . [9332-23]

9:20 am: **Raman system for rapid, label-free early disease signature detection**, Meiye Wu, Ryan W. Davis, Sandia National Labs. (USA) . . . [9332-24]

9:40 am: **Raman spectroscopic studies of dengue and malaria infection in human blood**, Saleem Muhammad, Bilal Muhammad, National Institute of Lasers and Optronics (Pakistan); Tayyaba Ijaz, Mayo Hospital Lahore (Pakistan); Samina T. Amanat, Huma A. Shakoor, PAEC General Hospital (Pakistan). . . . . [9332-25]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 6
LOCATION: ROOM 305 (ESPLANADE) . . . . . THU 10:30 AM TO 11:50 AM

Optical Imaging for Diagnosis of Precancer and Cancer

Session Chair: **Kristen C. Maitland,** Texas A&M Univ. (USA)

10:30 am: **Design and validation of a diffuse reflectance and spectroscopic microendoscope with poly(dimethylsiloxane)-based phantoms**, Gage J. Greening, Amy J. Powless, Joshua A. Hutcheson, Sandra P. Prieto, Aneeka A. Majid, Timothy J. Muldoon, Univ. of Arkansas (USA) . . . . . [9332-26]

10:50 am: **Assessing dysplasia of a bronchial biopsy with FTIR spectroscopic imaging**, Liberty Foreman, Univ. College London (United Kingdom); Rehan J. Haidry, Univ. College Hospital (United Kingdom) and National Medical Laser Ctr. (United Kingdom); Vinay Sehgal, Matthew R. Banks, Univ. College Hospital (United Kingdom); Marco R. Novelli, National Medical Laser Ctr. (United Kingdom); James A. Kimber, Sergei G. Kazarian, Imperial College London (United Kingdom); Manuel Rodriguez-Justo, National Medical Laser Ctr. (United Kingdom); Thomas Fearn, Univ. College London (United Kingdom); Laurence B. Lovat, Univ. College Hospital (United Kingdom) and National Medical Laser Ctr. (United Kingdom); Peter R. Rich, Univ. College London (United Kingdom) . . . . . [9332-27]

11:10 am: **Investigation on digital staining based on Mueller matrix imaging**, Wenfeng Wang, Quan Liu, Nanyang Technological Univ. (Singapore); Supriya Srivastava, National Univ. of Singapore (Singapore) . . . . . [9332-28]

11:30 am: **Exploiting Raman spectroscopy potential in middle ear surgery**, Rishikesh Pandey, Nicolas Spegazzini, Massachusetts Institute of Technology (USA); Tulio A. Valdez, Connecticut Children's Medical Ctr. (USA); Jeon Woong Kang, Massachusetts Institute of Technology (USA); Ishan Barman, Johns Hopkins Univ. (USA); Ramachandra R. Dasari, Peter T. C. So, Massachusetts Institute of Technology (USA) . . . . . [9332-29]

CONFERENCE 9333
LOCATION: ROOM 301 (ESPLANADE)

Saturday–Sunday 7–8 February 2015 • Proceedings of SPIE Vol. 9333

Biomedical Applications of Light Scattering IX

Conference Chairs: **Adam Wax,** Duke Univ. (USA); **Vadim Backman,** Northwestern Univ. (USA)

Program Committee: **Irving J. Bigio,** Boston Univ. (USA); **Stephen A. Boppart M.D.,** Univ. of Illinois at Urbana-Champaign (USA); **Dirk J. Faber,** Academisch Medisch Ctr. (Netherlands); **Steven L. Jacques,** Oregon Health & Science Univ. (USA); **Ofer Levi,** Univ. of Toronto (Canada); **Lev T. Perelman,** Harvard Univ. (USA); **Brian W. Pogue,** Thayer School of Engineering at Dartmouth (USA); **Bruce J. Tromberg,** Beckman Laser Institute and Medical Clinic (USA)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 301 (ESPLANADE) . . . . . .SAT 9:00 AM TO 10:10 AM

Dynamic Light Scattering and Speckle I

Session Chair: **Ofer Levi,** Univ. of Toronto (Canada)

9:00 am: **Backscattering of coherent polarized light from turbid tissue-like scattering medium with rough surface**, Alexander Doronin, Univ. of Otago (New Zealand); Lioudmila Tchvialeva, Igor Markhvida, Tim K. Lee, Vancouver Coastal Health Research Institute (Canada); Igor V. Meglinski, Univ. of Otago (New Zealand) . . . . . [9333-1]

9:20 am: **Robust estimation of vessel misfocus and real-time misfocus correction in laser speckle contrast imaging**, Dene Ringuette, Iliya Sigal, Ofer Levi, Univ. of Toronto (Canada). . . . . [9333-2]

9:40 am: **Optical thromboelastography (OTEG) and blood coagulation** *(Invited Paper)*, Seemantini K. Nadkarni, Harvard Medical School (USA) and Massachusetts General Hospital (USA) and Wellman Ctr. for Photomedicine (USA) . . . . . [9333-3]

Coffee Break . . . . . .Sat 10:10 am to 10:40 am

SESSION 2

LOCATION: ROOM 301 (ESPLANADE) . . . . . .SAT 10:40 AM TO 12:00 PM

Dynamic Light Scattering and Speckle II

Session Chair: **Ofer Levi,** Univ. of Toronto (Canada)

10:40 am: **Detection of early seizures by diffuse optical tomography**, Tao Zhang, Mohammad Reza Hajihashemi, Junli Zhou, Paul R. Carney, Huabei Jiang, Univ. of Florida (USA). . . . . [9333-4]

11:00 am: **Therapeutic efficacy testing in 3D biopsies using biodynamic imaging**, Daniel A. Merrill, Purdue Univ. (USA); Ran An, Animated Dynamics, Inc. (USA); Michael Childress, Purdue Univ. (USA); Daniela E. Matei, Indiana Univ.-Purdue Univ. Indianapolis (USA); John J. Turek, David D. Nolte, Purdue Univ. (USA) . . . . . [9333-5]

11:20 am: **Towards quantitative laser speckle contrast imaging: the influence of multiple scattering on velocity determination**, Annemarie Nadort, Koen Kalkman, Ton G. van Leeuwen, Dirk J. Faber, Univ. van Amsterdam (Netherlands) . . . . . [9333-6]

11:40 am: **Correction of particle size variations in laser speckle rheology applications**, Zeinab Hajjarian Kashany, Seemantini K. Nadkarni, Harvard Medical School (USA) . . . . . [9333-7]

Lunch Break . . . . . .Sat 12:00 pm to 1:30 pm

SESSION 3

LOCATION: ROOM 301 (ESPLANADE) . . . . . .SAT 1:30 PM TO 3:10 PM

Theory I

Session Chair: **Vadim Backman,** Northwestern Univ. (USA)

1:30 pm: **Phase function corrected diffusion approximation** *(Invited Paper)*, Lev T. Perelman, Edward Vitkin, Le Qiu, Vladimir M. Turzhitsky, Irving Itzkan, Harvard Univ. (USA) . . . . . [9333-8]

2:00 pm: **Three dimensional modelling of broadband optical imaging systems using an electromagnetic description of light**, Peter R. T. Munro, Sahan Amaratunge, Andrea Curatolo, David D. Sampson, The Univ. of Western Australia (Australia) . . . . . [9333-9]

2:20 pm: **Spectroscopic microscopy characterization of subdiffractional surface roughness with FDTD validation**, Di Zhang, Northwestern Univ. (USA); Ilker R. Capoglu, Halliburton Co. (USA); Lusik Cherkezyan, Hariharan Subramanian, Allen Taflove, Vadim Backman, Northwestern Univ. (USA) . . . . . [9333-10]

2:40 pm: **Monte Carlo estimators of absorption for radiative transport in turbid media: theory and analysis** *(Invited Paper)*, Carole K. Hayakawa, Univ. of California, Irvine (USA) and Beckman Laser Institute and Medical Clinic (USA); Jerome Spanier, Beckman Laser Institute and Medical Clinic (USA); Vasan Venugopalan, Univ. of California, Irvine (USA) and Beckman Laser Institute and Medical Clinic (USA). . . . . [9333-11]

Coffee Break . . . . . .Sat 3:10 pm to 3:40 pm

SESSION 4

LOCATION: ROOM 301 (ESPLANADE) . . . . . SAT 3:40 PM TO 5:10 PM

Theory II

Session Chair: **Lev T. Perelman,** Harvard Univ. (USA)

3:40 pm: **Propagation of coherent polarized light in turbid tissue-like scattering medium** *(Invited Paper)*, Igor V. Meglinski, Alexander Doronin, Callum M. Macdonald, Univ. of Otago (New Zealand) . . . . . [9333-12]

4:10 pm: **On the photon diffusion coefficient: the role of the absorption and persistence length**, H. Günhan Akarçay, Martin Frenz, Jaroslav Ricka, Univ. Bern (Switzerland) . . . . . [9333-13]

4:30 pm: **Investigation of the best model to characterize diffuse correlation spectroscopy measurements acquired directly on the brain**, Kyle Verdecchia, Lawson Health Research Institute (Canada); Mamadou Diop, Keith St. Lawrence, Lawson Health Research Institute (Canada) and The Univ. of Western Ontario (Canada). . . . . [9333-14]

4:50 pm: **Modeling scattering in turbid media using the Gegenbauer phase function**, Katherine W. Calabro, William Cassarly, Synopsys, Inc. (USA) . . . . . [9333-15]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 5

LOCATION: ROOM 301 (ESPLANADE) . . . . . .SUN 8:50 AM TO 10:00 AM

Cells and Tissues I

Session Chair: **Adam Wax,** Duke Univ. (USA)

8:50 am: **Multiple imaging modalities applied via digital Fourier microscopy to assess apoptosis in living cells**, Vincent M. Rossi, Oregon State Univ. (USA) and Oregon Health & Science Univ. (USA); Steven L. Jacques, Oregon Health & Science Univ. (USA) . . . . . [9333-16]

9:10 am: **Determining the optimal system parameters to detect organelle size changes in individual cells using angular domain elastic scattering**, Ashley E. Cannaday, Dustin W. Shipp, Janet Sorrells, Andrew J. Berger, Univ. of Rochester (USA) . . . . . [9333-17]

CONFERENCE 9333
LOCATION: ROOM 301 (ESPLANADE)

9:30 am: **Differentiation of tissue type ultrastructure using wide field imaging of sub-diffuse scattering parameters** *(Invited Paper)*, Stephen C. Kanick, David M. McClatchy III, Venkataramanan Krishnaswamy, Jonathan T. Elliott, Keith D. Paulsen, Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA) . . . . . [9333-18]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 6
LOCATION: ROOM 301 (ESPLANADE) . . . . . SUN 10:30 AM TO 11:30 AM

Cells and Tissues II

Session Chair: **Adam Wax,** Duke Univ. (USA)

10:30 am: **Depth-sensitive measurements of oral epithelial tissue with oblique polarized reflectance spectroscopy**, Maria J. Bailey, The Univ. of Texas at Austin (USA); Sylvia F. Lam, Catherine F. Poh, The BC Cancer Agency Research Ctr. (Canada); Adam R. Gardner, Vasan Venugopalan, Univ. of California, Irvine (USA); Konstantin V. Sokolov, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) . . . . . [9333-19]

10:50 am: **Quantifying the effect of age on foveal form birefringence**, Joel A. Papay, Ann E. Elsner, Indiana Univ. (USA) . . . . . [9333-21]

11:10 am: **Deep spectroscopic imaging of burns in human skin using multiply scattered light**, Adam Wax, Jason R. Maher, Duke Univ. (USA); Jina Kim, Howard Levinson, Duke Univ. Medical Ctr. (USA); William J. Brown, Duke Univ. (USA) . . . . . [9333-22]

Lunch Break . . . . . Sun 11:30 am to 1:20 pm

SESSION 7
LOCATION: ROOM 301 (ESPLANADE) . . . . . SUN 1:20 PM TO 3:30 PM

Novel Techniques

Session Chair: **Irving J. Bigio,** Boston Univ. (USA)

1:20 pm: **Determination of the reduced scattering coefficient from 3D imaging of thick tissues by second harmonic generation microscopy** *(Invited Paper)*, Paul J. Campagnola, Gunnsteinn Hall, Kevin W. Eliceiri, Univ. of Wisconsin-Madison (USA). . . . . [9333-23]

1:50 pm: **Video-rate dual polarization multispectral endoscopic imaging**, Anne Pigula, Neil T. Clancy, Shobhit Arya, Danail Stoyanov, George B. Hanna, Daniel S. Elson, Imperial College London (United Kingdom) . . . . . [9333-24]

2:10 pm: **Monte Carlo based investigation of berry phase for depth resolved characterization of biomedical scattering samples**, Justin S. Baba, Oak Ridge National Lab. (USA); Vijay Koju, Dwayne John, The Univ. of Tennessee Knoxville (USA) . . . . . [9333-25]

2:30 pm: **Nanophotonic force microscopy: measuring particle-surface interactions using near-field photonics**, Perry Schein, Pilgyu Kang, David Erickson, Cornell Univ. (USA) . . . . . [9333-26]

2:50 pm: **Characterizing protein aggregation by observing confined Brownian fluctuations in a near-field optical trap**, Dakota O'Dell, Perry Schein, Pilgyu Kang, David Erickson, Cornell Univ. (USA) . . . . . [9333-27]

3:10 pm: **Novel techniques for refractive index determination of single nanoparticles in suspension**, Edwin van der Pol, Frank A. W. Coumans, Anita N. Böing, Academisch Medisch Centrum (Netherlands); Auguste Sturk, Rienk Nieuwland, Univ. van Amsterdam (Netherlands); Ton G. van Leeuwen, Academisch Medisch Centrum (Netherlands). . . . . [9333-28]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 8
LOCATION: ROOM 301 (ESPLANADE) . . . . . SUN 4:00 PM TO 5:20 PM

Low Coherence Light Scattering

Session Chair: **Dirk J. Faber,**
Academisch Medisch Centrum (Netherlands)

4:00 pm: **Wavelet transform a/LCI analysis of ex vivo tissue for detection of cervical dysplasia**, Derek Ho, Tyler K. Drake, Adam Wax, Duke Univ. (USA) . . . . . [9333-29]

4:20 pm: **Speckle formation in optical coherence tomography: computational study and experiment**, Valentin Demidov, Univ. of Toronto (Canada); Alexander Doronin, Univ. of Otago (New Zealand); I. Alex Vitkin, Univ. of Toronto (Canada); Igor V. Meglinski, Univ. of Otago (New Zealand). . [9333-30]

4:40 pm: **OCT signal model for discrete random media**, Mitra Almasian, Nienke Bosschaart, Ton G. van Leeuwen, Dirk J. Faber, Academisch Medisch Centrum (Netherlands) . . . . . [9333-31]

5:00 pm: **Efficient signal processing in spectroscopic optical coherence tomography**, Maciej Kraszewski, Michal Trojanowski, Marcin R. Strakowski, Gdansk Univ. of Technology (Poland) . . . . . [9333-32]

POSTERS-SUNDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Analysis of water spread dynamics in human skin with near-infrared imaging, Hidenobu Arimoto, National Institute of Advanced Industrial Science and Technology (Japan); Mariko Egawa, Shiseido Research Ctr. (Japan). . . . . [9333-33]

Stokes vs. Jones: comparing two independent polarized Monte Carlo programs, H. Günhan Akarcay, Univ. Bern (Switzerland); Ansgar Hohmann, Alwin Kienle, Univ. Ulm (Germany); Martin Frenz, Jaroslav Ricka, Univ. Bern (Switzerland) . . . . . [9333-34]

A sub-diffuse tomography algorithm for blood vessels detection during brain biopsy needle using Monte Carlo computed photon path lengths, Julien Pichette, Andréanne Goyette, Marie-Andrée Tremblay, Ecole Polytechnique de Montréal (Canada); Gilles Soulez, Ctr. Hospitalier de l'Univ. de Montréal (Canada); Frédéric Leblond, Ecole Polytechnique de Montréal (Canada) . . . . . [9333-35]

computational hair quality categorization in lower magnifications, Barmak Heshmat, Hayato Ikoma, Ik Hyun Lee, MIT Media Lab. (USA); Krishna Rastogi, MIT Media Lab. (USA) and PES Institute of Technology (India); Ramesh Raskar, MIT Media Lab. (USA) . . . . . [9333-36]

Accuracy of common inverse models for assessment of turbid media optical properties in fiber optic diffuse reflectance spectroscopy: a comparative study, Peter Naglic, Maksimilijan Bregar, Miran Bürmen, Boštjan Likar, Franjo Pernuš, Univ. of Ljubljana (Slovenia) . . . . . [9333-37]

Parallel Monte Carlo code for simulation of propagation of light in segmented 3D structures of adult human head obtained by MRI, Stanislaw Wojtkiewicz, Adam Liebert, Institute of Biocybernetics and Biomedical Engineering (Poland). . . . . [9333-38]

Scatterers shape effect on speckle patterns, Valentin Denisenkov, Vadim V. Kiyko, A. M. Prokhorov General Physics Institute (Russian Federation) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Gleb V. Vdovin, Technische Univ. Delft (Netherlands) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation). . . . . [9333-39]

Numerical modeling of photon migration in the cerebral cortex of the living rat using the radiative transport equation, Hiroyuki Fujii, Hokkaido Univ. (Japan); Shinpei Okawa, National Defense Medical College (Japan); Ken Nadamoto, Eiji Okada, Keio Univ. (Japan); Yukio Yamada, The Univ. of Electro-Communications (Japan); Yoko Hoshi, The Tokyo Metropolitan Institute of Medical Science (Japan); Masao Watanabe, Hokkaido Univ. (Japan) [9333-40]

Advanced Monte Carlo simulator of the polarization-sensitive optical coherence tomography systems, Maciej Kraszewski, Michal Trojanowski, Jerzy Plucinski, Marcin R. Strakowski, Gdansk Univ. of Technology (Poland) . . . . . [9333-41]

Biodynamic imaging of pharmacodynamics and time-dependent effects in 3D tissue, Hao Sun, Purdue Univ. (USA) . . . . . [9333-42]

Electric field Monte Carlo study of coherent complex light in turbid media, Xiuwei Zhu, Xiaolei Lin, Zili Cao, Bixin Zeng, Wenzhou Medical Univ. (China); Min Xu, Fairfield Univ. (USA) . . . . . [9333-43]

BIOS SUNDAY PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

CONFERENCE 9334
LOCATION: ROOM 236 (MEZZANINE)

COSPONSORS:

Saturday–Sunday 7–8 February 2015 • Proceedings of SPIE Vol. 9334

Optical Methods in Developmental Biology III

Conference Chairs: **Andrew M. Rollins,** Case Western Reserve Univ. (USA); **Scott E. Fraser,** California Institute of Technology (USA); **Michael A. Choma M.D.,** Yale School of Medicine (USA)

Program Committee: **Anjul M. Davis,** Thorlabs Inc. (USA); **Mary E. Dickinson,** Baylor College of Medicine (USA); **Robert G. Gourdie,** Virginia Polytechnic Institute and State Univ. (USA); **Michael W. Jenkins,** Case Western Reserve Univ. (USA); **Bradley B. Keller,** Univ. of Louisville (USA); **Kirill V. Larin,** Univ. of Houston (USA); **Kersti K. Linask,** Univ. of South Florida (USA); **Charles D. Little,** The Univ. of Kansas Medical Ctr. (USA); **Cecilia W. Lo,** Univ. of Pittsburgh (USA); **David Sedmera M.D.,** Charles Univ. in Prague (Czech Republic); **Lars Thrane,** Technical Univ. of Denmark (Denmark); **Ruikang K. Wang,** Univ. of Washington (USA); **Michiko Watanabe,** Case Western Reserve Univ. (USA); **Talât Mesud Yelbuz,** Medizinische Hochschule Hannover (Germany)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 236 (MEZZANINE) . . . . . SAT 8:00 AM TO 9:20 AM

Cardiovascular I

Session Chair: **Mary E. Dickinson,** Baylor College of Medicine (USA)

8:00 am: **Visualizing dynamic neuro-vascular interactions during vertebrate development** *(Invited Paper)*, Paul M. Kulesa, Mary C. McKinney, Stowers Institute for Medical Research (USA) . . . . . [9334-1]

8:20 am: **Mapping conduction velocity of early embryonic hearts with robust fitting algorithms**, Shi Gu, Yves T. Wang, Pei Ma, Case Western Reserve Univ. (USA); Andreas A. Werdich, Brigham and Women's Hospital (USA); Andrew M. Rollins, Michael W. Jenkins, Case Western Reserve Univ. (USA) . . . . . [9334-2]

8:35 am: **Optical stimulation and inhibition in cardiac development**, Yves T. Wang, Matthew T. McPheeters, Case Western Reserve Univ. (USA); Stephanie Ford, Case Western Reserve Univ. (USA) and Univ. Hospitals Case Medical Ctr. (USA); Shi Gu, Michiko Watanabe, Andrew M. Rollins, Michael W. Jenkins, Case Western Reserve Univ. (USA) . . . . . [9334-3]

8:50 am: **Longitudinal optical coherence microscopy reveals the functional role of a circadian gene, cryptochrome, in drosophila heart development**, Aneesh Alex, Lehigh Univ. (USA); Airong Li, Massachussetts General Hospital (USA); Xianxu Zeng, Zhan Zhang, The 3rd Affiliated Hospital of Zhengzhou Univ. (China); Rudolph E. Tanzi, Massachussetts General Hospital (USA); Chao Zhou, Lehigh Univ. (USA) . . . . . [9334-4]

9:05 am: **Structural and functional measurements of the embryonic heart after cardiac neural crest ablation**, Pei Ma, Shi Gu, Leina Lunasco, Michael W. Jenkins, Michiko Watanabe, Andrew M. Rollins, Case Western Reserve Univ. (USA) . . . . . [9334-5]

SESSION 2

LOCATION: ROOM 236 (MEZZANINE) . . . . . SAT 9:20 AM TO 11:10 AM

Novel Physiology and Disease Mechanisms

Session Chair: **Irina V. Larina,** Baylor College of Medicine (USA)

9:20 am: **In vivo wide-field imaging reveals unexpected mechanisms of organ formation** *(Invited Paper)*, Charles D. Little, The Univ. of Kansas (USA) . . . . . [9334-6]

9:40 am: **Using SPIM to track the development of the focal power of the zebrafish lens**, Laura Young, Miguel Jarrin, Christopher D. Saunter, Roy Quinlan, John M. Girkin, Durham Univ. (United Kingdom). . . . . [9334-7]

9:55 am: **Dynamic imaging of preimplantation embryos in murine oviduct**, Jason C. Burton, Shang Wang, Irina V. Larina, Baylor College of Medicine (USA) . . . . . [9334-8]

Coffee Break . . . . . Sat 10:10 am to 10:40 am

10:40 am: **Monitoring morphology and vibration of zebrafish inner ear for hearing development by swept-source phase-sensitive optical coherence tomography**, Jesung Park, Esteban F. Carbajal, Brian E. Applegate, Texas A&M Univ. (USA) . . . . . [9334-9]

10:55 am: **Quantifying cilia driven fluid flow in animal models of neonatal and pediatric respiratory disease**, Ute A. Gamm, Brendan K. Huang, Mansoor Syed, Vineet Bhandari, Mustafa Khoka, Michael A. Choma, Yale School of Medicine (USA) . . . . . [9334-10]

SESSION 3

LOCATION: ROOM 236 (MEZZANINE) . . . . . SAT 11:10 AM TO 12:20 PM

Novel Imaging I

Session Chair: **Audrey K. Ellerbee,** Stanford Univ. (USA)

11:10 am: **An imaging and analysis toolset for the study of caenorhabditis elegans neurodevelopment** *(Invited Paper)*, Ryan P. Christensen, Alexandra Bokinsky, Yicong Wu, National Institutes of Health (USA); Abhishek Kumar, National Institutes of Health (USA) and Yale Univ. (USA); Ismar Kovacevic, Memorial Sloan-Kettering Cancer Ctr. (USA); Javier Marquina, Yale Univ. (USA); Zhirong Bao, Memorial Sloan-Kettering Cancer Ctr. (USA); Daniel Colón-Ramos, Yale Univ. (USA); Hari Shroff, National Institutes of Health (USA) . . . . . [9334-11]

11:30 am: **Quantitative analyses for elucidating mechanisms of cell fate commitment in the mouse blastocyst** *(Invited Paper)*, Anna-Katerina Hadjantonakis, Memorial Sloan-Kettering Cancer Ctr. (USA). . . . . [9334-12]

11:50 am: **Hybrid selective-plane illumination optical and optoacoustic microscopy**, Amy Lin, Andrei Chekkoury, Murad Omar, Helmholtz Zentrum München GmbH (Germany); Tobias Schmitt-Manderbach, Timo Mappes, Carl Zeiss AG (Germany); Hernán López-Schier, Daniel Razansky, Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany) . . . . . [9334-13]

12:05 pm: **New strategies for multicolor two-photon imaging of developing tissues**, Willy Supatto, Pierre Mahou, Ecole Polytechnique (France) and Lab. d'Optique et Biosciences, CNRS (France); Julien Vermot, Institut de Génétique et de Biologie Moléculaire et Cellulaire, CNRS, Univ. de Strasbourg (France); Karine Loulier, Institut de la Vision, CNRS (France); Nelly Vuillemin, Ecole Polytechnique (France) and Lab. d'Optique et Biosciences, CNRS (France); Katherine S. Matho, Institut de la Vision, CNRS (France); Xavier Morin, Ecole Normale Supérieure (France) and Institut de Biologie, CNRS (France); Jean Livet, Institut de la Vision, CNRS (France); Emmanuel Beaurepaire, Ecole Polytechnique (France) and Lab. d'Optique et Biosciences, CNRS (France) . . . . . [9334-14]

Lunch Break . . . . . Sat 12:20 pm to 1:50 pm

SESSION 4

LOCATION: ROOM 236 (MEZZANINE) . . . . . SAT 1:50 PM TO 3:15 PM

Novel Imaging II

Session Chair: **Michael W. Jenkins,** Case Western Reserve Univ. (USA)

1:50 pm: **The immune response in four dimensions** *(Invited Paper)*, Matthew F. Krummel, Univ. of California, San Francisco (USA) . . . . . [9334-15]

2:10 pm: **Applications of FF-OCT to early embryonic development** *(Invited Paper)*, Audrey K. Ellerbee, Stanford Univ. (USA). . . . . [9334-16]

2:30 pm: **Multiplexed FLIM-fret imaging in deep tissue during embryo development**, Ming Zhao, College of Optical Sciences, The Univ. of Arizona (USA); XiaoYang Wan, Univ. of Michigan (USA); Yu Li, College of Optical Sciences, The Univ. of Arizona (USA); Weibin Zhou, Univ. of Michigan (USA); Leilei L. Peng, College of Optical Sciences, The Univ. of Arizona (USA) [9334-17]

2:45 pm: **Comparison of optical projection tomography and optical coherence tomography for assessment of murine embryonic development**, Manmohan Singh, Univ. of Houston (USA); Tegy J. Vadakkan, Victor Piazza, Ryan Udan, Baylor College of Medicine (USA); Michael V. Frazier, Trevor Janecek, Univ. of Houston (USA); Mary E. Dickinson, Baylor College of Medicine (USA); Kirill V. Larin, Univ. of Houston (USA) and Baylor College of Medicine (USA) . . . . . [9334-18]

3:00 pm: **Optical clearing of uterus for deep imaging of mouse embryo**, Chen Wu, Narendran Sudheendran, Univ. of Houston (USA); Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Kirill V. Larin, Univ. of Houston (USA) . . . . . [9334-19]

Coffee Break . . . . . .Sat 3:15 pm to 3:45 pm

SESSION 5

LOCATION: ROOM 236 (MEZZANINE) . . . . . SAT 3:45 PM TO 5:05 PM

Complex Dynamics and Control

Session Chair: **Chao Zhou,** Lehigh Univ. (USA)

3:45 pm: **Reverse engineering morphogenesis in embryonic epithelia: time-lapse confocal microscopy, laser microsurgery, and force inference from cell shape** *(Invited Paper)*, M. Shane Hutson, Holley E. Lynch, Sarah M. Crews, David N. Mashburn, Vanderbilt Univ. (USA); Jim Veldhuis, G. Wayne Brodland, Univ. of Waterloo (Canada) . . . . . [9334-20]

4:05 pm: **Optical control of excitable cells** *(Invited Paper)*, Michael W. Jenkins, Case Western Reserve Univ. (USA). . . . . [9334-21]

4:25 pm: **Lattice light sheet microscopy: imaging molecules, cells, and embryos at high spatiotemporal resolution** *(Invited Paper)*, Wesley R. Legant, Howard Hughes Medical Institute - Janelia Farm Research Campus (USA); Bi-Chang Chen, Academia Sinica (Taiwan); Kai Wang, Lin Shao, Eric Betzig, Howard Hughes Medical Institute - Janelia Farm Research Campus (USA) . . . . . [9334-22]

4:45 pm: **Cellular connectivity in the developing embryo: what can we learn from the zebrafish model?** *(Invited Paper)*, Andreas A. Werdich, Brigham and Women's Hospital (USA) and Harvard Medical School (USA); Daniela Panakova, Marie Swinarski, Max-Delbrück-Ctr. für Molekulare Medizin Berlin-Buch (Germany); Steven M. Jay, Univ. of Maryland, College Park (USA); M. K. Sabeh, Gabriel Musso, Richard T. Lee, Calum A. MacRae, Brigham and Women's Hospital (USA) and Harvard Medical School (USA) . . . . . [9334-23]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 6

LOCATION: ROOM 236 (MEZZANINE) . . . . . .SUN 8:00 AM TO 9:20 AM

Cardiovascular II

Session Chair: **Ruikang K. Wang,** Univ. of Washington (USA)

8:00 am: **Systematic analysis of structural and functional defects in embryonic lethal mouse mutants** *(Invited Paper)*, Mary E. Dickinson, Baylor College of Medicine (USA) . . . . . [9334-24]

8:20 am: **Altered cardiac function: a contributing factor in ethanol-induced congenital heart defects?**, Ganga Karunamuni, Shi Gu, Yong Qiu Doughman, Lindsy M. Peterson, Case Western Reserve Univ. (USA); Kersti K. Linask, Univ. of South Florida (USA); Michael W. Jenkins, Andrew M. Rollins, Michiko Watanabe, Case Western Reserve Univ. (USA) . . . . . [9334-25]

8:35 am: **Characterizing the effects of high fat diet on heart development in wild-type and CLOCK mutant drosophila melanogaster using optical coherence microscopy**, Xianxu Zeng, The 3rd Affiliated Hospital of Zhengzhou Univ. (China); Airong Li, Massachussetts General Hospital (USA); Aneesh Alex, Fengqiang Li, Lehigh Univ. (USA); Zhan Zhang, The 3rd Affiliated Hospital of Zhengzhou Univ. (China); Rudolph E. Tanzi, Massachussetts General Hospital (USA); Chao Zhou, Lehigh Univ. (USA) . . . . . [9334-26]

8:50 am: **Live dynamic imaging and analysis of developmental cardiac defects in mouse models with optical coherence tomography**, Andrew L. Lopez III, Shang Wang, Monica D. Garcia, Christian Valladolid, Baylor College of Medicine (USA); Kirill V. Larin, Univ. of Houston (USA); Irina V. Larina, Baylor College of Medicine (USA) . . . . . [9334-27]

9:05 am: **Measuring embryonic aortic arch pulsatile blood flow and shear stress with Doppler OCT**, Lindsy M. Peterson, Shi Gu, Ganga Karunamuni, Michiko Watanabe, Michael W. Jenkins, Andrew M. Rollins, Case Western Reserve Univ. (USA) . . . . . [9334-28]

PANEL DISCUSSION

LOCATION: ROOM 236 (MEZZANINE) . . . . . 9:20 AM TO 10:05 AM

Hot Topics/Future Directions and Feedback

9:20 to 9:50 AM **Hot Topics/Future Directions**

Scott E. Fraser, California Institute of Technology (USA)

Panelists: **Anjul Davis,** Thorlabs (USA); **Anna-Katerina Hadjantonakis,** Memorial Sloan-Kettering Cancer Ctr. (USA); **Charles Little,** Univ. of Kansas Medical Ctr. (USA); **Willy Supatto,** Ecole Polytechnique (France)

9:50 to 10:05 AM **Feedback**

Michael A. Choma, Yale School of Medicine (USA)

POSTERS-SUNDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Breathing laser as inertia-free swept source for time-stretch imaging modality, Xiaoming Wei, Jingjiang Xu, Yiqing Xu, Luoqin Yu, Jianbing Xu, Bowen Li, Andy K. S. Lau, Xie Wang, Chi Zhang, Kevin K. Tsia, Kenneth K. Y. Wong, The Univ. of Hong Kong (Hong Kong, China). . . [9334-29]

Approach to quantify two-dimensional strain of chick embryonic heart in early stage based on spectral domain optical coherence tomography, Yuqian Zhao, Shidan Dou, Northeastern Univ. at Qinhuangdao (China); Wenlong Zhu, Qinhuangdao City Harbor Hospital (China); Yi Wang, Northeastern Univ. at Qinhuangdao (China); Tao Xu, Shenzhen Academy of Metrology and Quality Inspection (China); Fengwen Wang, Zhenhe Ma, Northeastern Univ. at Qinhuangdao (China). . . . . [9334-30]

Measurement of wall shear stress in chick embryonic heart using optical coherence tomography, Zhenhe Ma, Shidan Dou, Yuqian Zhao, Yi Wang, Northeastern Univ. at Qinhuangdao (China); Tao Xu, Shenzhen Academy of Metrology and Quality Inspection (China); Guangyuan Si, Fengwen Wang, Northeastern Univ. at Qinhuangdao (China) . . . . . [9334-31]

Improved resolution of optical coherence tomography for imaging of microstructures, Kai Shen, Hui Lu, Michael R. Wang, Univ. of Miami (USA). . . . . [9334-32]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their ground-breaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9335
LOCATION: ROOM 226 (MEZZANINE)

Saturday–Monday 7–9 February 2015 • Proceedings of SPIE Vol. 9335

Adaptive Optics and Wavefront Control for Biological Systems

Conference Chairs: **Thomas G. Bifano,** Boston Univ. (USA); **Joel Kubby,** Univ. of California, Santa Cruz (USA); **Sylvain Gigan,** Univ. Pierre et Marie Curie (France)

Program Committee: **Jacopo Bertolotti,** Univ. of Exeter (United Kingdom); **Martin J. Booth,** Univ. of Oxford (United Kingdom); **Wonshik Choi,** Korea Univ. (Korea, Republic of); **Meng Cui,** Howard Hughes Medical Institute (USA); **John M. Girkin,** Durham Univ. (United Kingdom); **Na Ji,** Howard Hughes Medical Institute (USA); **Benjamin Judkewitz,** California Institute of Technology (USA); **Ori Katz,** Univ. Pierre et Marie Curie (France); **Peter A. Kner,** The Univ. of Georgia (USA); **Pablo Loza-Alvarez,** ICFO - Institut de Ciències Fotòniques (Spain); **Allard P. Mosk,** Univ. Twente (Netherlands); **Rafael Piestun,** Univ. of Colorado at Boulder (USA); **Laura Waller,** Univ. of California, Berkeley (USA); **Monika Ritsch-Marte,** Medizinische Univ. Innsbruck (Austria)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 226 (MEZZANINE) . . . . . SAT 8:00 AM TO 8:40 AM

Wavefront Shaping Devices

Session Chair: **Thomas G. Bifano,** Boston Univ. (USA)

8:00 am: **Transmissive liquid crystal devices correcting the spherical aberrations in laser scanning microscopy**, Ayano Tanabe, Hokkaido Univ. (Japan) and Citizen Holdings Co., Ltd. (Japan); Terumasa Hibi, Hokkaido Univ. (Japan); Kenji Matsumoto, Masafumi Yokoyama, Makoto Kurihara, Citizen Holdings Co., Ltd. (Japan); Sari Ipponjima, Hokkaido Univ. (Japan); Nobuyuki Hashimoto, Citizen Holdings Co., Ltd. (Japan); Tomomi Nemoto, Hokkaido Univ. (Japan). . . . . [9335-1]

8:20 am: **Controlling the propagation of light in turbid media by polarization modulation**, Jongchan Park, Jung-Hoon Park, HyeonSeung Yu, YongKeun Park, KAIST (Korea, Republic of) . . . . . [9335-2]

SESSION 2

LOCATION: ROOM 226 (MEZZANINE) . . . . . SAT 8:40 AM TO 11:50 AM

Computed Optical Imaging Techniques

Session Chair: **Laura Waller,** Univ. of California, Berkeley (USA)

8:40 am: **Holographic fluorescence microscopy with incoherent digital holographic adaptive optics** *(Invited Paper)*, Changwon Jang, Jonghyun Kim, Seoul National Univ. (Korea, Republic of); David C. Clark, Univ. of South Florida (USA); Byoungho Lee, Seoul National Univ. (Korea, Republic of); Myung K. Kim, Univ. of South Florida (USA) . . . . . [9335-3]

9:10 am: **Computational adaptive optics for broadband optical interferometric tomography of biological tissue** *(Invited Paper)*, Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9335-4]

9:40 am: **Aberration correction and imaging using optical eigenmodes** *(Invited Paper)*, Michael Mazilu, Kishan Dholakia, Univ. of St. Andrews (United Kingdom). . . . . [9335-5]

10:10 am: **GPU accelerated holography for multimode fiber applications**, Martin Ploschner, Tomá? ?i?már, Univ. of Dundee (United Kingdom) . . . [9335-6]

Coffee Break . . . . . .Sat 10:30 am to 11:00 am

11:00 am: **Using speckle to build compact, high-resolution spectrometers** *(Invited Paper)*, Brandon Redding, Hui Cao, Yale Univ. (USA) . . . . . [9335-7]

11:30 am: **Analysis of the angular span of the optical phase conjugation phenomenon**, Chia-Ta Tseng, National Taiwan Univ. (Taiwan) . . . . . [9335-8]

Lunch Break . . . . . .Sat 11:50 am to 1:20 pm

SESSION 3

LOCATION: ROOM 226 (MEZZANINE) . . . . . SAT 1:20 PM TO 2:50 PM

Shaped Beams for Light Sheet and Structured Illumination Microscopy

Session Chair: **Pablo Loza-Alvarez,**
ICFO - Institut de Ciències Fotòniques (Spain)

1:20 pm: **Novel real time wavefront sensor in a SPIM microscope and active tracking of aberrations in a living animal** *(Invited Paper)*, Jonathan M. Taylor, Univ. of Glasgow (United Kingdom); Christopher D. Saunter, Cyril J. Bourgenot, Gordon D. Love, John M. Girkin, Durham Univ. (United Kingdom). . . . . [9335-9]

1:50 pm: **Adaptive optimisation of illumination beam profiles in fluorescence microscopy**, Thomas J. Mitchell, Christopher D. Saunter, Gordon D. Love, John M. Girkin, Durham Univ. (United Kingdom). . . . . [9335-10]

2:10 pm: **Adaptive optics STED microscopy in thick biological tissue**, Mary Grace M. Velasco, Yale Univ. (USA); Edward S. Allgeyer, Yale School of Medicine (USA); Emil B. Kromann, Yale Univ. (USA); Travis J. Gould, Bates College (USA); Daniel Burke, Martin J. Booth, Univ. of Oxford (United Kingdom); Joerg Bewersdorf, Yale School of Medicine (USA). . . . . [9335-11]

2:30 pm: **Closed-loop optimized phase masks for extended-depth-of-field light-sheet microscopy**, Omar Palillero-Sandoval, ICFO - Instituto de Ciencias Fotónicas (Spain) and Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Omar E. Olarte, Jordi Andilla, ICFO - Institut de Ciències Fotòniques (Spain); Luis Raúl Berriel-Valdos, J. Félix Aguilar, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); David Artigas-García, Pablo Loza-Alvarez, ICFO - Institut de Ciències Fotòniques (Spain) . . . . . [9335-12]

Coffee Break . . . . . .Sat 2:50 pm to 3:20 pm

SESSION 4

LOCATION: ROOM 226 (MEZZANINE) . . . . . .SAT 3:20 PM TO 4:40 PM

Coherent Optical Adaptive Techniques

Session Chair: **Peter A. Kner,** The Univ. of Georgia (USA)

3:20 pm: **In vivo deep tissue optical imaging via wavefront compensation** *(Invited Paper)*, Meng Cui, Howard Hughes Medical Institute (USA) . . . [9335-13]

3:50 pm: **High-speed in vivo volumetric deep tissue imaging by remote focusing and wavefront compensation** *(Invited Paper)*, Lingjie Kong, Meng Cui, Howard Hughes Medical Institute (USA) . . . . . [9335-14]

4:20 pm: **Wavefront sensing and analysis for underwater laser propagation**, Sergio R. Restaino, U.S. Naval Research Lab. (USA) . . . . . [9335-15]

SESSION 5

LOCATION: ROOM 226 (MEZZANINE) . . . . . .SAT 4:40 PM TO 5:50 PM

Channel De-Mixing for Endoscopy/Fibers

Session Chair: **Wonshik Choi,** Korea Univ. (Korea, Republic of)

4:40 pm: **Fibre-based imaging: new challenges** *(Invited Paper)*, Martin Ploschner, Univ. of Dundee (United Kingdom); Branislav Straka, Brno Univ. of Technology (Czech Republic); Kishan Dholakia, Univ. of St. Andrews (United Kingdom); Tomá? ?i?már, Univ. of Dundee (United Kingdom). . [9335-16]

5:10 pm: **Complex pattern projection through a multimode fiber**, Damien Loterie, Salma Farahi, Demetri Psaltis, Christophe Moser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9335-17]

5:30 pm: **Delivery of an ultrashort spatially focused pulse to the other end of a multimode fiber using digital phase conjugation**, Edgar E. Morales Delgado, Ioannis N. Papadopoulos, Salma Farahi, Demetri Psaltis, Christophe Moser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9335-18]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 6

LOCATION: ROOM 226 (MEZZANINE) . . . . . SUN 8:00 AM TO 10:10 AM

Adaptive Optics for Microscopy and Optical Coherence Tomography I

Session Chair: **John M. Girkin,** Durham Univ. (United Kingdom)

8:00 am: **Direct wavefront sensing for optimal resolution recovery over large fields of view** *(Invited Paper)*, Kai Wang, Wenzhi Sun, Na Ji, Eric Betzig, Howard Hughes Medical Institute (USA). . . . . [9335-19]

8:30 am: **Wavefront correction using machine learning methods for single molecule localization microscopy**, Kayvan F. Tehrani, Jianquan Xu, Peter A. Kner, The Univ. of Georgia (USA) . . . . . [9335-20]

8:50 am: **Wavefront shaping optical coherence tomography for enhancing penetration depth** *(Invited Paper)*, YongKeun Park, KAIST (Korea, Republic of). . . . . [9335-21]

9:20 am: **Performance of a combined optical coherence tomography and scanning laser ophthalmoscope with adaptive optics for human retinal imaging applications**, Elaine M. Wells-Gray, The Ohio State Univ. (USA); Robert J. Zawadzki, Univ. of California, Davis (USA); Susanna C. Finn, Univ. of Massachusetts Lowell (USA); Cherry Greiner, InfraReDx, Inc. (USA); John S. Werner, Univ. of California, Davis (USA); Stacey S. Choi, Nathan Doble, The Ohio State Univ. (USA) . . . . . [9335-22]

9:40 am: **Adaptive optics for single molecule switching and STED nanoscopy** *(Invited Paper)*, Brian R. Patton, Robert Vrees, Daniel Burke, Univ. of Oxford (United Kingdom); Travis J. Gould, Joerg Bewersdorf, Yale Univ. (USA); Martin J. Booth, Univ. of Oxford (United Kingdom) . . . . . [9335-23]

Coffee Break . . . . . Sun 10:10 am to 10:30 am

SESSION 7

LOCATION: ROOM 226 (MEZZANINE) . . . . . SUN 10:30 AM TO 12:10 PM

Adaptive Optics for Microscopy and Optical Coherence Tomography II

Session Chair: **Jacopo Bertolotti,** Univ. of Exeter (United Kingdom)

10:30 am: **Indirect wavefront sensing in adaptive optics** *(Invited Paper)*, Na Ji, Howard Hughes Medical Institute (USA). . . . . [9335-24]

11:00 am: **Wavefront coding with adaptive optics**, Gleb V. Vdovin, Flexible Optical B.V. (Netherlands) and Technische Univ. Delft (Netherlands) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Oleg Soloviev, Flexible Optical B.V. (Netherlands); Vitalii V. Bezzubik, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Vsevolod Patlan, Flexible Optical B.V. (Netherlands) . . . . . [9335-25]

11:20 am: **Measurement of the time-resolved reflection matrix for enhancing imaging depth and light energy delivery** *(Invited Paper)*, Wonshik Choi, Sungsam Kang, Seungwon Jeong, Pilsung Kang, Hakseok Ko, Yonghyeon Jo, Korea Univ. (Korea, Republic of); Youngwoon Choi, Zahid Yaqoob, Massachusetts Institute of Technology (USA) . . . . . [9335-26]

11:50 am: **Phase retrieval method for simple aberration determination in PALM/STORM and SPT**, Corey Butler, Imagine Optic SA (France) and Interdisciplinary Institute for Neuroscience, Univ. of Bordeaux (France); François Le, Grégory Clouvel, Imagine Optic SA (France). . . . . [9335-41]

Lunch Break . . . . . Sun 12:10 pm to 1:20 pm

SESSION 8

LOCATION: ROOM 226 (MEZZANINE) . . . . . SUN 1:20 PM TO 4:30 PM

Focusing Light Through Scattering Tissues

Session Chair: **Rafael Piestun,** Univ. of Colorado at Boulder (USA)

1:20 pm: **Transmission matrix correlations in anisotropically scattering media** *(Invited Paper)*, Benjamin Judkewitz, Charité Universitätsmedizin Berlin (Germany) . . . . . [9335-27]

1:50 pm: **New algorithms for binary wavefront optimization**, Xiaolong Zhang, Peter A. Kner, The Univ. of Georgia (USA) . . . . . [9335-28]

2:10 pm: **Structured illumination enables image transmission through scattering media**, Vicente Durán-Bosch, Pere Clemente Pesudo, Esther Irles, Fernando Soldevila Torres, Enrique Tajahuerce-Romera, Univ. Jaume I (Spain); Ángel David Rodríguez Jimenez, Universitat Jaume I (UJI) (Spain); Pedro Andrés Bou, Univ. de València (Spain); Jesús Lancis, Univ. Jaume I (Spain) . . . [9335-29]

2:30 pm: **Non-invasive imaging through opaque scattering layers** *(Invited Paper)*, Jacopo Bertolotti, Univ. of Exeter (United Kingdom); Elbert G. van Putten, Christian Blum, Ad Lagendijk, Willem L. Vos, Allard P. Mosk, Univ. Twente (Netherlands) . . . . . [9335-30]

Coffee Break . . . . . Sun 3:00 pm to 3:30 pm

3:30 pm: **Extreme wavefront control for imaging in complex media** *(Invited Paper)*, Antonio M. Caravaca-Aguirre, Donald B. Conkey, Eyal Niv, Jacob D. Dove, Todd W. Murray, Rafael Piestun, Univ. of Colorado at Boulder (USA) . . . . . [9335-31]

4:00 pm: **Wavefront shaping, adaptive optics, and everything in between** *(Invited Paper)*, Ivo M. Vellekoop, Univ. Twente (Netherlands) . . . . . [9335-32]

SESSION 9

LOCATION: ROOM 226 (MEZZANINE) . . . . . SUN 4:30 PM TO 6:30 PM

Wavefront Shaping for Photoacoustic and Acousto-Optical Imaging/TRUE

Session Chair: **Sylvain Gigan,** Institut Langevin (France)

4:30 pm: **Speckle-scale optical focusing in turbid media with photoacoustically guided wavefront shaping (PAWS)** *(Invited Paper)*, Lihong V. Wang, Puxiang Lai, Lidai Wang, Jian Wei Tay, Washington Univ. in St. Louis (USA). . . . . [9335-33]

5:00 pm: **Time-reversed ultrasonically encoded (TRUE) optical focusing in vivo**, Puxiang Lai, Yan Liu, Cheng Ma, Xiao Xu, Washington Univ. in St. Louis (USA); Alexander A. Grabar, Uzhgorod National Univ. (Ukraine); Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9335-34]

5:20 pm: **Time-reversed adapted-perturbation (TRAP) optical focusing inside scattering media**, Cheng Ma, Xiao Xu, Yan Liu, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9335-35]

5:40 pm: **Fast scanning of the time-reversed ultrasonically encoded focus by frequency-chirped wavefront recording**, Yuta Suzuki, Lihong V. Wang, Washington Univ. in St. Louis (USA) . . . . . [9335-36]

6:00 pm: **Noninvasive imaging through scattering media** *(Invited Paper)*, Ori Katz, Institut Langevin (France) and Ecole Supérieure de Physique et de Chimie Industrielles de la Ville de Paris (France) . . . . . [9335-37]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their groundbreaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

MONDAY 9 FEBRUARY

POSTERS-MONDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . MON 5:30 PM TO 7:30 PM

Conference attendees are invited to attend the BiOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Comparison of a novel adaptive lens with deformable mirrors and its application in high-resolution in-vivo OCT imaging, Stefano Bonora, Institute for Photonics and Nanotechnology, CNR (Italy) and Institute of Physics of the ASCR, v.v.i. (Czech Republic); Yifan Jian, Simon Fraser Univ. (Canada); Luca Rizzotto, Institute for Photonics and Nanotechnology, CNR (Italy); Pengfei Zhang, Azhar Zam, Edward N. Pugh Jr., Univ. of California, Davis (USA); F. Mammano, Istituto di Biologia Cellulare e Neurobiologia, CNR (Italy); Robert J. Zawadzki, Univ. of California, Davis (USA); Marinko V. Sarunic, Simon Fraser Univ. (Canada) . . . . . [9335-42]

Focusing on moving target in scattering media, Haojiang Zhou, California Institute of Technology (USA) . . . . . [9335-43]

CONFERENCE 9336
LOCATION: ROOM 123 (EXHIBIT LEVEL)

Saturday–Tuesday 7–10 February 2015 • Proceedings of SPIE Vol. 9336

New

Quantitative Phase Imaging

Conference Chairs: **Gabriel Popescu,** Univ. of Illinois at Urbana-Champaign (USA); **YongKeun Park,** KAIST (Korea, Republic of)

Program Committee: **George Barbastathis,** Massachusetts Institute of Technology (USA); **Audrey K. Ellerbee,** Stanford Univ. (USA); **Pietro Ferraro,** Istituto Nazionale di Ottica (Italy); **Myung K. Kim,** Univ. of South Florida (USA); **Theo Lasser,** Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Jerome Mertz,** Boston Univ. (USA); **Aydogan Ozcan,** Univ. of California, Los Angeles (USA); **Demetri Psaltis,** Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Colin James Richard Sheppard,** Istituto Italiano di Tecnologia (Italy); **Peter T. C. So,** Massachusetts Institute of Technology (USA); **Gert von Bally,** Univ. Münster (Germany); **Laura Waller,** Univ. of California, Berkeley (USA); **Changhuei Yang,** California Institute of Technology (USA)

SATURDAY 7 FEBRUARY

WELCOME REMARKS

LOCATION: ROOM 123 (EXHIBIT LEVEL) . . . . . 8:00 AM TO 8:20 AM

Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA);
YongKeun Park, KAIST (Korea, Republic of)

SESSION 1

LOCATION: ROOM 123 (EXHIBIT LEVEL) . . . . . SAT 8:20 AM TO 12:00 PM

QPI Methodologies I

Session Chairs: **Gabriel Popescu,** Univ. of Illinois at Urbana-Champaign (USA); **Jerome Mertz,** Boston Univ. (USA)

8:20 am: **New developments in oblique-back-illumination microscopy for phase imaging in thick tissue** *(Invited Paper)*, Jerome Mertz, Boston Univ. (USA) . . . . . [9336-1]

8:50 am: **Path-length stabilized low-coherent reflection-type quantitative phase microscope for nanometer-resolution profiling of plasma membrane**, Toyohiko Yamauchi, Hidenao Iwai, Kentaro Goto, Shu Homma, Yutaka Yamashita, Hamamatsu Photonics K.K. (Japan). . . . . [9336-2]

9:10 am: **Spectral modulation interferometry (SMI) for quantitative phase imaging**, Ruibo Shang, Shichao Chen, Yizheng Zhu, Virginia Polytechnic Institute and State Univ. (USA) . . . . . [9336-3]

9:30 am: **Super-resolution interference microscopy for 3D nanometrology**, Pavel S. Ignatyev, Andrey V. Pravdivtsev, Alexander B. Zenzinov, Konstantin V. Indukaev, Pavel A. Osipov, AMPHORA Labs Co., Ltd. (Russian Federation) . . . . . [9336-4]

9:50 am: **Wave fronts vs. phase-imaging interference**, Victor M. Muzafarov, Vladimir A. Andreev, Konstantin V. Indukaev, Pavel A. Osipov, AMPHORA Labs Co., Ltd. (Russian Federation). . . . . [9336-5]

Coffee Break . . . . . .Sat 10:10 am to 10:40 am

10:40 am: **Quantitative phase imaging unit**, KyeoReh Lee, YongKeun Park, KAIST (Korea, Republic of) . . . . . [9336-6]

11:00 am: **Fast quantitative birefringence imaging of biological samples using quadri wave interferometry**, Sherazade Aknoun, Institut Fresnel (France) and Aix-Marseille Univ. (France); Pierre Bon, Institut d'Optique Graduate School (France) and Bordeaux Univ. (France); Julien Savatier, Institut Fresnel (France) and Aix-Marseille Univ. (France); Benoit F. Wattellier, PHASICS S.A. (France); Serge Monneret, Institut Fresnel (France) and Aix-Marseille Univ. (France) . . . . . [9336-7]

11:20 am: **Differential fluorescence holography**, David C. Clark, Myung K. Kim, Univ. of South Florida (USA). . . . . [9336-8]

11:40 am: **Quantitative phase recovery from asymmetric illumination on an LED array microscope**, Lei Tian, Laura Waller, Univ. of California, Berkeley (USA) . . . . . [9336-9]

Lunch Break . . . . . .Sat 12:00 pm to 1:30 pm

SESSION 2

LOCATION: ROOM 123 (EXHIBIT LEVEL) . . . . . SAT 1:30 PM TO 5:30 PM

QPI Methodologies II

Session Chairs: **Aydogan Ozcan,** Univ. of California, Los Angeles (USA); **George Barbastathis,** Massachusetts Institute of Technology (USA)

1:30 pm: **Multiplexed off-axis interferometric phase microscopy for dynamic cell measurements** *(Invited Paper)*, Natan T. Shaked, Pinhas Girshovitz, Irena Frenklach, Tel Aviv Univ. (Israel). . . . . [9336-10]

2:00 pm: **Using electrochemistry - total internal refection imaging ellipsometry to monitor biochemical oxygen demand on the surface tethered polyelectrolyte modified electrode**, Wei Liu, Gang Jin, Institute of Mechanics (China); YanYan Chen, Bei'er Lv, Hongwei Ma, Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Science (China) . . [9336-11]

2:20 pm: **Phase-shifting interference with pumping noise-to-signal**, Victor M. Muzafarov, AMPHORA Labs Co., Ltd. (Russian Federation). . [9336-12]

2:40 pm: **Towards an incoherent off-axis digital holographic microscope**, Zahra Monemhaghdoust, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Frédéric Montfort, Lyncée Tec SA (Switzerland); Philippe Degol, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Yves Emery, Lyncée Tec SA (Switzerland); Christian D. Depeursinge, CDep engineering Sàrl (Switzerland); Christophe Moser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9336-13]

3:00 pm: **Fast control of temporal and spatial coherence properties of microscope illumination using DLP projector**, Jose A. Rodrigo Martin Romo, Tatiana Alieva, Univ. Complutense de Madrid (Spain) . . . . . [9336-14]

Coffee Break . . . . . .Sat 3:20 pm to 3:50 pm

3:50 pm: **Experimental setup combining digital holographic microscopy (DHM) and fluorescence imaging to study gold nanoparticle mediated laser manipulation**, Georgios C. Antonopoulos, Mirko Rakoski, Stefan Kalies, Tammo Ripken, Heiko Meyer, Laser Zentrum Hannover e.V. (Germany) . . . . . [9336-15]

4:10 pm: **Subwavelength light focusing and imaging via wavefront shaping and measurement in complex media**, Jung-Hoon Park, Chunghyun Park, Yong-Hoon Cho, YongKeun Park, KAIST (Korea, Republic of) . . . . . [9336-16]

4:30 pm: **Telecentric digital holography microscopy: perturbation free quantitative phase imaging**, Ana Doblas, Emilio Sánchez-Ortiga, Genaro Saavedra, Manuel Martínez-Corral, Univ. de València (Spain); Jorge Ivan Garcia-Sucerquia, Univ. Nacional de Colombia Sede Medellín (Colombia) . . . . . [9336-17]

4:50 pm: **Quantitative polarization microscopy using interferometric spectral multiplexing**, Chengshuai Li, Yizheng Zhu, Virginia Polytechnic Institute and State Univ. (USA) . . . . . [9336-18]

5:10 pm: **Coherence-controlled holographic microscopy for live-cell quantitative phase imaging**, Tomás Slabý, Brno Univ. of Technology (Czech Republic) and TESCAN, a.s. (Czech Republic); Aneta Krisová, CEITEC Brno Univ. of Technology (Czech Republic) and TESCAN, a.s. (Czech Republic); Martin Lostak, Brno Univ. of Technology (Czech Republic) and TESCAN, a.s. (Czech Republic); Jana Colláková, CEITEC Brno Univ. of Technology (Czech Republic); Veronika Juzová, TESCAN, a.s. (Czech Republic); Pavel Veselý, Radim Chmelík, CEITEC Brno Univ. of Technology (Czech Republic) . . [9336-19]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 3

LOCATION: ROOM 123 (EXHIBIT LEVEL) . . . . . SUN 8:00 AM TO 12:10 PM

QPI Methodologies III

Session Chairs: **Björn Kemper,** Westfälische Wilhelms-Univ. Münster (Germany); **Myung K. Kim,** Univ. of South Florida (USA)

8:00 am: **Super-resolution, complex field imaging microscope via Fourier ptychography**, Xiaoze Ou, California Institute of Technology (USA); Guoan Zheng, Univ. of Connecticut (USA); Changhuei Yang, California Institute of Technology (USA) . . . . . [9336-20]

8:20 am: **Speckle correlation reflection phase microscopy**, Youngwoon Choi, Poorya Hosseini, Massachusetts Institute of Technology (USA); Wonshik Choi, Korea Univ. (Korea, Republic of); Ramachandra R. Dasari, Peter T. C. So, Zahid Yaqoob, Massachusetts Institute of Technology (USA) . . . . . [9336-21]

8:40 am: **Halo-free quantitative phase imaging with partially coherent light**, Tan H. Nguyen, Hassaan Majeed, Christopher A. Edwards, Minh N. Do, Lynford L. Goddard, Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9336-22]

9:00 am: **Partially coherent phase imaging with source shape estimation**, Jingshan Zhong, Nanyang Technological Univ. (Singapore); Lei Tian, Univ. of California, Berkeley (USA); Justin Dauwels, Nanyang Technological Univ. (Singapore); Laura Waller, Univ. of California, Berkeley (USA) . . . . . [9336-23]

9:20 am: **Quantitative phase-shifting DIC using programmable spatial light modulators**, Tan H. Nguyen, Christopher A. Edwards, Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9336-24]

9:40 am: **Confocal based quantitative reflection phase microscopy system development**, Vijay Raj Singh, Singapore-MIT Alliance (Singapore); Peter T. C. So, Massachusetts Institute of Technology (USA) . . . . . [9336-25]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

10:30 am: **Fourier ptychography for multimodal imaging** *(Invited Paper)*, Guoan Zheng, Siyuan Dong, Kaikai Guo, Univ. of Connecticut (USA); Xiaoze Ou, California Institute of Technology (USA) . . . . . [9336-26]

11:00 am: **CINCH (confocal incoherent correlation holography) high spatial resolution super resolution fluorescence microscopy based upon FINCH (Fresnel incoherent correlation holography)** *(Invited Paper)*, Gary Brooker, Nisan Siegel, Johns Hopkins Univ. (USA) . . . . . [9336-27]

11:30 am: **Quantitative phase imaging through scattering media**, Vera Kollárová, Jana Colláková, Zbynek Dostál, CEITEC Brno Univ. of Technology (Czech Republic); Tomas Slab?, Brno Univ. of Technology (Czech Republic); Pavel Vesel?, Radim Chmelík, CEITEC Brno Univ. of Technology (Czech Republic) . . . . . [9336-28]

11:50 am: **Hyperspectral quantitative phase microscopy**, Jae Hwang Jung, KAIST (Korea, Republic of); Jaeduck Jang, Samsung Advanced Institute of Technology (Korea, Republic of); YongKeun Park, KAIST (Korea, Republic of) . . . . . [9336-29]

Lunch Break . . . . . Sun 12:10 pm to 1:40 pm

SESSION 4

LOCATION: ROOM 123 (EXHIBIT LEVEL) . . . . . SUN 1:40 PM TO 4:10 PM

QPI Algorithms and Imaging Processing

Session Chair: **Laura Waller,** Univ. of California, Berkeley (USA)

1:40 pm: **Integral functions of the phase image of biological microobjects: an algorithm and the role in cell morphology and physiology**, Vladimir P. Tychinsky, Tatiana V. Vyshenskaya, Alexander V. Kretushev, Vladislav D. Zverzhkhovskiy, Moscow State Institute of Radiotechnics, Electronics and Automation (Russian Federation); Alexander A. Shtil, N.N. Blokhin Russian Cancer Research Ctr. (Russian Federation) and National Research Nuclear Univ. MEPhI (Russian Federation) . . . . . [9336-31]

2:00 pm: **Fast processing of quantitative phase profiles from off-axis interferograms for real-time applications**, Pinhas Girshovitz, Natan T. Shaked, Tel Aviv Univ. (Israel). . . . . [9336-32]

2:20 pm: **Quantitative phase retrieval using nonlinear propagation**, Jen-Tang Lu, Chien-Hung Lu, Jason W. Fleischer, Princeton Univ. (USA) . . . . . [9336-33]

2:40 pm: **PRoCAST: a quantitative phase imaging tool for prostate cancer recurrence prediction**, Shamira Sridharan, Univ. of Illinois at Urbana-Champaign (USA); Virgilia Macias, Univ. of Illinois at Chicago (USA); Krishnarao V. Tangella, Presence Covenant Medical Ctr. (USA); Andre Kajdacsy-Balla, Univ. of Illinois at Chicago (USA); Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9336-34]

Coffee Break . . . . . Sun 3:00 pm to 3:30 pm

3:30 pm: **C++ software integration for a high-throughput slim platform**, Mikhail E. Kandel, Zelun Luo, Kevin Han, Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA). . . . . [9336-35]

3:50 pm: **Phase correction in low coherence diffraction phase microscopy using the optical transfer function**, Christopher A. Edwards, Gabriel Popescu, Lynford L. Goddard, Univ. of Illinois at Urbana-Champaign (USA). . . . . [9336-36]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their groundbreaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9336
LOCATION: ROOM 123 (EXHIBIT LEVEL)

MONDAY 9 FEBRUARY

SESSION 5
LOCATION: ROOM 123 (EXHIBIT LEVEL) .... MON 8:00 AM TO 12:00 PM

QPI of Cells and Tissues I
Session Chairs: **YongKeun Park,** KAIST (Korea, Republic of); **Gabriel Popescu,** Univ. of Illinois at Urbana-Champaign (USA)

8:00 am: **Incoherent quantitative phase imaging for label-free cytoskeleton single-shot imaging and organelle trafficking**, Pierre Bon, Ctr. National de la Recherche Scientifique (France) and Institut d'Optique Graduate School (France); Sandrine Lécart, Univ. Paris-Sud 11 (France); Emmanuel Fort, Institut Langevin (France); Sandrine Lévêque-Fort, Ctr. National de la Recherche Scientifique (France) and Institut des Sciences Moléculaires d'Orsay (France) . . . . . [9336-37]

8:20 am: **Holographic quantitative imaging of sample hidden by turbid medium or occluding objects**, Lisa Miccio, Vittorio Bianco, Francesco Merola, Istituto Nazionale di Ottica (Italy); Pasquale Memmolo, Istituto Nazionale di Ottica (Italy) and Ctr. for Advanced Biomaterials for Health Care, Istituto Italiano di Tecnologia (Italy); Oriella Gennari, Melania Paturzo, Istituto Nazionale di Ottica (Italy); Paolo A. Netti, Ctr. for Advanced Biomaterials for Health Care, Istituto Italiano di Tecnologia (Italy); Pietro Ferraro, Istituto Nazionale di Ottica (Italy) . . . . . [9336-38]

8:40 am: **Comparative biophysical study of red blood cells from mother and fetal cord blood using diffraction optical micro-tomography**, Hyunjoo Park, KAIST (Korea, Republic of); SungHun Na, Kangwon National Univ. Hospital (Korea, Republic of); YongKeun Park, KAIST (Korea, Republic of) . . . . . [9336-39]

9:00 am: **Differentiating neutrophils using the optical coulter counter**, Ethan F. Schonbrun, Giuseppe Di Caprio, Harvard Univ. (USA) . . . . . [9336-40]

9:20 am: **Quantitative phase imaging with a 3D resolution equivalent to fluorescence: application to label-free biological tissue reconstruction**, Pierre Bon, Institut d'Optique Graduate School (France) and Ctr. National de la Recherche Scientifique (France); Sherazade Aknoun, PHASICS S.A. (France) and Institut Fresnel (France); Serge Monneret, Institut Fresnel (France) and Ctr. National de la Recherche Scientifique (France); Brahim Lounis, Univ. of Bordeaux (France); Benoit F. Wattellier, PHASICS S.A. (France); Laurent Cognet, Institut d'Optique Graduate School (France) and Ctr. National de la Recherche Scientifique (France) and Univ. Bordeaux 1 (France) . . . . . [9336-41]

9:40 am: **Bright-field quantitative phase microscopy (BFQPM) for accurate phase imaging using conventional microscopy hardware**, Micah H. Jenkins, Thomas K. Gaylord, Georgia Institute of Technology (USA) . . . . . [9336-42]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

10:30 am: **Multimodal label-free growth and morphology characterization of different cell types in a single culture with quantitative digital holographic phase microscopy** *(Invited Paper)*, Björn Kemper, Jana Wibbeling, Lena Kastl, Jürgen Schnekenburger, Steffi Ketelhut, Westfälische Wilhelms-Univ. Münster (Germany) . . . . . [9336-43]

11:00 am: **Quantifying the effects of micro-environments on breast cancer cell proliferation using quantitative phase imaging**, Mustafa A. Mir, Univ. of California, Berkeley (USA); Tiina Jokela, Mark A. LaBarge, Lawrence Berkeley National Lab. (USA); Lydia L. Sohn, Univ. of California, Berkeley (USA) [9336-44]

11:20 am: **Prostate cancer diagnosis using quantitative phase imaging and machine learning algorithms**, Tan H. Nguyen, Shamira Sridharan, Univ. of Illinois at Urbana-Champaign (USA); Virgilia Macias, Andre K. Balla, Univ. of Illinois at Chicago (USA); Minh N. Do, Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9336-45]

11:40 am: **Quantitative phase imaging to verify non-proliferation in quiescent and senescent cells**, Basanta Bhaduri, Arindam Chakraborty, Mikhail E. Kandel, Supriya G. Prasanth, Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9336-46]

Lunch Break . . . . . Mon 12:00 pm to 1:30 pm

SESSION 6
LOCATION: ROOM 123 (EXHIBIT LEVEL) ..... MON 1:30 PM TO 3:30 PM

QPI Methodologies IV
Session Chair: **YongKeun Park,** KAIST (Korea, Republic of)

1:30 pm: **Wavelength-scanning phase imaging**, Poorya Hosseini, Yongjin Sung, Youngwoon Choi, Peter T. C. So, Zahid Yaqoob, Massachusetts Institute of Technology (USA) . . . . . [9336-47]

1:50 pm: **Lensless phase contrast microscopy and imaging through a multimode fiber**, Dirk E. Boonzajer Flaes, Daniel W. E. Noom, Elias Labordus, Kjeld S. E. Eikema, Johannes F. de Boer, Stefan M. Witte, Vrije Univ. Amsterdam (Netherlands) . . . . . [9336-48]

2:10 pm: **Simple optical tomography measurements using quantitative phase imaging unit**, Kyoohyun Kim, KyeoReh Lee, KAIST (Korea, Republic of); Zahid Yaqoob, Peter T. C. So, Massachusetts Institute of Technology (USA); YongKeun Park, KAIST (Korea, Republic of). . . . . [9336-49]

2:30 pm: **Thermal nano-imaging using quantitative phase microscopy**, Jaeduck Jang, Soohwan Sul, Taeho Shin, Changhoon Jung, Eui-Seong Moon, Samsung Advanced Institute of Technology (Korea, Republic of) . . . . . [9336-50]

2:50 pm: **Optical diffraction tomography for 3-D tracking of optically trapped colloidal particles**, Kyoohyun Kim, Jonghee Yoon, YongKeun Park, KAIST (Korea, Republic of) . . . . . [9336-133]

3:10 pm: **Quantitative phase imaging with programmable illumination**, Taewoo Kim, Christopher A. Edwards, Lynford L. Goddard, Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9336-51]

Coffee Break . . . . . Mon 3:30 pm to 4:00 pm

SESSION 7
LOCATION: ROOM 123 (EXHIBIT LEVEL) .....MON 4:00 PM TO 5:20 PM

QPI for Industrial Applications
Session Chair: **Pietro Ferraro,** Istituto Nazionale di Ottica (Italy)

4:00 pm: **Temperature microscopy using quantitative phase imaging**, Guillaume Baffou, Julien Savatier, Serge Monneret, Institut Fresnel (France) . . . . . [9336-52]

4:20 pm: **Semiconductor defect metrology using laser based quantitative phase imaging**, Renjie Zhou, Christopher A. Edwards, Gabriel Popescu, Lynford Goddard, Univ. of Illinois at Urbana-Champaign (USA). . . . . [9336-53]

4:40 pm: **Holographic techniques for high pressure studies**, Filippo Saglimbeni, Silvio Bianchi, Univ. degli Studi di Roma La Sapienza (Italy); Richard W. Bowman, Queens' College Cambridge (United Kingdom); Graham M. Gibson, Miles J. Padgett, Univ. of Glasgow (United Kingdom); Roberto Di Leonardo, Univ. degli Studi di Roma La Sapienza (Italy) . . . [9336-54]

5:00 pm: **In-situ measurements of nanoscale phenomena using diffraction phase microscopy**, Christopher A. Edwards, Steven J. McKeown, |SukWon Hwang, Paul Froeter, Xiuling Li, John A. Rogers, Gabriel Popescu, Lynford L. Goddard, Univ. of Illinois at Urbana-Champaign (USA). . . . . [9336-55]

POSTERS-MONDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) ..... MON 5:30 PM TO 7:30 PM

Conference attendees are invited to attend the BiOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Wavevector space calculations in the focal region: optical trapping, lens focusing, and the Gouy phase, Renjie Zhou, Taewoo Kim, Lynford L. Goddard, Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9336-76]

An efficient autofocusing scheme for quantitative phase imaging, Mikhail E. Kandel, Basanta Bhaduri, Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9336-77]

Optimization and automatization of the Fourier filtering for phase quantification in microtomography, Freddy A. Monroy-Ramirez, Univ. Nacional de Colombia Sede Medellín (Colombia); Edgar M. Torres, Univ. Nacional de Colombia Sede Bogotá (Colombia). . . . . [9336-80]

Incoherent common-path diffraction optical tomography (icDOT), KyeoReh Lee, Seungwoo Shin, KAIST (Korea, Republic of); Youngcan Kim, Imperial College London (United Kingdom); Kyoohyun Kim, HyunJoo Park, YongKeun Park, KAIST (Korea, Republic of). . . . . [9336-81]

3D optical study of melittin associated red blood cells using a common-path diffraction optical tomography, YongKeun Park, Joonseok Hur, HyunJoo Park, SangYoon Lee, KAIST (Korea, Republic of) . . . . . [9336-82]

Spectro-angular light scattering of individual microscopic samples, Jae Hwang Jung, YongKeun Park, KAIST (Korea, Republic of) . . . . . [9336-83]

Observation of spectral shift induced by light scattering of individual microscopic objects, Jae Hwang Jung, YongKeun Park, KAIST (Korea, Republic of) . . . . . [9336-84]

Spectroscopic diffraction optical tomography, Jae Hwang Jung, YongKeun Park, KAIST (Korea, Republic of) . . . . . [9336-85]

In vitro study of hydrostatic pressure effects on human erythrocytes, SangYun Lee, Joon Young Koh, Hyunjoo Park, YongKeun Park, KAIST (Korea, Republic of) . . . . . [9336-86]

LCD panel characterization by measuring spatially resolved full jones matrix of individual pixels, Jongchan Park, HyeonSeung Yu, Jung-Hoon Park, YongKeun Park, KAIST (Korea, Republic of). . . . . [9336-87]

Method for observing phase objects without halos and directional shadows, Yoshimasa Suzuki, Kazuo Kajitani, Hisashi Ohde, Olympus Corp. (Japan). . . . . [9336-88]

Common-path diffraction optical tomography revealing 3D structures and dynamics of biological cells, Kyoohyun Kim, KAIST (Korea, Republic of); Youngchan Kim, KAIST (Korea, Republic of) and Imperial College London (United Kingdom); Hyoeun Shim, Univ. of Ulsan (Korea, Republic of) and Seegene Medical Foundation (Korea, Republic of); Hyunjoo Park, Ji Han Heo, Jonghee Yoon, Chulhee Choi, KAIST (Korea, Republic of); Seongsoo Jang, Univ. of Ulsan (Korea, Republic of); YongKeun Park, KAIST (Korea, Republic of) . . . . . [9336-89]

Lipid droplets label-free imaging using optical diffraction tomography, Kyoohyun Kim, SeoEun Lee, KyeoReh Lee, Ji Han Heo, Jonghee Yoon, Mina Kim, Jae Hwang Jung, Hyunjoo Park, Jennifer H. Shin, Chulhee Choi, YongKeun Park, KAIST (Korea, Republic of). . . . . [9336-90]

3D refractive index map of intraerythrocytic parasite-babesia microti invaded RBCs using diffraction phase micro-tomography, Hyunjoo Park, KAIST (Korea, Republic of); Sung-Hee Hong, Sang-Eun Lee, Korea National Institute of Health (Korea, Republic of) and Korea Ctrs. for Disease Control and Prevention (Korea, Republic of); YongKeun Park, KAIST (Korea, Republic of) . . . . . [9336-91]

Quantitative phase imaging of cellular and subcellular structures for non-invasive screening diagnostics of socially significant diseases, Irina Vasilenko, Maimonides State Classical Academy (Russian Federation) and Russian Medical Academy of Postgraduate Education (Russian Federation); Vladislav Metelin, Maimonides State Classical Academy (Russian Federation); Marat Nasyrov, Russian Medical Academy of Postgraduate Education (Russian Federation); Alexander B. Kuznetsov, Evgenii Sukhenko, Pirogov Russian National Research Medical Univ. (Russian Federation); Vladimir Belyakov, Russian Medical Academy of Postgraduate Education (Russian Federation) . . . . . [9336-92]

A new approach for phase image analysis of asymmetrical microobjects, Vladislav D. Zverzhkhovskiy, Tatiana V. Vyshenskaya, Moscow State Institute of Radiotechnics, Electronics and Automation (Russian Federation); Alexander V. Kretushev, Institute of Radio Engineering and Electronics (Russian Federation); Alexander A. Shtil, N.N. Blokhin Russian Cancer Research Ctr. (Russian Federation) and Institute of Radio Engineering and Electronics (Russian Federation) and National Research Nuclear Univ. MEPhI (Russian Federation); Vladimir P. Tychinsky, Anatoly A. Evdokimov, Institute of Radio Engineering and Electronics (Russian Federation). . . . . [9336-93]

Multi-mode microscopy in real-time with LED array illumination, Ziji Liu, Univ. of Electronic Science and Technology of China (China) and Univ. of California, Berkeley (USA); Lei Tian, Laura Waller, Univ. of California, Berkeley (USA) . . . . . [9336-94]

Single-bacterial identification based on holographic machine learning, YoungJu Jo, Jae Hwang Jung, Hyunjoo Park, YongKeun Park, KAIST (Korea, Republic of). . . . . [9336-95]

Combined effect of complex wavefront shaping and optical clearing agent on the suppression of multiple light scattering in optical coherence tomography, HyeonSeung Yu, YoungJu Jo, YongKeun Park, KAIST (Korea, Republic of) . . . . . [9336-97]

White-light interferometric microscopy for 9nm node wafer defect inspection, Renjie Zhou, Christopher A. Edwards, Casey Bryniarski, Marjorie Dallmann, Gabriel Popescu, Lynford L. Goddard, Univ. of Illinois at Urbana-Champaign (USA). . . . . [9336-98]

Optical parameters of living vs. fixed lymphocytes detectable by coherent phase microscopy, Tatiana V. Vyshenskaya, Vladimir P. Tychinsky, Ivan V. Klemyashov, Moscow State Institute of Radiotechnics, Electronics and Automation (Russian Federation); Yurij B. Matveev, Pirogov Russian National Research Medical Univ. (Russian Federation); Vladislav D. Zverzhkhovskiy, Moscow State Institute of Radiotechnics, Electronics and Automation (Russian Federation); Alexander A. Shtil, N.N. Blokhin Russian Cancer Research Ctr. (Russian Federation); Alexander B. Kuznetsov, Pirogov Russian National Research Medical Univ. (Russian Federation). . . . . [9336-99]

Dynamics of neuronal filopodia measured using SLIM, Taewoo Kim, Anika Jain, Rajiv Iyer, Martha U. Gillette, Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA). . . . . [9336-100]

Effect of substrate stiffness on melanoma cell behavior studied by QPI, Shamira Sridharan, Yanfen Li, Mikhail E. Kandel, Kristopher A. Kilian, Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9336-101]

Quantification of glial cell dynamics under vasoactive intestinal peptide treatment, Taewoo Kim, Samuel Irving, Martha U. Gillette, Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9336-102]

Emergent patterns in cellular growth as studied by QPI, Mikhail E. Kandel, Jon Liang, Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9336-103]

TUESDAY 10 FEBRUARY

SESSION 8

LOCATION: ROOM 123 (EXHIBIT LEVEL) . . . . . TUE 8:00 AM TO 12:00 PM

QPI of Cells and Tissues II

Session Chairs: **Demetri Psaltis,** Ecole Polytechnique Fédérale de Lausanne (Switzerland); **YongKeun Park,** KAIST (Korea, Republic of)

8:00 am: **Label-free measurements of membrane tether thickness using optical tweezers combined with SLIM**, Mohammad Sarshar, Winson Wong, Bahman Anvari, Univ. of California, Riverside (USA). . . . . [9336-56]

8:20 am: **Quantitative phase imaging of cell division in ecoli using digital holographic microscopy**, Vimal Prabhu Pandiyan, Hanu Phani Ram G., Renu John, Indian Institute of Technology Hyderabad (India) . . . . . [9336-57]

8:40 am: **Complex refractive index change measurement of photoactive yellow protein (PYP) upon light irradiation using ssFTLS**, KyeoReh Lee, Youngmin Kim, Hyotcherl Ihee, YongKeun Park, KAIST (Korea, Republic of) . . . . . [9336-58]

9:00 am: **Digital holography microscopy as a tool to screen for diabetes**, Ana Doblas, Univ. de València (Spain); Jaime Esteve, Enrique Roche, Univ. Miguel Hernández de Elche (Spain); Francisco Javier Ampudia-Blasco, Genaro Saavedra, Manuel Martínez-Corral, Univ. de València (Spain); Jorge Ivan Garcia-Sucerquia, Univ. Nacional de Colombia Sede Medellín (Colombia) . . . . . [9336-59]

9:20 am: **Nuclear dynamics in metastatic cells studied by quantitative phase imaging**, Silvia P. Ceballos, Univ. of Illinois at Urbana-Champaign (USA) and National Univ. of Colombia (Colombia); Mikhail E. Kandel, Shamira Sridharan, Univ. of Illinois at Urbana-Champaign (USA); Freddy Alberto Monroy-Ramirez, Univ. Nacional de Colombia Sede Medellín (Colombia); Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9336-132]

9:40 am: **Diagnosis of breast cancer biopsies using quantitative phase imaging**, Hassaan Majeed, Mikhail E. Kandel, Kevin Han, Zelun Luo, Univ. of Illinois at Urbana-Champaign (USA); Virgilia Macias, Univ. of Illinois at Chicago (USA); Krishnarao V. Tangella, Christie Clinic (USA) and Univ. of Illinois at Urbana-Champaign (USA); Andre K. Balla, Univ. of Illinois at Chicago (USA); Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9336-61]

10:00 am: **Challenging strategies for adapting coherent imaging and diagnostics to bio-microfluidics** *(Invited Paper)*, Pietro Ferraro, Lisa Miccio, Francesco Merola, Pasquale Memmolo, Istituto Nazionale di Ottica, CNR (Italy) . . . . . [9336-62]

Coffee Break . . . . . Tue 10:30 am to 11:00 am

11:00 am: **The study of fast membrane dynamics in red blood cells**, SangYun Lee, Hyunjoo Park, YongKeun Park, KAIST (Korea, Republic of) . . . . . [9336-63]

11:20 am: **QPI for prostate cancer diagnosis: quantitative separation of Gleason grades 3 and 4**, Shamira Sridharan, Univ. of Illinois at Urbana-Champaign (USA); Virgilia Macias, Univ. of Illinois at Chicago (USA); Krishnarao V. Tangella, Presence Covenant Medical Ctr. (USA); Andre Kajdacsy-Balla, Univ. of Illinois at Chicago (USA); Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9336-64]

11:40 am: **3D quantitative phase imaging of neural networks using WDT**, Taewoo Kim, S. Chris Liu, Martha U. Gillette, Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA). . . . . [9336-65]

Lunch Break . . . . . Tue 12:00 pm to 1:30 pm

SESSION 9

LOCATION: ROOM 123 (EXHIBIT LEVEL) . . . . . TUE 1:30 PM TO 5:40 PM

QPI of Cells and Tissues III

Session Chairs: **Audrey K. Ellerbee,** Stanford Univ. (USA); **Peter T. C. So,** Massachusetts Institute of Technology (USA)

1:30 pm: **Profiling individual human red blood cells using holographic optical micro-tomography** *(Invited Paper)*, YongKeun Park, Youngchan Kim, KAIST (Korea, Republic of); Hyoeun Shim, Seongsoo Jang, College of Medicine and Asan Medical Ctr. (Korea, Republic of) . . . . . [9336-66]

2:00 pm: **Using digital inline holographic microscopy and quantitative phase contrast imaging to assess viability of cultured mammalian cells**, Sergey Missan, 4Deep Inwater Imaging (Canada); Olga Hrytsenko, Dept. of Biology, Dalhousie Univ. (Canada) . . . . . [9336-67]

2:20 pm: **High throughput analysis of blood smears using diffraction phase microscopy**, Hassaan Majeed, Mikhail E. Kandel, Basanta Bhaduri, Univ. of Illinois at Urbana-Champaign (USA); Krishnarao V. Tangella, Christie Clinic (USA); Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA). . [9336-68]

2:40 pm: **Diagnosis of colorectal cancer using quantitative phase imaging**, Shamira Sridharan, Jon Liang, Univ. of Illinois at Urbana-Champaign (USA); Virgilia Macias, Anish Shah, Roshan Patel, Univ. of Illinois at Chicago (USA); Krishnarao V. Tangella, Presence Covenant Medical Ctr. (USA); Grace Guzman, Andre Kajdacsy-Balla, Univ. of Illinois at Chicago (USA); Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9336-69]

3:00 pm: **Label-free quantitative analysis of phagocytosis using quantitative phase imaging techniques**, Jonghee Yoon, Kyoohyun Kim, Jae Hwang Jung, YongKeun Park, KAIST (Korea, Republic of). . . . . [9336-70]

Coffee Break . . . . . Tue 3:20 pm to 3:50 pm

3:50 pm: **Digital holographic microscopy applied to cell biology** *(Invited Paper)*, Christian D. Depeursinge, Ecole Polytechnique Fédérale de Lausanne (Switzerland) and King Abdullah Univ. of Science and Technology (Saudi Arabia); Pierre P. Marquet, Kaspar Rothenfusser, Benjamin Rappaz, Pascal Jourdain, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Pierre J. Magistretti, Ecole Polytechnique Fédérale de Lausanne (Switzerland) and King Abdullah Univ. of Science and Technology (Saudi Arabia) . . . [9336-71]

4:20 pm: **Noninvasive characterization and comparison of yeasts populations by dry mass and morphological parameters measurements with quadri wave lateral shearing interferometry**, Sherazade Aknoun, Institut Fresnel (France) and Aix-Marseille Univ. (France); Pierre Bon, Institut d'Optique Graduate School (France) and Bordeaux Univ. (France); Julien Savatier, Institut Fresnel (France) and Aix-Marseille Univ. (France); Benoit F. Wattellier, PHASICS S.A. (France); Serge Monneret, Institut Fresnel (France) and Aix-Marseille Univ. (France) . . . . . [9336-72]

4:40 pm: **Label-free quantification of emergent behaviors in human neuron network**, Taewoo Kim, Mustafa A. Mir, Univ. of Illinois at Urbana-Champaign (USA); Anirban Majumder, Steven Stice, The Univ. of Georgia (USA); Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9336-73]

5:00 pm: **Multiparametric characterization of red blood cells using quantitative phase spectroscopy and microfluidic devices**, Han Sang Park, Matthew T. Rinehart, Adam Wax, Duke Univ. (USA). . . . . [9336-74]

5:20 pm: **Lab on chip optical imaging of biological sample by quantitative phase microscopy**, Lisa Miccio, Istituto Nazionale di Ottica (Italy); Pasquale Memmolo, Istituto Nazionale di Ottica (Italy) and Ctr. for Advanced Biomaterials for Health Care, Istituto Italiano di Tecnologia (Italy); Francesco Merola, Istituto Nazionale di Ottica (Italy); Paolo A. Netti, Ctr. for Advanced Biomaterials for Health Care, Istituto Italiano di Tecnologia (Italy); Pietro Ferraro, Istituto Nazionale di Ottica (Italy). . . . . [9336-75]

CONFERENCE 9337
LOCATION: ROOM 270 (MEZZANINE)

Monday and Thursday 9 and 12 February 2015 • Proceedings of SPIE Vol. 9337

Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications XII

Conference Chairs: **Alexander N. Cartwright,** Univ. at Buffalo (USA); **Dan V. Nicolau,** McGill Univ. (Canada)

Program Committee: **Vamsy P. Chodavarapu,** McGill Univ. (Canada); **Piotr A. Grodzinski,** National Cancer Institute (USA); **Sung Jin Kim,** Univ. of Miami (USA); **Brian D. MacCraith,** Dublin City Univ. (Ireland); **Paulo C. Morais,** Univ. de Brasília (Brazil); **Paras N. Prasad,** Univ. at Buffalo (USA); **Sharon M. Weiss,** Vanderbilt Univ. (USA)

MONDAY 9 FEBRUARY

POSTERS-MONDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . MON 5:30 PM TO 7:30 PM

Conference attendees are invited to attend the BiOS poster session on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Persistent luminescence in nanophosphors for long term in-vivo bio-imaging *(Invited Paper)*, Bruno Viana, Ecole Nationale Supérieure de Chimie de Paris (France); Aurelie Bessiere, Sunchinder Sharma, Didier Gourier, Laurent Binet, IRCP Chimie Paris (France); N. Basavaraju, K. R. Priolkar, Goa Univ. (India); Thomas Maldiney, Elliot Teston, Cyrille Richard, Univ. Paris Descartes (France); Daniel Scherman, Univ. Paris Descartes (France) and Chimie-ParisTech (France). . . . . [9337-15]

Performance evaluation for different sensing surface of BICELLs bio-transducers for dry eye biomarkers, María-Fe Laguna, Miguel Holgado Bolaños, Univ. Politécnica de Madrid (Spain); Beatriz Santamaría, Univ Politecnica de Madrid (Spain); Ana L. Hernández, Univ. Politécnica de Madrid (Spain); María Victoria Maigler, Univ. Politécnica de Madrid (Spain) and Bio Optical Detection S.L. (Spain); Álvaro Lavín, Jesús de Vicente, Univ. Politécnica de Madrid (Spain); Javier Soria, Tatiana Suarez, Bioftalmik S.L. (Spain); Carlota Barcina, Mónica Jara, Antibody Bcn (Spain); Francisco J. Sanza, Univ. Politécnica de Madrid (Spain) and Bio Optical Detection S.L. (Spain); Rafael Casquel del Campo, Univ. Politécnica de Madrid (Spain); Álvaro Otón, Univ. Politécnica de Madrid (Spain) and Bio Optical Detection S.L. (Spain); Teresa Riesgo, Univ. Politécnica de Madrid (Spain) . . . . . [9337-19]

Characterisation of orientation distribution of gold nanorods using high-order image correlation spectroscopy, Timothy T. Y. Chow, James W. M. Chon, Swinburne Univ. of Technology (Australia). . . . . [9337-20]

Super-resolution fluorescence imaging of C2C12 cell differentiation, Jing Qi, Xiao Peng, Junle Qu, Shenzhen Univ. (China) . . . . . [9337-21]

Plasmon based super-resolution microscopy: break the diffraction limits, HeeSang Ahn, SeonHee Hwang, Tae Lim Yoon, Sang Mok Kim, Kyujung Kim, Pusan National Univ. (Korea, Republic of) . . . . . [9337-22]

Imaging highly-absorbing nanoparticles using photothermal microscopy, Simon-Alexandre Lussier, Hamid Moradi, Alain Price, Maxime Daneau, Sangeeta Murugkar, Carleton Univ. (Canada). . . . . [9337-23]

Systematic study and quantification of optical forces on porous silicon nanoparticles, Fook-Chiong Cheong, Thorlabs, Inc. (USA); Jeremy W. Mares, Vanderbilt Univ. (USA); Tobias Paprotta, Jens Schumacher, Thorlabs, Inc. (USA); Sharon M. Weiss, Vanderbilt Univ. (USA); Alex E. Cable, Thorlabs, Inc. (USA) . . . . . [9337-24]

THURSDAY 12 FEBRUARY

SESSION 1

LOCATION: ROOM 270 (MEZZANINE) . . . . . THU 8:00 AM TO 12:00 PM

Nanoscale Imaging and Nanospectroscopy

Session Chair: **Alexander N. Cartwright,** Univ. at Buffalo (USA)

8:00 am: **Confocal Raman microscopy and hyperspectral dark field microscopy imaging of chemical and biological systems** *(Invited Paper)*, Henrique E. Toma, Univ. de São Paulo (Brazil); Jorge da Silva Shinohara, Daniel Grasseschi, Univ. de Sao Paulo (Brazil) . . . . . [9337-1]

8:30 am: **Scanning localized magnetic fields in microfluidic system using single nitrogen vacancy center**, Kangmook Lim, Univ. of Maryland, College Park (USA) . . . . . [9337-2]

8:50 am: **Atomic force microscopy (AFM), Raman microspectroscopy (RM) and gene chip monitoring of porcine trophoblast derived cells differentiation**, Qifei Li, Sierra Heywood, Lifu Xiao, Mingjie Tang, Anhong Zhou, S. Clay Isom, Utah State Univ. (USA) . . . . . [9337-3]

9:10 am: **Super-resolution optical microscopy using solid-immersion of high-index microspheres**, Arash Darafsheh, Consuelo Guardiola Salmeron, Averie Palovcak, Jarod C. Finlay, Alejandro Carabe-Fernandez, The Univ. of Pennsylvania Health System (USA). . . . . [9337-4]

9:30 am: **Single and multiprobe apertureless nanothermal imaging of electromagnetic excitation over a wide range of wavelengths from the near to mid-infrared** *(Invited Paper)*, Aaron Lewis, The Hebrew Univ. of Jerusalem (Israel); Rimma Dekhter, Sophia Kokotov, Patricia Hamra, Boaz Fleischman, Hesham Taha, Nanonics Imaging Ltd. (Israel). . . . . [9337-5]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

10:30 am: **Hyperlens arrays for subwavelength imaging and microscopy** *(Invited Paper)*, Alexander N. Cartwright, Tania Moein, Jingbo Sun, Univ. at Buffalo (USA); Xiaoming Liu, Ji Zhou, Tsinghua Univ. (China); Natalia M. Litchinitser, Univ. at Buffalo (USA) . . . . . [9337-6]

11:00 am: **Quantitative analysis of confocal images to characterize structural disorder in biological cells: a novel method to analyze cancerous and noncancerous cells**, Peeyush Sahay, Hemendra M. Ghimire, Huda Almabadi, Vibha Tripathi, Jahangir Alam, Lauren Thompson, Omar Skalli, Prabhakar Pradhan, The Univ. of Memphis (USA) . . . . . [9337-7]

11:20 am: **Nano-imaging collagen by atomic force, near-field microscope and nonlinear microscope**, Ken Choong Lim, Nanyang Technological Univ. (Singapore); Jin Kai Tang, Singapore institute of Manufacturing Technology (Singapore) and Nanyang Technological University (Singapore); Hao Li, Boon Ping Ng, Shaw Wei Kok, Singapore Institute of Manufacturing Technology (Singapore); Qi Jie Wang, Nanyang Technological Univ. (Singapore); Ying Zhang, Singapore Institute of Manufacturing Technology (Singapore) . . . . . [9337-8]

11:40 am: **Extraordinary transmission-based super-resolved axial imaging using subwavelength metallic nanoaperture arrays**, Wonju Lee, Youngjin Oh, Yonsei Univ. (Korea, Republic of); Jong-Ryul Choi, Daegu-Gyeongbuk Medical Innovation Foundation (Korea, Republic of); Kyujung Kim, Pusan National Univ. (Korea, Republic of); Donghyun Kim, Yonsei Univ. (Korea, Republic of) . [9337-9]

Lunch Break . . . . . Thu 12:00 pm to 1:20 pm

CONFERENCE 9337
LOCATION: ROOM 270 (MEZZANINE)

SESSION 2
LOCATION: ROOM 270 (MEZZANINE) . . . . . .THU 1:20 PM TO 4:40 PM

Biosensing with Nanostructures and Nanoparticles

Session Chair: **Dan V. Nicolau,** McGill Univ. (Canada)

1:20 pm: **Nanoscale dynamics in live cells studied by quantitative phase imaging (QPI)** *(Keynote Presentation)*, Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9337-10]

1:50 pm: **Portable plasmonic interferometer sensor for rapid and label-free diagnosis of cancer markers** *(Invited Paper)*, Qiaoqiang Gan, Univ. at Buffalo (USA); Yun Wu, Univ. of Buffalo (USA); Xie Zeng, Univ. at Buffalo (USA) . . . . . [9337-11]

2:20 pm: **Label-free, in situ monitoring of single DNA hybridization using SERS on disk-shaped nanoporous gold nanoparticles**, Ji Qi, Jianbo Zeng, Fusheng Zhao, Wei-Chuan Shih, Univ. of Houston (USA) . . . . . [9337-12]

2:40 pm: **Determination of thickness and density of a wet multilayer polymer system with sub-nanometer resolution by means of a dual polarization silicon-on-insulator microring**, Jan-Willem Hoste, Univ. Gent (Belgium) and IMEC (Belgium); Bruno G. De Geest, Univ. Gent (Belgium); Peter Bienstman, Univ. Gent (Belgium) and IMEC (Belgium) . . . . . [9337-13]

Coffee Break . . . . . Thu 3:00 pm to 3:30 pm

3:30 pm: **Tunable vapor-condensed nanolenses for label-free nanoscale imaging and sensing** *(Invited Paper)*, Euan McLeod, Chau Nguyen, Patrick Huang, Wei Luo, Muhammed Veli, Aydogan Ozcan, Univ. of California, Los Angeles (USA). . . . . [9337-16]

4:00 pm: **Persistence length of actin filaments on surfaces patterned with various concentrations of myosin**, Dan V. Nicolau, McGill Univ. (Canada) . . . . . [9337-17]

4:20 pm: **Super absorbing mid-IR metasuface for surface enhanced infrared absorption spectroscopy**, Borui Chen, Dengxin Ji, Qiaoqiang Gan, Alexander N. Cartwright, Univ. at Buffalo (USA) . . . . . [9337-18]

CONFERENCE 9338
LOCATION: ROOM 232 (MEZZANINE)

Saturday–Monday 7–9 February 2015 • Proceedings of SPIE Vol. 9338

COSPONSOR: Ocean Optics

BIOS

Colloidal Nanoparticles for Biomedical Applications X

Conference Chairs: **Wolfgang J. Parak,** Philipps-Univ. Marburg (Germany); **Marek Osiński,** The Univ. of New Mexico (USA); **Xing-Jie Liang,** National Center for Nanoscience and Technology, China (China)

Program Committee: **Antigoni Alexandrou,** Ecole Polytechnique (France); **Ramon Alvares-Puebla,** Catalan Center for Chemical Technology (Spain); **Jesus M. de la Fuente,** Univ. de Zaragoza (Spain); **James B. Delehanty III,** U.S. Naval Research Lab. (USA); **Niko Hildebrandt,** Institut d'Électronique Fondamentale (France); **Jennifer A. Hollingsworth,** Los Alamos National Lab. (USA); **Thomas M. Jovin M.D.,** Max-Planck-Institut für Biophysikalische Chemie (Germany); **Antonios G. Kanaras,** Univ. of Southampton (United Kingdom); **Hedi Mattoussi,** The Florida State Univ. (USA); **Igor Medintz,** U.S. Naval Research Lab. (USA); **Paul Mulvaney,** The Univ. of Melbourne (Australia); **Jay L. Nadeau,** McGill Univ. (Canada); **Subramanian Tamil Selvan,** A*STAR Institute of Materials Research and Engineering (Singapore); **Konstantin V. Sokolov,** The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); **Claudia Tortiglione,** Istituto di Cibernetica Eduardo Caianiello (Italy); **Tania Q. Vu,** Oregon Health & Science Univ. (USA); **Horst Weller,** Univ. Hamburg (Germany); **Kenji I. Yamamoto,** National Ctr. for Global Health and Medicine (Japan)

SATURDAY 7 FEBRUARY

WELCOME

LOCATION: ROOM 232 (MEZZANINE) . . . . . 8:00 AM TO 8:05 AM

Wolfgang J. Parak, Philipps-Univ. Marburg (Germany)

SESSION 1

LOCATION: ROOM 232 (MEZZANINE) . . . . . SAT 8:05 AM TO 10:10 AM

Medical Applications of Nanoparticles I

Session Chair: **Marek Osiński,** The Univ. of New Mexico (USA)

8:05 am: **Design and optimization of polymer nanoshuttles for nanomedicine** *(Invited Paper)*, Daniela Guarnieri, Enza Torino, Raffaele Vecchione, Istituto Italiano di Tecnologia (Italy); Paolo A. Netti, Univ. degli Studi di Napoli Federico II (Italy) . . . . . [9338-1]

8:35 am: **Multifunctional metal rattle-type nanocarriers for MRI-guided photothermal cancer therapy**, Yuran Huang, National Ctr. for Nanoscience and Technology of China (China) . . . . . [9338-2]

8:50 am: **Stem cell/nanoparticle hybrids for targeted cancer therapy** *(Invited Paper)*, Jacob M. Berlin, Karen S. Aboody, Rachael Mooney, City of Hope Beckman Research Institute (USA) . . . . . [9338-3]

9:20 am: **Gold based hybrid nanosystems as potential agents for diagnostic and therapy**, Frederic Lerouge, Ecole Normale Supérieure de Lyon (France) and Univ. Claude Bernard Lyon 1 (France); Julien R. G. Navarro, Ecole Normale Supérieure de Lyon (France) and Ecole Normale Supérieure de Cachan (France); Guillaume Micouin, Ecole Normale Supérieure de Lyon (France); Patrice L. Baldeck, Ecole Normale Supérieure de Lyon (France) and Univ. Joseph Fourier (France); Chantal Andrau, Cryille Monnereau, Ecole Normale Supérieure de Lyon (France); Stéphane Parola, Ecole Normale Supérieure de Lyon (France) and Univ. Claude Bernard Lyon 1 (France); Arnaud Favier, Marie Thérèse Charreyre, Ecole Normale Supérieure de Lyon (France). . . . . [9338-4]

9:40 am: **Nanoarchitectured electrochemical biosensors for sensitive and selective detection of leukemia cells and cell-associated biomarkers** *(Invited Paper)*, Junjie Zhu, Nanjing Univ. (China) . . . . . [9338-5]

Coffee Break . . . . . Sat 10:10 am to 10:40 am

SESSION 2

LOCATION: ROOM 232 (MEZZANINE) . . . . . SAT 10:40 AM TO 12:20 PM

Plasmonic Nanoparticles I

Session Chair: **Jorge Perez-Juste,** Univ. de Vigo (Spain)

10:40 am: **Detection and in vivo imaging of quorum-sensing pyocyanin in bacterial biofilms by SERS**, Gustavo Bodelon, Vanesa Lopez, Veronica Montes, Sergio Rodal-Cedeira, Celina Costas, Isabel Pastoriza-Santos, Jorge Perez-Juste, Univ. de Vigo (Spain); Luis M. Liz-Marzan, Univ. de Vigo (Spain) and CIC biomaGUNE (Spain) . . . . . [9338-6]

11:00 am: **Au@pNIPAM nanoparticles as surface-enhanced resonance Raman spectroscopy (SERRS) tags for cell immunophenotyping** *(Invited Paper)*, Gustavo Bodelón, Veronica Montes, Cristina Fernandez-Lopez, Celina Costas, Univ. de Vigo (Spain); Luis M. Liz-Marzán, Univ. de Vigo (Spain) and CIC biomaGUNE (Spain); Isabel Pastoriza-Santos, Jorge Pérez-Juste, Univ. de Vigo (Spain) . . . . . [9338-7]

11:30 am: **Label-free detection of the interaction between the quorum sensing receptor LasR and its acyl-homoserine-lactone ligand by surface-enhanced Raman scattering spectroscopy**, Celina Costas, Vanesa Lopez, Gustavo Bodelón, Isabel Pastoriza-Santos, Jorge Perez-Juste, Univ. de Vigo (Spain); Luis M. Liz-Marzán, Univ. de Vigo (Spain) and CIC biomaGUNE (Spain) and IKERBASQUE. Basque Foundation for Science (Spain) . . . . . [9338-8]

11:50 am: **The limits of field enhancement in nanoplasmonic optical sensing** *(Invited Paper)*, Francisco Javier García de Abajo, ICFO - Institut de Ciències Fotòniques (Spain). . . . . [9338-9]

Lunch Break . . . . . Sat 12:20 pm to 1:20 pm

SESSION 3

LOCATION: ROOM 232 (MEZZANINE) . . . . . SAT 1:20 PM TO 3:10 PM

Novel Syntheses of Nanoparticles I

Session Chair: **Stefan Wuttke,** Ludwig-Maximilians-Univ. München (Germany)

1:20 pm: **Bio-functional silicon quantum dots prepared by one step green strategy for in vivo applications** *(Invited Paper)*, Romuald Intartaglia, Istituto Italiano di Tecnologia (Italy) . . . . . [9338-10]

1:50 pm: **Laser synthesis and characterization of bioconjugated hydroxyapatite nanocrystals for biomedical applications**, Marina Rodio, Alberto Diaspro, Romuald Intartaglia, Istituto Italiano di Tecnologia (Italy) . . . . . [9338-11]

2:05 pm: **Programming nanoparticle assembly**, Amelie Heuer-Jungemann, Antonios G. Kanaras, Univ. of Southampton (United Kingdom) . . . . . [9338-12]

2:25 pm: **Core-shell AgSiO2-protoporphyrin IX nanoparticle: effect of the Ag core on reactive oxygen species generation**, Marjorie Lismont, Carlos Pàez-Martinez, Dreesen Laurent, Univ. de Liège (Belgium) . . . . . [9338-13]

2:40 pm: **Engineering the streptavidins for nanoparticles assembly** *(Invited Paper)*, Cheng-An J. Lin, Wei-Ling Hung, Ting-En Lin, Hsin-An Chen, Walter H. Chang, Chung Yuan Christian Univ. (Taiwan) . . . . . [9338-14]

Coffee Break . . . . . Sat 3:10 pm to 3:40 pm

CONFERENCE 9338
LOCATION: ROOM 232 (MEZZANINE)

SESSION 4
LOCATION: ROOM 232 (MEZZANINE) . . . . . SAT 3:40 PM TO 6:10 PM

Fluorescent Nanoparticles I

Session Chair: **Oliver T. Bruns,**
Massachusetts Institute of Technology (USA)

3:40 pm: **Nanoparticle-assisted stimulated-emission-depletion nanoscopy (NP-STED)** *(Invited Paper)*, Emiliano Cortes, Stefan A. Maier, Imperial College London (United Kingdom) . . . . . [9338-15]

4:10 pm: **Evidence of energy transfer in nanoparticle-porphyrins conjugates for radiation therapy enhancement** *(Invited Paper)*, Konstantin Kudinov, The Univ. of Southern California (USA); Daniel Cooper, Pooja Pyagi, McGill Univ. (Canada); Dhrittiman Bhattacharyya, Colin Hill, Jonathan K. Ha, Stephen E. Bradforth, The Univ. of Southern California (USA); Jay L. Nadeau, McGill Univ. (Canada) . . . . . [9338-16]

4:40 pm: **Bifunctional luminescent magnetic nanowires for intracellular rheology studies** *(Invited Paper)*, Gaelle Charron, Jean-François Berret, Univ. Paris 7-Denis Diderot (France) . . . . . [9338-17]

5:10 pm: **Influence of surface chemistry on the colloidal properties and photoluminescence of upconversion nanoparticles and measurement of absolute quantum yields** *(Invited Paper)*, Ute Resch-Genger, Bundesanstalt für Materialforschung und -prüfung (Germany) . . . . . [9338-18]

5:40 pm: **Doped semiconductor nanocrystals** *(Invited Paper)*, Andreas Riedinger, David J. Norris, Maximilian Fischer, ETH Zürich (Switzerland) . . . . . [9338-19]

BIOS HOT TOPICS
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 5
LOCATION: ROOM 232 (MEZZANINE) . . . . . SUN 8:00 AM TO 10:35 AM

Interaction of Nanoparticles with Cells I

Session Chair: **Alfredo Ambrosone,**
Istituto di Cibernetica Eduardo Caianiello (Italy)

8:00 am: **Mechanisms of cell penetration and cytotoxicity of ultrasmall Au nanoparticles conjugated to doxorubicin and/or targeting peptides** *(Invited Paper)*, Jay L. Nadeau, Xuan Zhang, McGill Univ. (Canada) . . . [9338-20]

8:30 am: **Fluorescent nanoparticle interactions with biological systems: what have we learned so far?** *(Invited Paper)*, Shang Li, Gerd Ulrich Nienhaus, Karlsruher Institut für Technologie (Germany) . . . . . [9338-21]

9:00 am: **Understanding the redox coupling between quantum dots and the neurotransmitter dopamine in hybrid self-assemblies**, Xin Ji, Florida State Univ. (USA); Nikolay S. Makarov, Los Alamos National Lab. (USA); Wentao Wang, Goutam Palui, Florida State Univ. (USA); Istvan Robel, Los Alamos National Lab. (USA); Hedi Mattoussi, Florida State Univ. (USA) . . . . . [9338-22]

9:20 am: **Polyelectrolyte multilayer microcapsules as smart carriers for controlled drug delivery** *(Invited Paper)*, Alfredo Ambrosone, Istituto di Cibernetica Eduardo Caianiello (Italy); Susana Carregal-Romero, Philipps-Univ. Marburg (Germany); Valentina Marchesano, Daniela Intartaglia, Istituto di Cibernetica Eduardo Caianiello (Italy); Wolfgang J. Parak, Philipps-Univ. Marburg (Germany); Claudia Tortiglione, Istituto di Cibernetica Eduardo Caianiello (Italy) . . . . . [9338-23]

9:50 am: **Antibacterial activities of CdO-ZnO nanocomposite synthesized by microwave-assisted method**, Sivasubramanian Dhanuskodi, Bharathidasan Univ. (India) . . . . . [9338-24]

10:05 am: **Nanoparticles for cell imaging and activations** *(Invited Paper)*, Jinwoo Cheon, Yonsei Univ. (Korea, Republic of). . . . . [9338-25]

Coffee Break . . . . . Sun 10:35 am to 11:00 am

SESSION 6
LOCATION: ROOM 232 (MEZZANINE) . . . . . SUN 11:00 AM TO 12:30 PM

Novel Syntheses of Nanoparticles II

Session Chair: **Jay L. Nadeau,** McGill Univ. (Canada)

11:00 am: **Multifunctional perfluorocarbon nanoemulsions for cancer therapy and imaging**, Donald A. Fernandes, Ryerson Univ. (Canada); Dennis D. Fernandes, Univ. of Toronto Mississauga (Canada); Yan J. Wang, Ryerson Univ. (Canada); Yuchong C. Li, Claudiu C. Gradinaru, Univ. of Toronto Mississauga (Canada); Derick Rousseau, Michael C. Kolios, Ryerson Univ. (Canada) . . . . . [9338-26]

11:15 am: **Shape responses of ultrathin hydrogel microcapsules** *(Invited Paper)*, Eugenia Kharlampieva, The Univ. of Alabama at Birmingham (USA) . . . . . [9338-27]

11:45 am: **Binding of cationic porphyrins to zeolite nanoparticles**, Anna G. Gyulkhandanyan, Institute of Biochemistry (Armenia); Robert K. Ghazaryan, Yerevan State Medical Univ. (Armenia); Anna Zakoyan, Hakob O. Sargsyan, Aram G. Gyulkhandanyan, Institute of Biochemistry (Armenia); Marina H. Paronyan, Science and Production Ctr. "Armbiotechnology" (Armenia); Grigor V. Gyulkhandanyan, Institute of Biochemistry (Armenia) . . . . . [9338-28]

12:00 pm: **Biomimetic silica nanospheres: a versatile nanotool for protein immobilization** *(Invited Paper)*, Erienne Jackson, Mariana Ferrari, Univ. ORT Uruguay (Uruguay); Maria Valeria Grazú Bonavía, Univ. de Zaragoza (Spain); Jesus Martinez de la Fuente, Spanish Research Council (Spain); Lorena Betancor, Univ. ORT Uruguay (Uruguay) . . . . . [9338-29]

Lunch Break . . . . . Sun 12:30 pm to 1:40 pm

SESSION 7
LOCATION: ROOM 232 (MEZZANINE) . . . . . SUN 1:40 PM TO 3:00 PM

Medical Applications of Nanoparticles II

Session Chair: **Jacob M. Berlin,**
City of Hope Beckman Research Institute (USA)

1:40 pm: **Disease specific protein corona** *(Invited Paper)*, Morteza Mahmoudi, Masoud Rahman, Tehran Univ. of Medical Sciences (Iran, Islamic Republic of) . . . . . [9338-30]

2:10 pm: **Dendronized iron oxide colloids for imaging the sentinel node** *(Invited Paper)*, Geneviève Pourroy, Julien C. Jouhannaud, Antonio Garofalo, Delphine Felder-Flesch, Univ. de Strasbourg (France) . . . . . [9338-32]

2:40 pm: **Efficient delivery of quantum dots in live cells by gold nanoparticle mediated photoporation**, Ranhua Xiong, Freya Joris, Ine De Cock, Jo Demeester, Stefaan C. De Smedt, Andre G. Skirtach, Kevin Braeckmans, Univ. Gent (Belgium) . . . . . [9338-79]

Coffee Break . . . . . Sun 3:00 pm to 3:30 pm

SESSION 8
LOCATION: ROOM 232 (MEZZANINE) . . . . . SUN 3:30 PM TO 6:15 PM

Fluorescent Nanoparticles II

Session Chair: **Kevin Braeckmans,** Univ. Gent (Belgium)

3:30 pm: **Metal doping in NIR fluorescent gold nanoclusters and their biological applications** *(Invited Paper)*, Eunkeu Oh, Lauren D. Field, James B. Delehanty III, Ramasis Goswami, Alan L. Huston, Igor L. Medintz, U.S. Naval Research Lab. (USA) . . . . . [9338-34]

4:00 pm: **Short-wavelength infrared (SWIR) quantum dots for high speed imaging of physiology in freely moving mice**, Oliver T. Bruns, Thomas S. Bischof, Daniel K. Harris, Yanxiang Shi, Massachusetts Institute of Technology (USA); Lars Riedemann, Thomas Reiberger, Massachusetts General Hospital (USA); Klavs F. Jensen, Massachusetts Institute of Technology (USA); Rakesh K. Jain, Massachusetts General Hospital (USA); Moungi G. Bawendi, Massachusetts Institute of Technology (USA) . . . . . [9338-78]

4:15 pm: **Brightness-equalized quantum dots** *(Invited Paper)*, Andrew M. Smith, Sung Jun Lim, Univ. of Illinois at Urbana-Champaign (USA). . . . [9338-36]

4:45 pm: **Understanding the protein-nanoparticles interactions using spectroscopy** *(Invited Paper)*, Amitava Patra, Indian Association for the Cultivation of Science (India). . . . . [9338-37]

5:15 pm: **Three dimensional time-gated tracking of non-blinking quantum dots in live cells** *(Invited Paper)*, James H. Werner, Matt DeVore, Aaron M. Keller, Dominik Stich, Jennifer A. Hollingsworth, Mary E. Phipps, Los Alamos National Lab. (USA); Bridget S. Wilson, Diane S. Lidke, The Univ. of New Mexico (USA); Michael H. Stewart, U.S. Naval Research Lab. (USA); Yagnaseni Ghosh, Los Alamos National Lab. (USA) . . . . . [9338-38]

5:45 pm: **Quantum dot-photosentizer hybrids for use in two-photon excitation photodynamic therapy** *(Invited Paper)*, C. Fowley, A. P. McHale, B. McCaughan, Univ. of Ulster (Ireland); N. Nomikou, Univ. College London (United Kingdom); John F. Callan, Univ. of Ulster (Ireland) . . . . . [9338-39]

POSTERS-SUNDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Single nanoparticle Raman spectroscopy and nanoparticle surface analysis using waveguides, Bernardo Cordovez, Robert Hart, Christopher Earhart, Brian DiPaolo, Abbey Weith, Ian Adam, Optofluidics (USA) . . . . . [9338-77]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their ground-breaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

MONDAY 9 FEBRUARY

SESSION 9

LOCATION: ROOM 232 (MEZZANINE) . . . . . MON 8:00 AM TO 10:30 AM

Novel Syntheses of Nanoparticles III

Session Chair: **Ute Resch-Genger,** Bundesanstalt für Materialforschung und -prüfung (Germany)

8:00 am: **Size dependence of gold nanorod stability: the need for customized surface chemistry**, Elliott SoRelle, Stanford Univ. School of Medicine (USA); Orly Liba, Zeshan Hussain, Milan Ghambhir, Stanford Univ. (USA); Adam de la Zerda, Stanford Univ. School of Medicine (USA) . . . [9338-40]

8:15 am: **Functionalization of carbon nano-onions for biomedical applications** *(Invited Paper)*, Silvia Giordani, Istituto Italiano di Tecnologia (Italy) . . . . . [9338-41]

8:45 am: **Multifunctional iron oxide nanoparticles for biomedical applications**, Maarten Bloemen, Carla Denis, Thomas Van Stappen, Katholieke Univ. Leuven (Belgium); Luc De Meester, KU Leuven (Belgium); Nick Geukens, Ann Gils, Thierry Verbiest, Katholieke Univ. Leuven (Belgium) . . . . . [9338-42]

9:00 am: **Design of "smart" multifunctional MOF nanocarriers for controlled and targeted drug delivery** *(Invited Paper)*, Stefan Wuttke, Andreas Zimpel, Ludwig-Maximilians-Univ. München (Germany) . . . . . [9338-43]

9:30 am: **Amphitropic liquid crystal phases from polyhydroxy sugar surfactants: Fundamental studies** , Rauzah Hashim, Univ. of Malaya (Malaysia); Osama K. Abou-Zied, Sultan Qaboos Univ. (Oman); Bakir A. Timimi, Univ. of Southampton (United Kingdom) . . . . . [9338-44]

9:45 am: **Surface modification of inorganic nanoparticles for biomedical applications**, Mahmoud G. Soliman, Beatriz Pelaz, Philipps-Univ. Marburg (Germany); Pablo del Pino, CIC BiomaGUNE (Spain); Wolfgang J. Parak, Philipps-Univ. Marburg (Germany) . . . . . [9338-45]

10:00 am: **Quantifying the density of surface capping ligands on semiconductor quantum dots** *(Invited Paper)*, Naiqian Zhan, Goutam Palui, Florida State Univ. (USA); Jan-Philip Merkl, Florida State Univ. (USA) and Univ. Hamburg (Germany); Hedi Mattoussi, Florida State Univ. (USA) . . . . . [9338-46]

Coffee Break . . . . . Mon 10:30 am to 10:45 am

SESSION 10

LOCATION: ROOM 232 (MEZZANINE) . . . . . MON 10:45 AM TO 12:05 PM

Plasmonic Nanoparticles II

Session Chair: **Antonios G. Kanaras,**
Univ. of Southampton (United Kingdom)

10:45 am: **Plasmonic nanoengineering in metal nanostructures: from solid nanocubes to complex hollow multi-walled nanoboxes** *(Invited Paper)*, Aziz Genç, Institut de Ciència de Materials de Barcelona (Spain); Javier Patarroyo, Institut Català de Nanotecnologia (Spain); Raul Arenal, Univ. de Zaragoza (Spain); Luc Henrard, Univ. of Namur (Belgium); Edgar Gonzalez, Univ. Javeriana (Colombia); Neus G. Bastus, Victor F. Puntes, Institut Català de Nanotecnologia (Spain); Jordi Arbiol, Consejo Superior de Investigaciones Científicas (Spain) . . . . . [9338-47]

11:15 am: **SERS active colloidal nanoparticles for the detection of small blood biomarkers using aptamers**, Haley L. Marks, Texas A&M Univ. (USA); Samuel Mabbott, Univ. of Strathclyde (United Kingdom); George W. Jackson, BioTex, Inc. (USA) and Base Pair Biotechnologies (USA); Duncan Graham, Univ. of Strathclyde (United Kingdom); Gerard L. Cote, Texas A&M Univ. (USA) . . . . . [9338-48]

11:30 am: **Degradable plasmon resonant liposomes for controlled drug delivery**, Shellie Knights-Mitchell, Joshua D. Williams, Marek Romanowski, The Univ. of Arizona (USA) . . . . . [9338-49]

11:45 am: **Synthesis and modelling of optical properties of gold-silver alloy nanoparticles**, David Rioux, Michel Meunier, Ecole Polytechnique de Montréal (Canada) . . . . . [9338-50]

Lunch Break . . . . . Mon 12:05 pm to 1:05 pm

SESSION 11

LOCATION: ROOM 232 (MEZZANINE) . . . . . MON 1:05 PM TO 2:15 PM

Medical Applications of Nanoparticles III

Session Chair: **Eckart Rühl,** Freie Univ. Berlin (Germany)

1:05 pm: **Magnetic microcapsule as a MRI-visible multifunctional theranostic platform for remote cancer therapy with synergistic antitumor effect** *(Invited Paper)*, Niveen M. Khashab, King Abdullah Univ. of Science and Technology (Saudi Arabia) . . . . . [9338-51]

1:35 pm: **RF heating of nano-clusters for cancer therapy**, Renat R. Letfullin, Alla R. Letfullin, Rose-Hulman Institute of Technology (USA); Thomas F. George, Univ. of Missouri-St. Louis (USA) . . . . . [9338-52]

1:55 pm: **Monitoring biological responses driven by magnetic hyperthermia in vitro and in vivo**, Alfredo Ambrosone, Istituto di Cibernetica Eduardo Caianiello (Italy); Grazyna Stepien, Maria Moros, Univ. de Zaragoza (Spain); Federica Fabozzi, Valentina Marchesano, Istituto di Cibernetica Eduardo Caianiello (Italy); Sara Rivera, Jesus M. de la Fuente, Univ. de Zaragoza (Spain); Claudia Tortiglione, Istituto di Cibernetica Eduardo Caianiello (Italy) . . . [9338-53]

CONFERENCE 9338
LOCATION: ROOM 232 (MEZZANINE)

SESSION 12

LOCATION: ROOM 232 (MEZZANINE) . . . . . MON 2:15 PM TO 5:40 PM

Interaction of Nanoparticles with Cells II

Session Chairs: **James B. Delehanty III,** U.S. Naval Research Lab. (USA); **Niveen M. Khashab,** King Abdullah Univ. of Science and Technology (Saudi Arabia)

2:15 pm: **Cancer cell uptake behavior of Au nanoring and its localized surface plasmon resonance induced cell inactivation efficiency**, Che-Kuan Chu, Yi-Chou Tu, Chih-Ken Chu, Yu-Wei Chang, Shih-Yang Chen, Ting-Ta Chi, Ming-Jyun Li, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) . . . . . [9338-54]

2:35 pm: **Laser-induced vapor nanobubbles for efficient delivery of macromolecules in live cells** *(Invited Paper)*, Ranhua Xiong, Koen Raemdonck, Karen Peynshaert, Ine Lentacker, Ine De Cock, Joseph Demeester, Stefaan C. De Smedt, Andre G. Skirtach, Kevin Braeckmans, Univ. Gent (Belgium) . . . . . [9338-55]

3:05 pm: **Analysis of bacteria-derived outer membrane vesicles using tunable resistive pulse sensing** , Evgeny Bogomolny, Jiwon Hong, Cherie Blenkiron, The Univ. of Auckland (New Zealand); Denis Simonov, The Univ. of Auckland (New Zealand); Priscila Dauros, The Univ. of Auckland (New Zealand); Simon Swift, Department of Molecular Medicine and Pathology (New Zealand); Anthony Phillips, The Univ. of Auckland (New Zealand); Geoff Willmott, The Univ. of Auckland (New Zealand) and The MacDiarmid Institute for Advanced Materials and Nanotechnology (New Zealand) . . [9338-56]

Coffee Break . . . . . .Mon 3:20 pm to 3:45 pm

3:45 pm: **Penetration of spherical and rod-like gold nanoparticles into intact and barrier-disrupted human skin** *(Invited Paper)*, Christina M. Graf, Daniel Nordmeyer, Freie Univ. Berlin (Germany); Sebastian Ahlberg, Charité Universitätsmedizin Berlin (Germany); Joerg Raabe, Swiss Light Source (Switzerland); Annika Vogt, Juergen M. Lademann, Fiorenza Rancan, Charité Universitätsmedizin Berlin (Germany); Eckart Ruehl, Freie Univ. Berlin (Germany) . . . . . [9338-57]

4:15 pm: **Optically generated hybridoma using bispecific gold nanoparticles**, Daniella Yeheskely-Hayon, Limor Minai, Dvir Yelin, Technion-Israel Institute of Technology (Israel). . . . . [9338-58]

4:35 pm: **Quantification of nanoparticle uptake by cells and its correlation to basic physicochemical parameters**, Wolfgang J. Parak, Philipps-Univ. Marburg (Germany) . . . . . [9338-59]

4:50 pm: **Imaging the endocytic pathways inside cells using surface-enhanced Raman spectroscopy**, Anna Huefner, Wei-Li Kuan, Roger A. Barker, Univ. of Cambridge (United Kingdom); Sumeet Mahajan, Univ. of Cambridge (United Kingdom) and Univ. of Southampton (United Kingdom) . . . . . [9338-60]

5:10 pm: **Membrane-targeting peptides for nanoparticle-facilitated cellular imaging and analysis** *(Invited Paper)*, Joyce Breger, James B. Delehanty III, Kelly Boeneman Gemmill, Lauren D. Field, U.S. Naval Research Lab. (USA); Juan B. Blanco-Canosa, Philip E. Dawson, The Scripps Research Institute (USA); Alan L. Huston, Igor L. Medintz, U.S. Naval Research Lab. (USA) . . . . . [9338-61]

5:40 pm: **Inhibition of bacterial growth by iron oxide nanoparticles with and without attached drug: Have we conquered the antibiotic resistance problem in cystic fibrosis lung infections?**, Leisha M. Armijo, Annaka Westphal, Priyanka Jain, Angelina Malagodi, Franye Fornelli, Allison Hayat, Michael French, The Univ. of New Mexico (USA); Hugh D. C. Smyth, The Univ. of Texas at Austin (USA); Marek Osi?ski, The Univ. of New Mexico (USA) . . . . . [9338-62]

CONCLUDING REMARKS

LOCATION: ROOM 232 (MEZZANINE) . . . . . 5:40 PM TO 5:50 PM

Session Chair: **Xing-Jie Liang,** National Center for Nanoscience and Technology, China (China)

AWARD PRESENTATION

LOCATION: ROOM 232 (MEZZANINE) . . . . . 5:50 PM TO 6:05 PM

Ocean Optics Young Investigator Award Presentation

The Ocean Optics Young Investigator Award will be given for the best paper presented by a leading author who is either a graduate student or has graduated within less than five years of the paper submission date. The award consists of a $1,000 cash prize to the Young Investigator and $2,000 Ocean Optics equipment credit to the laboratory where the work was performed.

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CONFERENCE 9339
LOCATION: ROOM 226 (MEZZANINE)

Sunday–Tuesday 8–10 February 2015 • Proceedings of SPIE Vol. 9339

Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications VII

Conference Chairs: **Samuel Achilefu,** Washington Univ. School of Medicine in St. Louis (USA); **Ramesh Raghavachari,** U.S. Food and Drug Administration (USA)

Program Committee: **Bohumil Bednar,** Merck & Co., Inc. (USA); **Mikhail Y. Berezin,** Washington Univ. School of Medicine in St. Louis (USA); **Richard B. Dorshow,** MediBeacon, LLC (USA); **Paul M. W. French,** Imperial College London (United Kingdom); **Yueqing Gu,** China Pharmaceutical Univ. (China); **Hisataka Kobayashi,** National Institutes of Health (USA); **Ashok Kumar Mishra,** Indian Institute of Technology Madras (India); **D. Michael Olive,** LI-COR Biosciences (USA); **Gabor Patonay,** Georgia State Univ. (USA); **Attila Tarnok,** Univ. Leipzig (Germany); **Yasuteru Urano,** The Univ. of Tokyo (Japan)

SUNDAY 8 FEBRUARY

POSTERS-SUNDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Phospholipid liposomes functionalized by protein, Olga E. Glukhova, Olga A. Grishina, Georgy V. Savostyanov, N.G. Chernyshevsky Saratov State Univ. (Russian Federation). . . . . [9339-26]

Impact of magnetite nanoparticle incorporation on the eigenfrequencies of nanocomposite microcapsules, Olga E. Glukhova, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Olga A. Grishina, N.G. Chernyshevsky Saratov State Univ. (Russian Federation). . . . . [9339-27]

Emitting terahertz frequency wave by charged fullerene C36 inside carbon nanotube under electric field, Olga E. Glukhova, Anna S. Kolesnikova, Mikhail M. Slepchenkov, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) . . . . . [9339-28]

A control of phospholipid motion on graphene layer under external electric field, Olga E. Glukhova, Anna S. Kolesnikova, Mikhail M. Slepchenkov, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Dmitriy S. Shmygin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) . . . . . [9339-29]

Stability of composites based on graphene layers and carbon nanotubes, Olga E. Glukhova, Anna S. Kolesnikova, Georgy V. Savostyanov, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Dmitriy S. Shmygin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Mikhail M. Slepchenkov, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) . . . . . [9339-30]

Prediction of stability for carbon nanotori, Olga E. Glukhova, Anna S. Kolesnikova, Georgy V. Savostyanov, Mikhail M. Slepchenkov, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) . . . . . [9339-31]

Theoretical study of the behavior of cryptand with different ion metal inside carbon nanotube, Olga E. Glukhova, Anna S. Kolesnikova, Denis A. Melnikov, Mikhail M. Slepchenkov, Vladislav V. Shunaev, N.G. Chernyshevsky Saratov State Univ. (Russian Federation). . . . . [9339-32]

Manipulation of fullerene molecules on graphene, Olga E. Glukhova, Vadim V. Mitrofanov, Vladislav V. Shunaev, Mikhail M. Slepchenkov, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) . . . . . [9339-33]

Simulation of the formation for molecular compounds of nanotubes with different chirality indexes to create new molecular devices on their basis, Olga E. Glukhova, Anna S. Kolesnikova, Georgy V. Savostyanov, Mikhail M. Slepchenkov, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) . . . . . [9339-34]

Structure and properties of composites based chitosan and carbon nanostructures: atomistic and coarse-grained simulation, Olga E. Glukhova, Anna S. Kolesnikova, Olga A. Grishina, Mikhail M. Slepchenkov, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) . . . . . [9339-35]

Development of new turn-on fluorescent probes for prostate cancer imaging *(Invited Paper)*, Takao Yogo, Keitaro Umezawa, Mako Kamiya, Yasuteru Urano, The Univ. of Tokyo (Japan). . . . . [9339-36]

Biomedical applications involving multiphoton probes, Mary J. Potasek, Karl Beeson, Evgueni Parilov, Simphotek Inc. (USA) . . . . . [9339-37]

BIOS SUNDAY PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their groundbreaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9339
LOCATION: ROOM 226 (MEZZANINE)

MONDAY 9 FEBRUARY

SESSION 1
LOCATION: ROOM 226 (MEZZANINE) . . . . . MON 8:30 AM TO 11:20 AM

NIR and Other Fluorescent Dyes: Imaging and Other Applications

Session Chair: **Samuel Achilefu,**
Washington Univ. School of Medicine in St. Louis (USA)

8:30 am: **Cytotoxic mechanism of silica-phthalocyanine-based near infrared photoimmunotherapy** *(Invited Paper)*, Hisataka Kobayashi, National Cancer Institute (USA) . . . . . [9339-1]

9:00 am: **NIR fluorescent silica nanoparticles as reporting labels in bioanalytical applications** *(Invited Paper)*, Gabor Patonay, Maged Henary, Gala Chapman, Georgia State Univ. (USA) . . . . . [9339-2]

9:30 am: **Multi-molecular imaging of cancer cells and leukocytes is critical for accurate micrometastasis monitoring using activatable probes**, Bryan Q. Spring, Akilan Palanisami, Tayyaba Hasan, Harvard Medical School (USA) and Massachusetts General Hospital (USA) . . . . . [9339-3]

9:50 am: **Results of the first-in-human clinical trial for MB-102, a novel fluorescent tracer agent for real-time measurement of glomerular filtration rate**, Richard B. Dorshow, Martin P Debreczeny, MediBeacon, LLC (USA); Thomas C Dowling, Ferris State University (USA). . . . . [9339-4]

Coffee Break . . . . . Mon 10:10 am to 10:40 am

10:40 am: **Ratiometric cellular sensor based on J-aggregate trapping in liposomes** *(Invited Paper)*, Albert Lee, The Univ. of Texas at Austin (USA) and The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Geoffrey P. Luke, Stanislav Y. Emelianov, The Univ. of Texas at Austin (USA); Konstantin V. Sokolov, The Univ. of Texas at Austin (USA) and The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) . . . . . [9339-5]

11:00 am: **Spectroscopic characterization of the binding mechanism of fluorescein and carboxyfluorescein in human serum albumin**, Saba A. J. Sulaiman, Sultan Qaboos Univ. (Oman); H. Udani Kulathunga, Sultan Qaboos Univ (Oman); Osama K. Abou-Zied, Sultan Qaboos Univ. (Oman) . . . . . [9339-6]

SESSION 2
LOCATION: ROOM 226 (MEZZANINE) . . . . . MON 11:20 AM TO 12:20 PM

It's a 'NANO' World I

Session Chair: **Ramesh Raghavachari,**
U.S. Food and Drug Administration (USA)

11:20 am: **Energy transfer between host and dopant in lanthanide-based nanoparticles for imaging and photodynamic therapy**, Brian G. Yust, The Univ. of Texas-Pan American (USA); Francisco J. Pedraza, Dhiraj Kumar Sardar, The Univ. of Texas at San Antonio (USA) . . . . . [9339-7]

11:40 am: **Effects of nanoparticle surface chemistry on optical properties and cellular interaction**, Francisco J. Pedraza III, The Univ. of Texas at San Antonio (USA); Brian G. Yust, The Univ. of Texas-Pan American (USA); Ivan Beeks, Andrew Tsin, Dhiraj Kumar Sardar, The Univ. of Texas at San Antonio (USA) . . . . . [9339-8]

12:00 pm: **Molecule-specific darkfield imaging using gold nanocages**, Amy J. Powless, Samir V. Jenkins, Mary Lee McKay, Jingyi Chen, Timothy J. Muldoon, Univ. of Arkansas (USA) . . . . . [9339-9]

Lunch Break . . . . . Mon 12:20 pm to 1:40 pm

SESSION 3
LOCATION: ROOM 226 (MEZZANINE) . . . . . MON 1:40 PM TO 3:40 PM

It's a 'NANO' World II

Session Chair: **Hisataka Kobayashi,** National Cancer Institute (USA)

1:40 pm: **Activatable thermo-sensitive ICG encapsulated pluronic nanocapsules for temperature sensitive fluorescence tomography**, Tiffany C. Kwong, Farouk Nouizi, Univ. of California, Irvine (USA); Uma Sampathkumaran, Yue Zhu, Maksudul M. Alam, InnoSense LLC (USA); Gultekin Gulsen, Univ. of California, Irvine (USA) . . . . . [9339-10]

2:00 pm: **Enhancing immunotherapy with magneto-plasmonic nanoparticles**, Konstantin V. Sokolov, Chun-Hsien Wu, Figen Beceren-Braun, M. Anna Zal, Tomasz Zal, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) . . . . . [9339-11]

2:20 pm: **Lanthanide (Ln^{3+})-doped calcium molybdate nanoparticle ($CaMoO_4$:Ln^{3+}, Ln=Eu, Tb) based SERS-fluorescence bimodal imaging probes for detection and imaging of fatty acid responsive GPR120 and CD36 receptors**, Lifu Xiao, Abdul K. Parchur, Han Xu, Qifei Li, Timothy A. Gilbertson, Anhong Zhou, Utah State Univ. (USA) . . . . . [9339-12]

2:40 pm: **Intracellular delivery of a survivin-specific theranostic agent by pmma nanoparticles and carbon nanotubes**, Francesco Baldini, Barbara Adinolfi, Istituto di Fisica Applicata Nello Carrara (Italy); Claudio Domenici, Istituto di Fisiologia Clinica (Italy); Giuliano Giambastiani, Istituto di Chimica dei Composti OrganoMetallici (Italy); Ambra Giannetti, Istituto di Fisica Applicata Nello Carrara (Italy); Mario Pellegrino, Univ. di Pisa (Italy); Giovanna Sotgiu, Istituto per la Sintesi Organica e la Fotoreattività (Italy); Sara Tombelli, Cosimo Trono, Istituto di Fisica Applicata Nello Carrara (Italy); Giulia Tuci, Istituto di Chimica dei Composti OrganoMetallici (Italy); Greta Varchi, Istituto per la Sintesi Organica e la Fotoreattività (Italy) . . . . . [9339-13]

3:00 pm: **Regulatory section: chemistry requirements for marketing imaging agents**, Ramesh Raghavachari, U.S. Food and Drug Administration (USA) . . . . . [9339-14]

Coffee Break . . . . . Mon 3:40 pm to 4:10 pm

SESSION 4
LOCATION: ROOM 226 (MEZZANINE) . . . . . MON 4:10 PM TO 5:30 PM

Photoswitchable Probes for Imaging

Session Chair: **Gabor Patonay,** Georgia State Univ. (USA)

4:10 pm: **Water-soluble polymer photoswitch based on dithienylethene-naphthalimide dyad as lysosensor for super-resolution bioimaging**, Ming-Qiang Zhu, Huazhong Univ. of Science and Technology (China) . [9339-15]

4:30 pm: **Development of bright green, maturation improved, reversibly switchable fluorescent proteins based on EGFP**, Sam Duwé, Elke De Zitter, Benjamien Moeyaert, Vincent Gielen, Johan Hofkens, Peter Dedecker, Katholieke Univ. Leuven (Belgium). . . . . [9339-16]

4:50 pm: **In vivo detection of cancer cells with immunoconjugated fluorescent probes by macro zoom microscopy and two-photon microscopy**, Shigehiro Koga, Yusuke Oshima, Atsuhiko Hikita, Yuji Watanabe, Takeshi Imamura, Ehime Univ. (Japan) . . . . . [9339-17]

5:10 pm: **In vitro and in vivo investigation of pH tumor status using genetically encoded sensors and fluorescence imaging**, Elena V. Zagaynova, Marina V. Shirmanova, Irina N. Druzhkova, Maria Lukina, Ludmila B. Snopova, Natalia N. Prodanetz, Nizhny Novgorod State Medical Academy (Russian Federation); Vsevolod V. Belousov, Sergey A. Lukyanov, M. M. Shemyakin and Yu. A. Ovchinnikov Institute of Bioorganic Chemistry (Russian Federation) and Nizhny Novgorod State Medical Academy (Russian Federation) . . . . . [9339-18]

TUESDAY 10 FEBRUARY

SESSION 5

LOCATION: ROOM 226 (MEZZANINE) . . . . . .TUE 8:30 AM TO 10:10 AM

Multimodal Imaging

Session Chair: **Mikhail Y. Berezin,** Washington Univ. School of Medicine in St. Louis (USA)

8:30 am: **Fluorescence characterization of water-driven self-assembled lipids and their temperature-induced phase transitions**, N. Idayu Zahid, Univ. of Malaya (Malaysia); Osama K. Abou-Zied, Sultan Qaboos Univ. (Oman); Rauzah Hashim, Univ. of Malaya (Malaysia) . . . . . [9339-19]

8:50 am: **Imaging small biomolecules in live cells and animals by stimulated Raman scattering of alkyne vibrational tags**, Lu Wei, Fanghao Hu, Yihui Shen, Zhixing Chen, Columbia Univ. (USA); Yong Yu, Chih-Chun Lin, Meng C. Wang, Baylor College of Medicine (USA); Wei Min, Columbia Univ. (USA) . . . . . [9339-20]

9:10 am: **A bi-functional contrast agent for simultaneous optical and magnetic resonance imaging in vivo**, Alex T. Luk, Gultekin Gulsen, Univ. of California, Irvine (USA); Mehmet B. Unlu, Bogaziçi Üniv. (Turkey); Melissa Ali-Santosa, Cindy R. M. Rodas, Joey E. Pazzi, Univ. of California, Irvine (USA) . . . . . [9339-21]

9:30 am: **Radionuclide mediated x-ray and optical signal amplification for quantitative imaging of infection and cancer**, Michael A. McDonald, Johns Hopkins Medicine (USA). . . . . [9339-22]

9:50 am: **Quantum dots targeted to VEGFR2 as a contrast agent for OCT/LIF dual-modality imaging of colorectal cancer in a mouse model**, Jordan L. Carbary, Jennifer K. Barton, Urs Utzinger, The Univ. of Arizona (USA) . . . . . [9339-23]

Coffee Break . . . . . Tue 10:10 am to 10:30 am

PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . .TUE 10:30 AM TO 11:30 AM

Nano/Biophotonics Program Track

10:30 am: **Welcome and Introduction**
Dan Nicolau, McGill Univ. (Canada)

10:45 am: **Bridging molecular and cellular biology with optics**
Gabriel Popescu, Univ. of Illinois at Urbana-Champaign (USA)

See page 20 for details.

Lunch Break . . . . . Tue 11:30 am to 1:30 pm

SESSION 6

LOCATION: ROOM 226 (MEZZANINE) . . . . . TUE 1:30 PM TO 3:20 PM

Non-Bleaching and Ultra-Small Fluorescent Probes I

Joint Session with Conferences 9339 and 9377

Session Chairs: **Ramesh Raghavachari,** U.S. Food and Drug Administration (USA); **Philip R. Hemmer,** Texas A&M Univ. (USA)

1:30 pm: **Fluorescence imaging and quantum sensing using nitrogen-vacancy centers in nanodiamonds** *(Invited Paper)*, Huan-Cheng Chang, Academia Sinica (Taiwan) . . . . . [9377-1]

2:00 pm: **Neurons on diamond: towards optical sensing of action potential** *(Invited Paper)*, Milos Nesladek, Mathew McDonald, Univ. Hasselt (Belgium); Micha Spira, The Hebrew Univ. of Jerusalem (Israel) . . . . . [9377-2]

2:30 pm: **Nanoscale magnetic resonance detection and imaging using nitrogen-vacancy centers in diamond** *(Invited Paper)*, Daniel Rugar, IBM Research - Almaden (USA) . . . . . [9377-3]

3:00 pm: **Silica nanoparticles containing therapeutics for attenuation of oxidative stress in neurons** *(Invited Paper)*, Desiree White-Schenk, Riyi Shi, James F. Leary, Purdue Univ. (USA). . . . . [9339-24]

Coffee Break . . . . . Tue 3:20 pm to 3:50 pm

SESSION 7

LOCATION: ROOM 226 (MEZZANINE) . . . . . TUE 3:50 PM TO 5:10 PM

Non-Bleaching and Ultra-Small Fluorescent Probes II

Joint Session with Conferences 9339 and 9377

Session Chairs: **Ramesh Raghavachari,** U.S. Food and Drug Administration (USA); **Philip R. Hemmer,** Texas A&M Univ. (USA)

3:50 pm: **New method to detect organic nanoparticles in live tissue** *(Invited Paper)*, Dror Fixler, Inbar Yariv, Bar-Ilan Univ. (Israel) . . . . . [9339-25]

4:20 pm: **Microplasma synthesis of sub-5 nm nanodiamonds** *(Invited Paper)*, R. Mohan Sankaran, Case Western Reserve Univ. (USA). . . . . [9377-4]

4:50 pm: **Sub-diffraction optical manipulation of the charge state of nitrogen vacancy center in diamond**, Fang-Wen Sun, Xiang-Dong Chen, Chang-Ling Zou, Guang-Can Guo, Univ. of Science and Technology of China (China) . . . . . [9377-5]

CONFERENCE 9340
LOCATION: ROOM 252 (MEZZANINE)

Saturday–Sunday 7–8 February 2015 • Proceedings of SPIE Vol. 9340

Plasmonics in Biology and Medicine XII

Conference Chairs: **Tuan Vo-Dinh,** Fitzpatrick Institute For Photonics, Duke Univ. (USA); **Joseph R. Lakowicz,** Univ. of Maryland School of Medicine (USA)

Program Committee: **A. Claude Boccara,** Ecole Supérieure de Physique et de Chimie Industrielles (France); **Michael T. Canva,** Lab. Charles Fabry (France); **Volker Deckert,** Institut für Photonische Technologien e.V. (Germany); **Bruce S. Dunn,** Univ. of California, Los Angeles (USA); **Christopher D. Geddes,** Univ. of Maryland, Baltimore (USA); **Zygmunt Karol Gryczynski,** Univ. of North Texas Health Science Ctr. at Fort Worth (USA); **Naomi J. Halas,** Rice Univ. (USA); **Ho-Pui A. Ho,** The Chinese Univ. of Hong Kong (Hong Kong, China); **Jiri Homola,** Institute of Photonics and Electronics of the ASCR, v.v.i. (Czech Republic); **Laura Maria Lechuga,** Ctr. d'Investigacions en Nanociència i Nanotecnologia (Spain); **Boris Mizaikoff,** Univ. Ulm (Germany); **Shuming Nie,** Emory Univ. (USA); **Krishanu Ray,** Univ. of Maryland School of Medicine (USA); **Wei-Chuan Shih,** Univ. of Houston (USA); **Weihong Tan,** Univ. of Florida (USA); **Andrew Taton,** Univ. of Minnesota, Twin Cities (USA); **Richard P. Van Duyne,** Northwestern Univ. (USA); **Jeffrey I. Zink,** Univ. of California, Los Angeles (USA)

SATURDAY 7 FEBRUARY

SESSION 1

LOCATION: ROOM 252 (MEZZANINE) . . . . . SAT 9:30 AM TO 10:30 AM

Plasmonics and Surface-Enhanced Raman Spectroscopy I

Session Chair: **Tuan Vo-Dinh,**
Fitzpatrick Institute for Photonics, Duke Univ. (USA)

9:30 am: **DNA origami based assembly of gold nanoparticle dimers for surface enhanced Raman scattering**, Vivek Thacker, Lars O. Herrmann, Daniel O. Sigle, Univ. of Cambridge (United Kingdom); Tao Zhang, Tim Liedl, Ludwig-Maximilians-Univ. München (Germany); Jeremy J. Baumberg, Ulrich F. Keyser, Univ. of Cambridge (United Kingdom) . . . . . [9340-2]

9:50 am: **Amplifying the SERS signal of DNA bases via the chemical resonance**, Lindsay M. Freeman, Lin Pang, Yeshaiahu Fainman, Univ. of California, San Diego (USA). . . . . [9340-3]

10:10 am: **Creatinine sensing in urine by stamping surface enhanced Raman scattering**, Ming Li, Wei-Chuan Shih, Univ. of Houston (USA) . [9340-38]

Coffee Break . . . . . .Sat 10:30 am to 11:00 am

SESSION 2

LOCATION: ROOM 252 (MEZZANINE) . . . . . SAT 11:00 AM TO 12:20 PM

Plasmonics and Surface-Enhanced Raman Spectroscopy II

Session Chair: **Tuan Vo-Dinh,**
Fitzpatrick Institute for Photonics, Duke Univ. (USA)

11:00 am: **Optimization of gold nanorod arrays for SERS enumeration of CTCs**, Jonathan Calderón, Daniel Hill, Maria Isabel Gomez, Univ. de València (Spain) . . . . . [9340-4]

11:20 am: **Silica-coated gold nanostars for surface-enhanced resonance Raman spectroscopy mapping of integrins in breast cancer cells**, Michael B. Fenn Jr., Nik?a Roki, Chris Bashur, Florida Institute of Technology (USA) . . . . . [9340-5]

11:40 am: **DNA-guided assembly of three-dimensional nanostructures for surface-enhanced Raman spectroscopy**, Li-An Wu, National Yang-Ming Univ. (Taiwan); Yu-Ting Lin, National Cheng Kung Univ. (Taiwan); Yih-Fan Chen, National Yang-Ming Univ. (Taiwan) . . . . . [9340-6]

12:00 pm: **Plasmonics-active SERS nanoprobes for biomedial sensing**, Andrew M. Fales, Hsin-Neng Wang, Hoan Thanh Ngo, Tuan Vo-Dinh, Duke Univ. (USA) . . . . . [9340-7]

Lunch Break . . . . . .Sat 12:20 pm to 2:1s0 pm

SESSION 3

LOCATION: ROOM 252 (MEZZANINE) . . . . . .SAT 2:10 PM TO 3:10 PM

SERS Sensing Techniques and Systems

Session Chair: **Wei-Chuan Shih,** Univ. of Houston (USA)

2:10 pm: **Surface-enhanced Raman imaging of tissue sections for metabolic analysis**, Megumi Shiota, Shogo Yamazoe, FUJIFILM Corp. (Japan) and Keio Univ. School of Medicine (Japan); Masayuki Naya, FUJIFILM Corp. (Japan); Mitsuyo Ohmura, Mayumi Kajimura, Makoto Suematsu, Keio Univ. School of Medicine (Japan) and Japan Science and Technology Agency (Japan). . . . . [9340-9]

2:30 pm: **A multimodal imaging agent for intrinsic surface enhanced Raman scattering of biological tissue**, Christoph B. Pohling, Jos Campbell, Timothy A. Larson, Sanjiv S. Gambhir, Stanford Univ. (USA) . . . . . [9340-11]

2:50 pm: **Monolithic nanoporous gold disks with large specific surface area, tunable plasmon resonance, and high-density, internal plasmonic hot-spots**, Fusheng Zhao, Jianbo Zeng, Wei-Chuan Shih, Univ. of Houston (USA) . . . . . [9340-12]

Coffee Break . . . . . .Sat 3:10 pm to 3:40 pm

SESSION 4

LOCATION: ROOM 252 (MEZZANINE) . . . . . .SAT 3:40 PM TO 5:20 PM

Surface Plasmon Resonance Sensing

Session Chair: **Jean-François Masson,** Univ. de Montréal (Canada)

3:40 pm: **Nanostructuring for sensitivity enhancement of biosensors based on surface plasmon resonance and surface-enhanced Raman scattering**, Jean-François Bryche, Institut d'Électronique Fondamentale (France) and Lab. Charles Fabry (France); Grégory Barbillon, Institut d'Électronique Fondamentale (France); Anne-Lise Coutrot, Lab. Charles Fabry (France); Frédéric Hamouda, Institut d'Électronique Fondamentale (France); Mitradeep Sarkar, Lab. Charles Fabry (France); Raymond Gillibert, HORIBA Scientific (France) and Univ. Paris 13 (France); Aurore Olivéro, Lab. Charles Fabry (France) and HORIBA Scientific (France); Julien Moreau, Lab. Charles Fabry (France); Marc Lamy de la Chapelle, Univ. Paris 13 (France); Bernard Bartenlian, Institut d'Électronique Fondamentale (France); Michael T. Canva, Lab. Charles Fabry (France) . . . . . [9340-13]

4:00 pm: **Effect of transformation on plasmonic chiral nanostructures for the detection of alpha-helical monomers and proteins**, Eng Huat Khoo, A*STAR Institute of High Performance Computing (Singapore) . . . . . [9340-14]

4:20 pm: **A computer model for the prediction of sensitivity in SPR sensing platforms**, Kristel D. Izquierdo, Instituto Tecnológico y de Estudios Superiores de Monterrey (Mexico); Arnoldo Salazar, Univ. of California, Irvine (USA); Adrian Losoya-Leal, Sergio O. Martinez-Chapa, Instituto Tecnológico y de Estudios Superiores de Monterrey (Mexico) . . . . . [9340-15]

4:40 pm: **SPR-MS: from identifying adsorbed molecules to image tissues**, Jean-François Masson, Julien Breault-Turcot, Alexandra Aube, Simon Forest, Pierre Chaurand, Univ. de Montréal (Canada). . . . . [9340-16]

5:00 pm: **Matching plasmon resonances to the C=C and C-H bonds in estradiol**, Ifeoma G. Mbomson, Nigel P. Johnson, Univ. of Glasgow (United Kingdom); Scott McMeekin, Glasgow Caledonian Univ. (United Kingdom); Richard De La Rue, Univ. of Glasgow (United Kingdom) . . . . . [9340-17]

BIOS HOT TOPICS

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 5

LOCATION: ROOM 252 (MEZZANINE) . . . . . SUN 8:30 AM TO 10:10 AM

Plasmonic Nanostructures

Session Chair: **Tuan Vo-Dinh,**
Fitzpatrick Institute for Photonics, Duke Univ. (USA)

8:30 am: **Understanding the TERS effect with on-line tunneling and force feedback using multiprobe AFM/NSOM with Raman integration** *(Invited Paper)*, Aaron Lewis, The Hebrew Univ. of Jerusalem (Israel); Rimma Dekhter, Patricia Hamra, Yossi Bar-David, Hesham Taha, Nanonics Imaging Ltd. (Israel) . . . . . [9340-1]

8:50 am: **Plasmonic lenses and bioparticle separation**, Ahmet A. Yanik, Xiangchao Zhang, Univ. of California, Santa Cruz (USA) . . . . . [9340-18]

9:10 am: **Effect of tip geometry on two photon excited luminescence of single gold nanorods**, Arif M. Siddiquee, Swinburne Univ. of Technology (Australia) . . . . . [9340-19]

9:30 am: **Photo-thermal effects in DNA/gold nanorods complexes**, Luciano De Sio, BEAM Engineering for Advanced Measurements Co. (USA) and Univ. della Calabria (Italy); Giulio Caracciolo, Univ. degli Studi di Roma La Sapienza (Italy); Ferdinanda Annesi, Istituto per i Processi Chimico-Fisici (Italy); Tiziana Placido, Univ. degli Studi di Bari Aldo Moro (Italy); Daniela Pozzi, Univ. degli Studi di Roma La Sapienza (Italy); Roberto Comparelli, Alfredo Pane, M. Lucia Curri, Istituto per i Processi Chimico-Fisici (Italy); Nelson V. Tabiryan, BEAM Engineering for Advanced Measurements Co. (USA); Roberto Bartolino, Univ. della Calabria (Italy) . . . . . [9340-20]

9:50 am: **UV plasmonics with magnetic spin-polarized nanoparticles**, Vladimir P. Drachev, Hari Bhatta, Soumya Nag, Univ. of North Texas (USA); Arrigo Calzolari, Univ. of North Texas (USA) and Istituto Nanoscienze (Italy); Marco Buongiorno Nardelli, Univ. of North Texas (USA) . . . . . [9340-21]

Coffee Break . . . . . Sun 10:10 am to 10:40 am

SESSION 6

LOCATION: ROOM 252 (MEZZANINE) . . . . . SUN 10:40 AM TO 12:20 PM

Plasmonic Imaging and Devices

Session Chair: **Krishanu Ray,**
Univ. of Maryland School of Medicine (USA)

10:40 am: **Hyperspectral backscattering imaging of cells using gold-silver alloy nanoparticles as chromatic biomarkers**, Sergiy Patskovsky, David Rioux, Éric Bergeron, Michel Meunier, Ecole Polytechnique de Montréal (Canada) . . . . . [9340-22]

11:00 am: **Biologically active plasmonic devices: fusing direct-write lithography with molecular self-assembly to create hybrid nano-sensor surfaces**, Alasdair W. Clark, Jonathan M. Cooper, Univ. of Glasgow (United Kingdom) . . . . . [9340-23]

11:20 am: **Enhanced performance of plasmonic biosensors using high field confinement around metallic nanostructures due to the coupling of propagating plasmons of a thin metallic film**, Mitradeep Sarkar, Mondher Besbes, Julien Moreau, Jean-François Bryche, Aurore Olivéro, Lab. Charles Fabry (France); Grégory Barbillon, Institut d'Électronique Fondamentale (France); Anne-Lise Coutrot, Lab. Charles Fabry (France); Bernard Bartenlian, Institut d'Électronique Fondamentale (France); Michael T. Canva, Lab. Charles Fabry (France) . . . . . [9340-24]

11:40 am: **Plasmonic cell manipulation for biomedical and screening applications**, Dag Heinemann, Markus Schomaker, Stefan Kalies, Merve Sinram, Patrick Heeger, Laser Zentrum Hannover e.V. (Germany); Hugo Murua Escobar, Univ. Rostock (Germany); Heiko Meyer, Laser Zentrum Hannover e.V. (Germany) and Medizinische Hochschule Hannover (Germany); Tammo Ripken, Laser Zentrum Hannover e.V. (Germany) . . . . . [9340-25]

12:00 pm: **Investigation of Electron Beam Irradiation Effect on Pore Formation For Single Molecule Bio-Sensor Fabrication**, Seong Soo Choi, Myoung Jin Park, Sun Moon Univ. (Korea, Republic of); Chul Hee Han, Sun Moon Univ (Korea, Republic of); Sung In Kim, Jung Ho Yoo, Kyung Jin Park, National Nanofab Ctr. (Korea, Republic of); Namkyou Park, Seoul National Univ. (Korea, Republic of) . . . . . [9340-26]

POSTERS-SUNDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

Conference attendees are invited to attend the BiOS poster session on Sunday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Bidimensional assemblies of nonspherical gold nanoparticles for SERS analysis of biomolecules, Paolo Matteini, Marella de Angelis, Istituto di Fisica Applicata Nello Carrara (Italy); Lorenzo Ulivi, Istituto dei Sistemi Complessi (Italy); Sonia Centi, Univ. degli Studi di Firenze (Italy); Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy) . . . . . [9340-8]

Enhancing the sensitivity of localized surface plasmon resonance (LSPR) biosensors using nanorods and DNA aptamers, Po-Chun Chuang, National Yang-Ming Univ. (Taiwan); Pei-Chen Liao, National Cheng Kung Univ. (Taiwan); Yih-Fan Chen, National Yang-Ming Univ. (Taiwan) . . . . . [9340-27]

Analysis of transmission through multiple slit and grooves structures for biosensors, Bikash Nakarmi, Yong Hyub Won, Bong Ho Kim, KAIST (Korea, Republic of) . . . . . [9340-28]

Numerical investigation of plasmonic properties of gold nanoshells, Sathiyamoorthy Krishnan, Michael C. Kolios, Ryerson Univ. (Canada) . [9340-29]

Theoretical approach to surface plasmon scattering microscopy for single nanoparticle detection in near infrared region, Taehwang Son, Donghyun Kim, Yonsei Univ. (Korea, Republic of) . . . . . [9340-32]

Optical near-field response of plasmonic nanostructures for ultrashort light pulses, Hongki Lee, Donghyun Kim, Yonsei Univ. (Korea, Republic of). [9340-33]

Silver nanoislands based SERS-active substrates for DNAs detection, Hyerin Song, Seunghun Lee, Taeyoung Kang, Kyujung Kim, Pusan National Univ. (Korea, Republic of) . . . . . [9340-34]

Surface-plasmon enhanced Brillouin scattering from gold nano-structures, Zhaokai Meng, Vladislav V. Yakovlev, Texas A&M Univ. (USA) . . . . . [9340-35]

Optical properties of plasmon-resonant gold nanoparticles with different morphologies, Olga Bibikova, Univ. of Oulu (Finland) and Saratov State Univ. (Russian Federation); Alexey Popov, Alexander Bykov, Prateek Singh, Univ. of Oulu (Finland); Elizaveta Panfilova, Institute of Biochemistry and Physiology of Plants and Microorganisms (Russian Federation); Vitaly Khanadeev, Institute of Biochemistry and Physiology of Plants and Microorganisms (Russian Federation) and Saratov State Univ. (Russian Federation); Ilya Skovorodkin, Univ. of Oulu (Finland); Boris Khlebtsov, Institute of Biochemistry and Physiology of Plants and Microorganisms (Russian Federation) and Saratov State Univ. (Russian Federation); Matti Kinnunen, Seppo Vainio, Krisztian Kordas, Univ. of Oulu (Finland); Vladimir Bogatyrev, Nikolai Khlebtsov, Institute of Biochemistry and Physiology of Plants and Microorganisms (Russian Federation) and Saratov State Univ. (Russian Federation); Valery V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) and Univ. of Oulu (Finland) . . . . . [9340-36]

Dynamic plasmonic trapping and manipulation of metallic particles for SERS application, Yuquan Zhang, Nankai Univ. (China) . . . . . [9340-37]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

NOBEL LAUREATE SPEAKERS

All Photonics West technical attendees are invited to hear the scientists who shared the 2014 Nobel Prize in Chemistry. Let's celebrate their ground-breaking work that has brought optical microscopy into the nano dimension and allowed scientists to visualize the pathways of individual molecules inside living cells. The session includes an extended question and answer period, allowing broad audience participation.

Stefan W. Hell, Max Planck Institute Göttingen (via video message)
2014 Nobel Laureate in Chemistry

Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

CONFERENCE 9341
LOCATION: ROOM 130 (EXHIBIT LEVEL)

Saturday–Sunday 7–8 February 2015 • Proceedings of SPIE Vol. 9341

Bioinspired, Biointegrated, Bioengineered Photonic Devices III

Conference Chairs: **Luke P. Lee,** Univ. of California, Berkeley (USA); **John A. Rogers,** Univ. of Illinois at Urbana-Champaign (USA); **Seok Hyun Andy Yun,** Harvard Univ. (USA)

Program Committee: **David Erickson,** Cornell Univ. (USA); **Malte C. Gather,** Univ. of St. Andrews (United Kingdom); **Viktoria Greanya,** Defense Threat Reduction Agency (USA); **Hongrui Jiang,** Univ. of Wisconsin-Madison (USA)

SATURDAY 7 FEBRUARY

SESSION 1
LOCATION: ROOM 130 (EXHIBIT LEVEL) . .SAT 9:00 AM TO 10:00 AM

Keynote Session
Session Chair: **Luke P. Lee,** Univ. of California, Berkeley (USA)

9:00 am: **DNA probe based multiplexing and super-resolution imaging** *(Keynote Presentation)*, Peng Yin, Harvard Univ. (USA). . . . . [9341-1]

Coffee Break . . . . . .Sat 10:00 am to 10:30 am

SESSION 2
LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . . SAT 10:30 AM TO 11:50 AM

Biomimetic Photonics
Session Chair: **Luke P. Lee,** Univ. of California, Berkeley (USA)

10:30 am: **Bioinspired stimuli-responsive color-tunable photonic fibers**, Mathias Kolle, Joseph D. Sandt, Massachusetts Institute of Technology (USA); James Hardin, Harvard Univ. (USA); Christian D. Argenti, Massachusetts Institute of Technology (USA); Jennifer A. Lewis, Joanna Aizenberg, Harvard Univ. (USA) . . . . . [9341-2]

10:50 am: **Bioinspired artificial light collectors for enhancement of imaging in dim environments**, Hewei Liu, Yinggang Huang, Chi-Chieh Huang, Hongrui Jiang, Univ. of Wisconsin-Madison (USA). . . . . [9341-3]

11:05 am: **Design and microfabrication of an artificial compound eye inspired by vision mechanism of Xenos peckii**, Dongmin Keum, Inchang Choi, Min H. Kim, Ki-Hun Jeong, KAIST (Korea, Republic of). . . [9341-4]

11:20 am: **Biomimetic photonic structures and sensors** *(Invited Paper)*, Rajesh R. Naik, Air Force Research Lab. (USA) . . . . . [9341-5]

Lunch Break . . . . . .Sat 11:50 am to 1:30 pm

SESSION 3
LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . . SAT 1:30 PM TO 3:00 PM

Wearable Photonic Devices
Session Chair: **Hongrui Jiang,** Univ. of Wisconsin-Madison (USA)

1:30 pm: **Organic ultrathin-film photonic and electronic devices on 1 µm thick ultra-flexible substrate** *(Invited Paper)*, Tomoyuki Yokota, The Univ. of Tokyo (Japan); Tsuyoshi Sekitani, The Univ. of Tokyo (Japan) and Osaka Univ. (Japan); Martin Kaltenbrunner, Univ. of Tokyo (Japan) and Johannes Kepler Univ. Linz (Austria); Siegfried G. Bauer, Johannes Kepler Univ. Linz (Austria); Takao Someya, The Univ. of Tokyo (Japan) . . . . . [9341-6]

2:10 pm: **A wearable, conformal, optical sensor bandage for the non-invasive, two-dimensional mapping of cutaneous oxygenation**, Zongxi Li, Emmanuel Roussakis, Wellman Ctr. for Photomedicine, Harvard Medical School (USA); Pieter L. Koolen, Ahmed M. S. Ibrahim, Kuylhee Kim, Beth Israel Deaconess Medical Ctr., Harvard Medical School (USA); Lloyd F. Rose, Jesse Wu, U.S. Army Institute of Surgical Research (USA); Alexander J. Nichols, Wellman Ctr. for Photomedicine, Harvard Medical School (USA); Yunjung Baek, KAIST (Korea, Republic of); Reginald Birngruber, Univ. zu Lübeck (Germany); Gabriela Apiou-Sbirlea, Wellman Ctr. for Photomedicine, Harvard Medical School (USA); Robina Matyal, Thomas Huang, Beth Israel Deaconess Medical Ctr., Harvard Medical School (USA); Rodney Chan, U.S. Army Institute of Surgical Research (USA); Samuel J. Lin, Beth Israel Deaconess Medical Ctr., Harvard Medical School (USA); Conor L. Evans, Wellman Ctr. for Photomedicine, Harvard Medical School (USA) . . . . . [9341-7]

2:25 pm: **Optical design and modelling of tissue for application as wearable optoelectronic sensors**, Olena Kulyk, Ashu K. Bansal, Shuoben Hou, Eric M. Bowman, Ifor D. W. Samuel, Univ. of St. Andrews (United Kingdom) . . . . . [9341-8]

2:40 pm: **OLED microdisplays as biophotonic platform for optogenetics**, Anja Steude, Malte C. Gather, Univ. of St. Andrews (United Kingdom) . . [9341-9]

Coffee Break . . . . . .Sat 3:00 pm to 3:30 pm

SESSION 4
LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . . SAT 3:30 PM TO 5:30 PM

Bioengineered Light Sources
Session Chair: **Malte C. Gather,** Univ. of St. Andrews (United Kingdom)

3:30 pm: **MicroLED probes for optogenetic control of cortical circuits** *(Invited Paper)*, Keith Mathieson, Robert Scharf, Niall McAlinden, Erdan Gu, Shuzo Sakata, Martin D. Dawson, Univ. of Strathclyde (United Kingdom) . . . . . [9341-10]

4:10 pm: **Femtosecond pumped biological laser**, Mark Mackenzie, Heriot-Watt Univ. (United Kingdom); Hamilton Charlotte, Heriot-Watt Univ. (United Kingdom) and The Univ. of Edinburgh (United Kingdom); Kirsty J. Martin, Rebecca S. Saleeb, Rory R. Duncan, Lynn Paterson, Ajoy K. Kar, Heriot-Watt Univ. (United Kingdom) . . . . . [9341-11]

4:25 pm: **Demonstration of cell lasers made from common cell types and different fluorescent dyes**, Matjaz Humar, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) and Jo?ef Stefan Institute (Slovenia); Seok Hyun Yun, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA) . . . . . [9341-12]

4:45 pm: **Photodynamic therapy using internal molecular resonance energy transfer source**, Seonghoon Kim, Yi Rang Kim, HyeongChan Jo, Mijeong Jeon, KAIST (Korea, Republic of); Seok Hyun Yun, Wellman Ctr. for Photomedicine (USA) and Massachusetts General Hospital (USA) and KAIST (Korea, Republic of) . . . . . [9341-13]

5:00 pm: **Micro-patterning colloidal quantum dots based light sources for cellular array imaging** *(Invited Paper)*, Gauri Behave, The University of Texas at Austin (USA); Elaine Ng, Stanford University (USA); Youngkyu Lee, The University of Texas at Austin (USA); Xiaojing Zhang, Dartmouth College (USA) . . . . . [9341-14]

BIOS HOT TOPICS
LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SAT 7:00 PM TO 9:30 PM

Hear the latest technical breakthroughs and promising technologies for biomedical applications from leading worldwide experts. Access to Hot Topics is included with your registration.

BRITTON CHANCE BIOMEDICAL OPTICS AWARD

The Britton Chance Biomedical Optics Award is presented annually in recognition of outstanding lifetime contributions to the field of biomedical optics through the development of innovative, high impact technologies. The award particularly honors pioneering contributions to optical methods and devices that have facilitated advancements in biology or medicine. Honorarium of $2,000 presented annually.

See full Hot Topics presentation listing on page 18.

SUNDAY 8 FEBRUARY

SESSION 5

LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . . SUN 8:10 AM TO 10:00 AM

Bioinspired Photonics

Session Chair: **Viktoria Greanya,**
Defense Threat Reduction Agency (USA)

8:10 am: **Analysis of quasi-periodic pore structure of centric marine diatom frustules**, Gregory A. Cohoon, Univ. of Arizona (USA); Christine E. Alvarez, Keith Meyers, The Univ. of Arizona (USA); Dimitri D. Deheyn, Mark Hildebrand, Scripps Institution of Oceanography (USA); Khanh Q. Kieu, The Univ. of Arizona (USA); Robert A. Norwood, Scripps Institution of Oceanography (USA) [9341-15]

8:25 am: **Effect of ICG concentration on the fluorescence characteristics of erythrocyte-derived optical vectors**, Jack Tang, Danielle Bacon, Univ. of California, Riverside (USA); Victor Sun, Wangcun Jia, John S. Nelson, Univ. of California, Irvine (USA); Bahman Anvari, Univ. of California, Riverside (USA) . . . . . [9341-16]

8:40 am: **Bioinspired biomedical devices: analysis of the labrum of aedes aegypti mosquitoes via Raman and Brillouin microspectroscopy**, Vladislav V. Yakovlev, Texas A&M Univ. (USA) . . . . . [9341-17]

9:00 am: **Natural production of biological optical systems** , Seung Ho Choi, Young L. Kim, Purdue Univ. (USA) . . . . . [9341-18]

9:15 am: **Untwisting the polarisation properties of light reflected by scarab beetles**, Luke McDonald, Ewan D. Finlayson, Peter Vukusic, Univ. of Exeter (United Kingdom). . . . . [9341-19]

9:30 am: **The structure-function relationships of a natural nanoscale photonic device in cuttlefish chromatophores** *(Invited Paper)*, Leila Deravi, The Univ. of New Hampshire (USA); Andrew P. Magyar, Sean Sheehy, Harvard Univ. (USA); George Bell, Lydia Mathger, Alan Kuzirian, Roger T. Hanlon, Marine Biological Lab. (USA); Evelyn L. Hu, Kevin Kit Parker, Harvard Univ. (USA) . . . . . [9341-20]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 6

LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . SUN 10:30 AM TO 12:05 PM

Biointegrated Devices

Session Chair: **David Erickson,** Cornell Univ. (USA)

10:30 am: **Biocompatible step-index optical fibers made of hydrogels**, Myunghwan Choi, Harvard Medical School (USA); Matjas Humar, Harvard Medical School (USA) and Massachusetts General Hospital (USA) and Jožef Stefan Institute (Slovenia); Xiangwei Zhao, Southeast Univ. (China); Seok-Hyun Yun, Harvard Medical School (USA) . . . . . [9341-21]

10:50 am: **Towards a multi-functional disposable microneedle based probe**, Clement Yuen, Quan Liu, Nanyang Technological Univ. (Singapore) . . . [9341-22]

11:05 am: **An optical microneedle for antimicrobial blue light therapy**, Jeesoo An, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Caio M. Guimaraes, Univ. de Pernambuco (Brazil); Matjaz Humar, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA) and Jožef Stefan Institute (Slovenia); Moonseok Kim, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Myunghwan Choi, Wellman Ctr. for Photomedicine (USA) and Harvard Medical School (USA); Tianhong Dai, Wellman Ctr. for Photomedicine (USA) and Massachusetts General Hospital (USA); Seok-Hyun Yun, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA) and Harvard-MIT Health Sciences and Technology (USA) . . . . . [9341-23]

11:20 am: **High-resolution endomicroscopy using a graded-index lens coated by scattering layers**, Changhyeong Yoon, Jungho Moon, Hakseok Ko, Pilsung Kang, Yonghyeon Jo, Wonshik Choi, Korea Univ. (Korea, Republic of) . . . . . [9341-24]

11:35 am: **Biointegrated micro-cavities for single cell force-mapping** *(Invited Paper)*, Nils Kronenberg, Univ. of St. Andrews (United Kingdom); Philipp Liehm, Univ. of St Andrews (United Kingdom); Anja Steude, Malte C. Gather, Univ. of St. Andrews (United Kingdom). . . . . [9341-25]

POSTERS-SUNDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . SUN 5:30 PM TO 7:00 PM

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Biocompatible optical needle array for antibacterial blue light therapy, Caio M. Guimarães, Univ. de Pernambuco (Brazil); Jeesoo An, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA); Matjaz Humar, Wellman Ctr. for Photomedicine, Massachusetts General Hospital (USA) and Harvard Medical School (USA) and Jo?ef Stefan Institute (Slovenia); Will A. Goth, The Univ. of Texas at Austin (USA); Seok-Hyun Yun, Harvard Medical School (USA) and Wellman Ctr. for Photomedicine (USA) and Massachusetts General Hospital (USA) . . . . . [9341-26]

BIOS SUNDAY PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . SUN 7:00 PM TO 8:30 PM

Plenary Session Chairs: **Ammasi Periasamy,** Univ. of Virginia (USA
Rainer Erdmann, PicoQuant GmbH (Germany)
Bruce Tromberg, Beckman Laser Institute and Medical Ctr. (USA)

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Stefan W. Hell, Max Planck Institute Göttingen (via video message)
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Eric Betzig, Janelia Research Campus, Howard Hughes Medical Institute, *2014 Nobel Laureate in Chemistry*

W.E. Moerner, Stanford Univ., *2014 Nobel Laureate in Chemistry*

SPIE. PHOTONICS WEST TRANSLATIONAL RESEARCH

SYMPOSIUM CHAIRS

Bruce J. Tromberg
Beckman Laser Institute,
Univ. of California, Irvine (USA)

Gabriela Apiou
Harvard Medical School, Wellman Ctr.
for Photomedicine, Massachusetts
General Hospital (USA)

Contents.

TOPIC AREAS

Translational Research Lunchtime Forum
Sunday 8 February · 12:30 to 2:00 pm
Location: Room 300 (Esplanade)

Discussion Facilitators: **Bruce J. Tromberg** and **Gabriela Apiou**

A discussion of outcomes-based studies that can change the lives of patients. Select participants from the Translational Research virtual symposium will have the opportunity to present their methodology and findings. These speakers will demonstrate the use of optical/light-based techniques that are innovative and clever and can change the outcome for patients in a positive and life-giving way.

BEST PAPER AWARDS IN THE CATEGORY OF EVIDENCE-BASED MEDICINE WILL BE PRESENTED.

SPONSORED BY: OCT News — Optical Coherence Tomography News

Photonic Therapeutics and Diagnostics

(ORDERED BY PRESENTATION DATE AND TIME)

SATURDAY 7 FEBRUARY • 8:30 AM

Conference 9303A: Photonics in Dermatology and Plastic Surgery
SESSION 1: Skin Cancer
Assessment of cutaneous melanoma and basal cell carcinoma with photoacoustic imaging
PAPER 9303-101
Aedán Breathnach, National Univ. of Ireland, Galway (Ireland), et al.

SATURDAY 7 FEBRUARY • 8:50 AM

Conference 9303A: Photonics in Dermatology and Plastic Surgery
SESSION 1: Skin Cancer
In vivo multiphoton microscopy imaging of basal cell carcinoma
PAPER 9303-102
Mihaela Balu, Beckman Laser Institute and Medical Clinic (USA), et al.

SATURDAY 7 FEBRUARY • 8:50 AM

Conference 9305A: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology
SESSION 1: OCT and Microscopy I
Integration of optical coherence tomography with tissue clearing for deep brain imaging
PAPER 9305-101
Sunwoo Jung, Ulsan National Institute of Science and Technology (Korea, Republic of), et al.

SATURDAY 7 FEBRUARY • 9:10 AM

Conference 9309: Mechanisms for Low-Light Therapy X
SESSION 1: Reviews and Dosimetry
Clinical translation with low light therapies: current barriers and new frontiers
PAPER 9309-3
Praveen Arany, National Institute of Dental and Craniofacial Research (USA), et al.

SATURDAY 7 FEBRUARY • 9:30 AM

Conference 9303C: Optical Imaging, Therapeutics, and Advanced Technology in Head and Neck Surgery and Otolaryngology
SESSION 1: OCT for Imaging and Functional Assessment of Middle Ear Structures
Initial results of an OCT vibration measuring otoscope
PAPER 9303-303
Tracy C. Petrie, Oregon Health & Science Univ. (USA), et al.

SATURDAY 7 FEBRUARY • 9:30 AM

Conference 9305A: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology
SESSION 1: OCT and Microscopy I
Coaxial cavity injected OCT and fiber laser ablation system for real-time monitoring of ablative processes
PAPER 9305-103
Jamil Jivraj, Ryerson Univ. (Canada), et al.

SATURDAY 7 FEBRUARY • 9:45 AM

Conference 9307: Ophthalmic Technologies XXV
SESSION 2: Ophthalmic Surgery: Intraoperative Imaging and Monitoring
Automated real-time instrument tracking for microscope-integrated intraoperative OCT imaging of ophthalmic surgical maneuvers
PAPER 9307-6
Mohamed T. El-Haddad, The Cleveland Clinic (USA), et al.

SATURDAY 7 FEBRUARY • 10:00 AM

Conference 9307: Ophthalmic Technologies XXV
SESSION 2: Ophthalmic Surgery: Intraoperative Imaging and Monitoring
Image-guided modified deep anterior lamellar keratoplasty (DALK) corneal transplant using intraoperative optical coherence tomography

PAPER 9307-7

Yuankai K. Tao, The Cleveland Clinic (USA), et al.

SATURDAY 7 FEBRUARY • 10:00 AM

Conference 9308: Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIV
SESSION 1: Photodynamic Therapy I
Targeting cellular and microenvironmental determinants of tumor heterogeneity for PDT-based combinations

PAPER 9308-3

Imran Rizvi, Brigham and Women's Hospital (USA), et al.

SATURDAY 7 FEBRUARY • 10:30 AM

Conference 9307: Ophthalmic Technologies XXV
SESSION 2: Ophthalmic Surgery: Intraoperative Imaging and Monitoring
Design and evaluation of an intraocular B-scan OCT-guided 36-gauge needle tip

PAPER 9307-9

Karen M. Joos, Vanderbilt Univ. (USA), et al.

SATURDAY 7 FEBRUARY • 10:40 AM

Conference 9303D: Diagnosis and Treatment of Diseases in the Breast and Reproductive System
SESSION 2: Gynocology
Imaging and modeling the extracellular matrix in ovarian cancer

PAPER 9303-406

Paul J. Campagnola, Univ. of Wisconsin-Madison (USA), et al.

SATURDAY 7 FEBRUARY • 10:40 AM

Conference 9303E: Diagnostic and Therapeutic Applications of Light in Cardiology
SESSION 2: Multimodality Imaging
Ultrahigh speed integrated intravascular ultrasound and optical coherence tomography imaging system and catheter

PAPER 9303-505

Jiawen Li, Univ. of California, Irvine (USA), et al.

SATURDAY 7 FEBRUARY • 11:00 AM

Conference 9303F: Optics in Bone Surgery and Diagnostics
SESSION 2: Muskuloskeletal Imaging and Diagnostics I
Photoacoustic imaging: a potential new platform for assessment of bone health

PAPER 9303-603

Xueding Wang, Univ. of Michigan Medical School (USA), et al.

SATURDAY 7 FEBRUARY • 11:10 AM

Conference 9303D: Diagnosis and Treatment of Diseases in the Breast and Reproductive System
SESSION 2: Gynocology
Characterization of cervical remodeling during pregnancy using in vivo Raman spectroscopy

PAPER 9303-407

Christine M. O'Brien, Vanderbilt Univ. (USA), et al.

SATURDAY 7 FEBRUARY • 11:20 AM

Conference 9308: Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIV
SESSION 2: Photodynamic Therapy II
Carbonic Anhydrase-9 (CAIX) expression as a marker to predict response of aminolevulinic acid based photodynamic therapy

PAPER 9308-5

Srivalleesha Mallidi, Harvard Medical School (USA), et al.

SATURDAY 7 FEBRUARY • 11:40 AM

Conference 9303B: Therapeutics and Diagnostics in Urology
SESSION 10: Urinary Tract Diagnosis
Label-free serial optical coherence tomography for visualizing development of unilateral ureteral obstruction

PAPER 9303-206

Sungbea Ban, Ulsan National Institute of Science and Technology (Korea, Republic of), et al.

SATURDAY 7 FEBRUARY • 1:20 PM

Conference 9303D: Diagnosis and Treatment of Diseases in the Breast and Reproductive System
SESSION 3: Diffuse Optics and Spectroscopy
Preclinical monitoring of breast and prostate chemotherapy response with spatial frequency domain imaging

PAPER 9303-410

Darren M. Roblyer, Boston Univ. (USA), et al.

SATURDAY 7 FEBRUARY • 1:30 PM

Conference 9308: Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIV
SESSION 3: Photodynamic Therapy III
Estimating Verteporfin delivery and light treatment planning for pancreas PDT

PAPER 9308-7

Brian W. Pogue, Thayer School of Engineering at Dartmouth (USA), et al.

SATURDAY 7 FEBRUARY • 1:40 PM

Conference 9303D: Diagnosis and Treatment of Diseases in the Breast and Reproductive System
SESSION 3: Diffuse Optics and Spectroscopy
Diffuse optical quantification of early hemodynamic changes by chemotherapy on breast cancer xenografts & its implication for therapeutic prediction in clinic

PAPER 9303-411

Regine Choe, Univ. of Rochester (USA), et al.

SATURDAY 7 FEBRUARY • 1:45 PM

Conference 9307: Ophthalmic Technologies XXV
SESSION 3: Ophthalmic Imaging: Small Animal Models
Model-based solution for remotely scanned in-vivo mouse retinal imaging

PAPER 9307-12

Adi Schejter, Technion-Israel Institute of Technology (Israel), et al.

SATURDAY 7 FEBRUARY • 1:50 PM

Conference 9309: Mechanisms for Low-Light Therapy X
SESSION 3: Animal Studies I
Transcranial low-level laser therapy increases memory, learning, neuroprogenitor cells, BDNF and synaptogenesis in mice with traumatic brain injury

PAPER 9309-11

Michael R. Hamblin, Wellman Ctr. for Photomedicine (USA), et al.

SATURDAY 7 FEBRUARY • 2:00 PM

Conference 9303A: Photonics in Dermatology and Plastic Surgery
SESSION 4: Wound Healing
A rapid-drying liquid bandage for the non-invasive transdermal two-dimensional mapping of cutaneous oxygenation

PAPER 9303-110

Zongxi Li, Massachusetts General Hospital (USA), et al.

SATURDAY 7 FEBRUARY • 2:00 PM

Conference 9303D: Diagnosis and Treatment of Diseases in the Breast and Reproductive System
SESSION 3: Diffuse Optics and Spectroscopy
Identification of non-responding locally advanced breast tumors after a single cycle of neoadjuvant chemotherapy

PAPER 9303-412

Martijn Van de Giessen, Leiden Univ. Medical Ctr. (Netherlands), et al.

TRANSLATIONAL RESEARCH PAPERS

SATURDAY 7 FEBRUARY • 2:10 PM

Conference 9305A: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology
SESSION 3: Operative and Post-op Therapy I

Interstitial photodynamic therapy and glioblastoma: light fractionation study on pre clinical model

PAPER 9305-111

Henri-Arthur Leroy, Lille Univ. Hospital (France), et al.

SATURDAY 7 FEBRUARY • 2:20 PM

Conference 9309: Mechanisms for Low-Light Therapy X
SESSION 3: Animal Studies I

Optical properties of mice skin for optical therapy relevant wavelengths: influence of gender and pigmentation

PAPER 9309-12

Caetano Padial Sabino, Ctr. for Lasers and Applications, Institute for Nuclear and Energetic Research-CNEN/SP (Brazil), et al.

SATURDAY 7 FEBRUARY • 2:30 PM

Conference 9303A: Photonics in Dermatology and Plastic Surgery
SESSION 4: Wound Healing

Microvascular complications associated with injection of cosmetic facelift dermal fillers

PAPER 9303-111

Siavash Yousefi, Stanford Univ. (USA), et al.

SATURDAY 7 FEBRUARY • 2:30 PM

Conference 9303C: Optical Imaging, Therapeutics, and Advanced Technology in Head and Neck Surgery and Otolaryngology
SESSION 3: Advances In Upper Airway Imaging: Functional Assessment and Therapeutic Options

Monte Carlo modeling of light propagation in the human head for applications in sinus imaging

PAPER 9303-310

Albert E. Cerussi, Beckman Laser Institute and Medical Clinic (USA), et al.

SATURDAY 7 FEBRUARY • 2:40 PM

Conference 9303B: Therapeutics and Diagnostics in Urology
SESSION 11: Kidney Disease Treatment

In-vivo, percutaneous, optical biopsy of renal masses using optical coherence tomography

PAPER 9303-210

Abel Swaan, Academisch Medisch Centrum (Netherlands), et al.

SATURDAY 7 FEBRUARY • 2:50 PM

Conference 9303E: Diagnostic and Therapeutic Applications of Light in Cardiology
SESSION 3: Imaging the Myocardium

Imaging myocardial fiber architecture of the mouse heart using Stokes vector analysis from fiber-based polarization-sensitive optical frequency domain imaging

PAPER 9303-513

Sun-Joo Jang, KAIST (Korea, Republic of), et al.

SATURDAY 7 FEBRUARY • 3:00 PM

Conference 9303D: Diagnosis and Treatment of Diseases in the Breast and Reproductive System
SESSION PSat: Poster SESSION and Coffee Break

Full-field optical coherence tomography (FFOCT) for evaluation of endometrial cancer

PAPER 9303-426

Jeffrey L. Fine, Univ. of Pittsburgh (USA), et al.

SATURDAY 7 FEBRUARY • 3:40 PM

Conference 9305A: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology
SESSION 4: Operative and Post-Op Therapy II

A neurosurgical guidance spectroscopic probe system for combined single-point detection of intrinsic fluorescence, diffuse reflectance and inelastic scattering

PAPER 9305-115

Jeanne Mercier, Ecole Polytechnique de Montréal (Canada), et al.

SATURDAY 7 FEBRUARY • 4:00 PM

Conference 9309: Mechanisms for Low-Light Therapy X
SESSION 4: Clinical Studies

To evaluate the safety and efficiency of low level laser therapy(LLLT) in treating decubitus ulcers: a review

PAPER 9309-14

Ambereen Ahmed, A&M AssortedTherapy.LLC (USA), et al.

SATURDAY 7 FEBRUARY • 4:00 PM

Conference 9311: Molecular-Guided Surgery: Molecules, Devices, and Applications
SESSION 2: Advanced Molecular Imaging Methods

Quantitative wide-field fluorescence imaging in neurosurgery

PAPER 9311-7

Keith D. Paulsen, Thayer School of Engineering at Dartmouth (USA), et al.

SATURDAY 7 FEBRUARY • 4:20 PM

Conference 9305A: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology
SESSION 4: Operative and Post-Op Therapy II

Video rate high definition near infra red (NIR) Intra-operative imaging of brain tumors using BLZ-100

PAPER 9305-118

Pramod V. Butte, Cedars-Sinai Medical Ctr. (USA), et al.

SATURDAY 7 FEBRUARY • 5:00 PM

Conference 9309: Mechanisms for Low-Light Therapy X
SESSION 4: Clinical Studies

Comparison of clinical effectiveness of laser acupuncture and amitrytyline in diabetic peripheral neuropathy (DPN) a sham controlled randomized clinical trial

PAPER 9309-17

Shahzad Anwar, Iffat Anwar Medical Complex (Pakistan), et al.

SATURDAY 7 FEBRUARY • 5:00 PM

Conference 9311: Molecular-Guided Surgery: Molecules, Devices, and Applications
SESSION 2: Advanced Molecular Imaging Methods

Quantitative molecular receptor imaging is facilitated by arterial input function acquisition combined with kinetic modeling

PAPER 9311-9

Jonathan T. Elliott, Dartmouth College (USA), et al.

SATURDAY 7 FEBRUARY • 5:30 PM

Conference 9303D: Diagnosis and Treatment of Diseases in the Breast and Reproductive System
SESSION 4: Microscopy

Differentiating cancerous from normal breast tissue by redox imaging

PAPER 9303-419

He N. Xu, Univ. of Pennsylvania (USA), et al.

SUNDAY 8 FEBRUARY • 8:00 AM

Conference 9311: Molecular-Guided Surgery: Molecules, Devices, and Applications
SESSION 3: Clinical Fluorescence Imaging Systems

Fluorescence image-guided surgery: from benchtop to bedside

PAPER 9311-13

Siavash Yazdanfar, GE Global Research (USA), et al.

SUNDAY 8 FEBRUARY • 8:30 AM

Conference 9311: Molecular-Guided Surgery: Molecules, Devices, and Applications
SESSION 3: Clinical Fluorescence Imaging Systems
Molecular-guided endoscopic mucosal resection of early neoplasia in Barrett's esophagus

PAPER 9311-14

Thomas D. Wang, Univ. of Michigan (USA), et al.

SUNDAY 8 FEBRUARY • 8:30 AM

Conference 9304B: Endoscopic Microscopy X
SESSION 2: New Techniques and Contrast Agents
In vivo laser-based imaging of the human fallopian tube for future cancer detection

PAPER 9304-201

Eric J. Seibel, Univ. of Washington (USA), et al.

SUNDAY 8 FEBRUARY • 8:45 AM

Conference 9307: Ophthalmic Technologies XXV
SESSION 5: Vision: Assessment, Correction, Restoration
Photovoltaic restoration of sight with high visual acuity in rats with retinal degeneration

PAPER 9307-28

D**aniel V. Palanker,** Stanford Univ. (USA), et al.

SUNDAY 8 FEBRUARY • 8:50 AM

Conference 9304B: Endoscopic Microscopy X
SESSION 2: New Techniques and Contrast Agents
Near infrared probe-based confocal laser endomicroscopy for in vivo diagnostic of peritoneal carcinomatosis

PAPER 9304-202

Muriel Abbaci, Institut Gustave Roussy (France), et al.

SUNDAY 8 FEBRUARY • 9:10 AM

Conference 9304B: Endoscopic Microscopy X
SESSION 2: New Techniques and Contrast Agents
Laparoscopic volume holographic system for in vivo: simultaneous multi-section imaging of ovary

PAPER 9304-203

Jennifer K. Barton, The Univ. of Arizona (USA), et al.

SUNDAY 8 FEBRUARY • 9:20 AM

Conference 9311: Molecular-Guided Surgery: Molecules, Devices, and Applications
SESSION 3: Clinical Fluorescence Imaging Systems
Augmented microscopy with near-infrared fluorescence detection

PAPER 9311-16

Jeff Watson, The Univ. of Arizona (USA), et al.

SUNDAY 8 FEBRUARY • 9:20 AM

Conference 9303C: Optical Imaging, Therapeutics, and Advanced Technology in Head and Neck Surgery and Otolaryngology
SESSION 4: Non-Invasive Head and Neck Cancer Diagnosis: OCT and Other Modalities
Full-field OCT for fast diagnostic of head and neck cancer

PAPER 9303-317

Frederic De Leeuw, Institut Gustave Roussy (France), et al.

SUNDAY 8 FEBRUARY • 9:30 AM

Conference 9304B: Endoscopic Microscopy X
SESSION 2: New Techniques and Contrast Agents
A six-color four-laser mobile platform for multi-spectral fluorescence imaging endoscopy

PAPER 9304-204

John F. Black, Glannaventa, Inc. (USA), et al.

SUNDAY 8 FEBRUARY • 9:40 AM

Conference 9303C: Optical Imaging, Therapeutics, and Advanced Technology in Head and Neck Surgery and Otolaryngology
SESSION 4: Non-Invasive Head and Neck Cancer Diagnosis: OCT and Other Modalities
Development of a supraglottic and subglottic tumor model and multimodal imaging of endobronchial ultrasound and optical coherence tomography

PAPER 9303-318

Yeh-Chan Ahn, Pukyong National Univ. (Korea, Republic of), et al.

SUNDAY 8 FEBRUARY • 10:00 AM

Conference 9308: Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIV
SESSION 6: Photodynamic Therapy V
Enabling technology for photodynamic therapy in global health settings: battery-powered irradiation and smartphone-based imaging for ALA-PDT

PAPER 9308-18

Jonathan P. Celli, Univ. of Massachusetts Boston (USA), et al.

SUNDAY 8 FEBRUARY • 10:30 AM

Conference 9311: Molecular-Guided Surgery: Molecules, Devices, and Applications
SESSION 4: Molecular Contrast Agents
Activatable fluorescence probes appropriate for assisting surgical and endoscopic procedures

PAPER 9311-18

Hisataka Kobayashi, National Cancer Institute (USA), et al.

SUNDAY 8 FEBRUARY • 10:30 AM

Conference 9303A: Photonics in Dermatology and Plastic Surgery
SESSION 7: Therapeutics
The stepwise multi-photon activation fluorescence guided ablation of melanin

PAPER 9303-122

Zhenhua Lai, Northeastern Univ. (USA), et al.

SUNDAY 8 FEBRUARY • 10:30 AM

Conference 9305A: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology
SESSION 6: OCT and Microscopy III
Evaluation of hemodynamics changes during interventional stent placement using Doppler optical coherence tomography

PAPER 9305-126

Barry Vuong, Ryerson Univ. (Canada), et al.

SUNDAY 8 FEBRUARY • 10:50 AM

Conference 9303A: Photonics in Dermatology and Plastic Surgery
SESSION 7: Therapeutics
Controlled laser delivery into biological tissue via thin-film optical tunneling and refraction

PAPER 9303-123

Paul J. D. Whiteside, Univ. of Missouri-Columbia (USA), et al.

SUNDAY 8 FEBRUARY • 10:50 AM

Conference 9305A: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology
SESSION 6: OCT and Microscopy III
Patient specific intracranial aneurysm flow phantom imaging with optical coherence tomography

PAPER 9305-127

Barry Vuong, Ryerson Univ. (Canada), et al.

SUNDAY 8 FEBRUARY • 11:00 AM

Conference 9311: Molecular-Guided Surgery: Molecules, Devices, and Applications
SESSION 4: Molecular Contrast Agents
Clinical trials in near Infrared fluorescence imaging with IRDye 800CW

PAPER 9311-19

Daniel R. Draney, LI-COR Biosciences (USA), et al.

TRANSLATIONAL RESEARCH PAPERS

SUNDAY 8 FEBRUARY • 11:10 AM

Conference 9305A: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology
SESSION 6: OCT and Microscopy III
Label free, real time visualization of tissue histology at subcellular resolution: a study of primary versus secondary human brain cancer tissues

PAPER 9305-128

Carmen Kut, The Johns Hopkins Hospital (USA), et al.

SUNDAY 8 FEBRUARY • 11:30 AM

Conference 9305A: Optical Techniques in Neurosurgery, Brain Imaging, and Neurobiology
SESSION 6: OCT and Microscopy III
Optomechanical design of a miniaturized intraoperative fluorescence-guided surgical resection camera system

PAPER 9305-114

David S. Kittle, Cedars-Sinai Medical Ctr. (USA), et al.

SUNDAY 8 FEBRUARY • 12:00 PM

Conference 9311: Molecular-Guided Surgery: Molecules, Devices, and Applications
SESSION 4: Molecular Contrast Agents
Novel near-infrared imaging agents targeting prostate cancer

PAPER 9311-21

Xinning Wang, Case Western Reserve Univ. (USA), et al.

SUNDAY 8 FEBRUARY • 1:50 PM

Conference 9304B: Endoscopic Microscopy X
SESSION 4: New OCT Probes I
Integrated OCT-US catheter for detection of cancer in gastrointestinal tract

PAPER 9304-211

Jiawen Li, Univ. of California, Irvine (USA), et al.

SUNDAY 8 FEBRUARY • 2:20 PM

Conference 9306: Lasers in Dentistry XXI
SESSION 3: Lasers in Imaging
Real time imaging of in vivo caries and gingivitis

PAPER 9306-11

Mari-Alina I. Timoshchuk, Univ. of Washington (USA), et al.

SUNDAY 8 FEBRUARY • 2:30 PM

Conference 9308: Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIV
SESSION 8: Photodynamic Therapy VII
Fluorescence time course imaging of healthy and diseased skin for PpIX metabolic maps used in topical PDT and its correlation to the skin and lesions structures

PAPER 9308-25

Olena Kulyk, Univ. of St. Andrews (United Kingdom), et al.

SUNDAY 8 FEBRUARY • 2:30 PM

Conference 9311: Molecular-Guided Surgery: Molecules, Devices, and Applications
SESSION 5: Preclinical Applications and Clinical Translation
A miniaturized imaging system for optical guided surgery of head and neck cancer

PAPER 9311-25

Jean-Luc Coll, INSERM (France), et al.

SUNDAY 8 FEBRUARY • 2:50 PM

Conference 9311: Molecular-Guided Surgery: Molecules, Devices, and Applications
SESSION 5: Preclinical Applications and Clinical Translation
Ex-vivo tissue classification of cell surface receptor concentrations using kinetic modeling

PAPER 9311-26

Lagnojita Sinha, Illinois Institute of Technology (USA), et al.

SUNDAY 8 FEBRUARY • 2:50 PM

Conference 9304B: Endoscopic Microscopy X
SESSION 4: New OCT Probes I
Tethered capsule endomicroscopy for comprehensive imaging of the human small intestine

PAPER 9304-214

Michalina J. Gora, Wellman Ctr. for Photomedicine (USA), et al.

SUNDAY 8 FEBRUARY • 3:00 PM

Conference 9306: Lasers in Dentistry XXI
SESSION 3: Lasers in Imaging
All-optical photoacoustic imaging and detection of early-stage dental caries

PAPER 9306-13

Ashwin Sampathkumar, Riverside Research Institute (USA), et al.

SUNDAY 8 FEBRUARY • 3:10 PM

Conference 9311: Molecular-Guided Surgery: Molecules, Devices, and Applications
SESSION 5: Preclinical Applications and Clinical Translation
Small animal imaging platform for quantitative short-wave infrared emitting contrast agents

PAPER 9311-27

Mark C. Pierce, Rutgers, The State Univ. of New Jersey (USA), et al.

SUNDAY 8 FEBRUARY • 3:30 PM

Conference 9308: Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIV
SESSION 9: Photodynamic Therapy VIII
Topical calcitriol prior to photodynamic therapy enhances treatment efficacy in non-melanoma skin cancer mouse models

PAPER 9308-26

Kishore Reddy Rollakanti, The Cleveland Clinic (USA), et al.

SUNDAY 8 FEBRUARY • 3:50 PM

Conference 9304A: Optical Techniques in Pulmonary Medicine II
SESSION 6: Animal Models II
In vivo optical coherence tomography imaging of airway and alveolar dynamics during bronchial challenge test

PAPER 9304-119

Yeh-Chan Ahn, Pukyong National Univ. (Korea, Republic of), et al.

SUNDAY 8 FEBRUARY • 4:00 PM

Conference 9311: Molecular-Guided Surgery: Molecules, Devices, and Applications
SESSION 6: Clinical Applications
Image guided surgery using near infrared fluorescent light: from bench to bedside

PAPER 9311-28

Alexander L. Vahrmeijer, Leiden Univ. Medical Ctr. (Netherlands), et al.

SUNDAY 8 FEBRUARY • 4:15 PM

Conference 9307: Ophthalmic Technologies XXV
SESSION 9: Ophthalmic Imaging: Models, Phantoms, Technology
Automatic optimization high-speed high-resolution OCT retinal imaging at 1μm

PAPER 9307-48

Yifan Jian, Simon Fraser Univ. (Canada), et al.

SUNDAY 8 FEBRUARY • 4:20 PM

Conference 9304B: Endoscopic Microscopy X
SESSION 5: New OCT Probes II
Tethered capsule OCT endomicroscopy with image guided biopsy for technology validation

PAPER 9304-217

Amna R. Soomro, Massachusetts General Hospital (USA), et al.

SUNDAY 8 FEBRUARY • 4:30 PM

Conference 9311: Molecular-Guided Surgery: Molecules, Devices, and Applications
SESSION 6: Clinical Applications
Sentinel lymph node detection in breast cancer patients using surgical navigation system based on fluorescence molecular imaging technology
PAPER 9311-29
Jie Tian, Institute of Automation (China), et al.

SUNDAY 8 FEBRUARY • 5:20 PM

Conference 9311: Molecular-Guided Surgery: Molecules, Devices, and Applications
SESSION 6: Clinical Applications
Intraoperative imaging of tumors with indo-cyanine green fluorescence with an endoscope
PAPER 9311-31
Ashwin B. Parthasarathy, Univ. of Pennsylvania (USA), et al.

SUNDAY 8 FEBRUARY • 5:30 PM

Conference 9307: Ophthalmic Technologies XXV
SESSION PSun: Posters-Sunday
Preliminary studies for the diagnosis and treatment of ocular surface squamous neoplasia
PAPER 9307-67
Yeh-Chan Ahn, Pukyong National Univ. (Korea, Republic of), et al.

SUNDAY 8 FEBRUARY • 5:30 PM

Conference 9307: Ophthalmic Technologies XXV
SESSION PSun: Posters-Sunday
A novel platform for minimally invasive delivery of cellular therapy as a thin layer across the subretina for treatment of retinal degeneration
PAPER 9307-69
Ygal Rotenstreich, Tel Aviv Univ. (Israel), et al.

SUNDAY 8 FEBRUARY • 5:30 PM

Conference 9311: Molecular-Guided Surgery: Molecules, Devices, and Applications
SESSION PSun: Posters-Sunday
Fiber optic quantification of dual-fluorophores to provide both tissue and vascular contrast during resection of brain tumors
PAPER 9311-37
Jaime Bravo, Thayer School of Engineering at Dartmouth (USA), et al.

SUNDAY 8 FEBRUARY • 5:40 PM

Conference 9311: Molecular-Guided Surgery: Molecules, Devices, and Applications
SESSION 6: Clinical Applications
Quantitative assessment of the potential for Cerenkov luminescence imaging guided oncologic surgery
PAPER 9311-32
Justin S. Klein, Univ. of California, Davis (USA), et al.

MONDAY 9 FEBRUARY • 8:50 AM

Conference 9304B: Endoscopic Microscopy X
SESSION 6: Advances in SECM/SEE Technology
Comprehensive confocal microscopy of human esophagus in vivo using an SECM endoscopic probe
PAPER 9304-220
DongKyun Kang, Massachusetts General Hospital (USA), et al.

MONDAY 9 FEBRUARY • 9:10 AM

Conference 9304B: Endoscopic Microscopy X
SESSION 6: Advances in SECM/SEE Technology
Large-area imaging of breast tissues with spectrally encoded confocal microscopy (SECM)
PAPER 9304-221
DongKyun Kang, Massachusetts General Hospital (USA), et al.

MONDAY 9 FEBRUARY • 9:30 AM

Conference 9304B: Endoscopic Microscopy X
SESSION 6: Advances in SECM/SEE Technology
Confocal microscopy of the esophagus using a tethered capsule endomicroscopy device enables the visualization of individual eosinophils in eosinophilic esophagitis patients
PAPER 9304-222
DongKyun Kang, Massachusetts General Hospital (USA), et al.

MONDAY 9 FEBRUARY • 11:00 AM

Conference 9304B: Endoscopic Microscopy X
SESSION 7: Endoscopic Microscopy I
Dual-modal optical imaging microendoscope for ovarian cancer detection
PAPER 9304-225
Molly Keenan, The Univ. of Arizona (USA), et al.

MONDAY 9 FEBRUARY • 11:30 AM

Conference 9305B: Neurophotonics
SESSION 2: Neurophotonic Applications I
Laser-acupuncture for autism spectrum disorder a randomized sham controlled trial
PAPER 9305-207
Shahzad Anwar, Anwar Shah Trust for Cerebral Palsy & Paralysis (Pakistan), et al.

MONDAY 9 FEBRUARY • 1:50 PM

Conference 9304B: Endoscopic Microscopy X
SESSION 8: Endoscopic Microscopy II
Clinical experience with a confocal microlaparoscope for ovarian cancer detection
PAPER 9304-229
Andrew R. Rouse, The Univ. of Arizona (USA), et al.

MONDAY 9 FEBRUARY • 2:10 PM

Conference 9304B: Endoscopic Microscopy X
SESSION 8: Endoscopic Microscopy II
Aberration correction of gradient index lens based combined two-photon microscopy and optical coherence tomography
PAPER 9304-230
Taejun Wang, Pohang Univ. of Science and Technology (Korea, Republic of), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9304B: Endoscopic Microscopy X
SESSION PMon: Posters-Monday
Stray light mitigation in a novel endoscope for fallopian tubes
PAPER 9304-236
Elizabeth J. Swan, The Univ. of Arizona (USA), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9304B: Endoscopic Microscopy X
SESSION PMon: Posters-Monday
Development of a new laparoscopic system for detection of gastric cancer using fluorescent clip emitting near-infrared light
PAPER 9304-238
Shunko A. Inada, Nagoya Univ. (Japan), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9305B: Neurophotonics
SESSION PMon: Posters-Monday
The evaluation of cerebral autoregulation in patients with obstructive sleep apnea syndrome with near-infrared spectroscopy
PAPER 9305-252
Zhongxing Zhang, Clinic Barmelweid (Switzerland), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9305B: Neurophotonics
SESSION PMon: Posters-Monday
Miniature device for chronic, label-free multi-modal optical imaging of cortical hemodynamics in rats
PAPER 9305-256
Ofer Levi, Univ. of Toronto (Canada), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9305B: Neurophotonics
SESSION PMon: Posters-Monday
Near-infrared spectroscopy assessment of divided visual attention task-invoked cerebral hemodynamics during prolonged true driving
PAPER 9305-258
Ting Li, Univ. of Electronic Science and Technology of China (China), et al.

Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering

(ORDERED BY PRESENTATION DATE AND TIME)

SATURDAY 7 FEBRUARY • 8:20 AM

Conference 9317: Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications XV
SESSION 1: Fibers and Sensors I
In-vivo assessment of ultra-structural alterations as an early event in cancer progression: implications for cancer screening
PAPER 9317-1
Adam Eshein, Northwestern Univ. (USA), et al.

SATURDAY 7 FEBRUARY • 9:20 AM

Conference 9317: Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications XV
SESSION 1: Fibers and Sensors I
FO-SPR for therapeutic drug monitoring of infliximab
PAPER 9317-4
Thomas Van Stappen, Katholieke Univ. Leuven (Belgium), et al.

SATURDAY 7 FEBRUARY • 11:20 AM

Conference 9314: Optics and Biophotonics in Low-Resource Settings
SESSION 2: Mobile-Phone Enabled Skin Imaging Technologies
A mobile medical application for imaging and analysis of hand arthritis: (I) characterizing the reproducibility
PAPER 9314-7
Fartash Vasefi, eTreat Medical Diagnostics, Inc. (Canada), et al.

SATURDAY 7 FEBRUARY • 11:40 AM

Conference 9314: Optics and Biophotonics in Low-Resource Settings
SESSION 2: Mobile-Phone Enabled Skin Imaging Technologies
A mobile medical application for imaging and analysis of hand arthritis: (II) quantitative osteoarthritis scoring
PAPER 9314-8
Fartash Vasefi, eTreat Medical Diagnostics, Inc. (Canada), et al.

SATURDAY 7 FEBRUARY • 2:20 PM

Conference 9314: Optics and Biophotonics in Low-Resource Settings
SESSION 3: Mobile-Phone Enabled Cervical and ENT Imaging
Cellphone based mobile colposcope for the evaluation of women with abnormal cervical cancer screening
PAPER 9314-11
Bruce Kahn, Scripps Clinic Carmel Valley (USA), et al.

SATURDAY 7 FEBRUARY • 2:30 PM

Conference 9316: Multimodal Biomedical Imaging X
SESSION 3: Multimodality Microscopy
Detection of oral precancer with fluorescence lifetime imaging and reflectance confocal microscopy
PAPER 9316-14
Bilal H. Malik, Texas A&M Univ. (USA), et al.

SATURDAY 7 FEBRUARY • 2:40 PM

Conference 9314: Optics and Biophotonics in Low-Resource Settings
SESSION 3: Mobile-Phone Enabled Cervical and ENT Imaging
Near-infrared imaging for management of chronic maxillary sinusitis
PAPER 9314-12
Joon S. You, Praxis BioSciences (USA), et al.

SATURDAY 7 FEBRUARY • 2:50 PM

Conference 9316: Multimodal Biomedical Imaging X
SESSION 3: Multimodality Microscopy
Integrated ultrasound and optical coherence tomography (OCT) endoscope for enhanced endoscopic diagnosis of bile duct cancer (cholangiocarcinoma)
PAPER 9316-15
Teng Ma, The Univ. of Southern California (USA), et al.

SATURDAY 7 FEBRUARY • 3:50 PM

Conference 9315: Design and Quality for Biomedical Technologies VIII
SESSION 2: Quality and Standardization
A dynamic opto-physiological model to effectively interpret retinal microvascular circulation
PAPER 9315-5
Sijung Hu, Loughborough Univ. (United Kingdom), et al.

SATURDAY 7 FEBRUARY • 4:30 PM

Conference 9315: Design and Quality for Biomedical Technologies VIII
SESSION 2: Quality and Standardization
Standardized cell samples for midIR technology development
PAPER 9315-7
Jürgen Schnekenburger, Westfälische Wilhelms-Univ. Münster (Germany), et al.

SATURDAY 7 FEBRUARY • 4:50 PM

Conference 9315: Design and Quality for Biomedical Technologies VIII
SESSION 2: Quality and Standardization
Calibration of NIRS-measured hemodynamics with best-matched hemoglobin extinction coefficients and group statics on human-blood-model data
PAPER 9315-8
Ting Li, Univ. of Electronic Science and Technology of China (China), et al.

SATURDAY 7 FEBRUARY • 5:00 PM

Conference 9316: Multimodal Biomedical Imaging X
SESSION 4: Preclinical / Hybrid Imaging
Multi-modality imaging using a handheld gamma camera and MRI for tumor localization
PAPER 9316-20
Cheryl Dika, Cubresa Inc. (Canada), et al.

SATURDAY 7 FEBRUARY • 5:20 PM

Conference 9316: Multimodal Biomedical Imaging X
SESSION 4: Preclinical / Hybrid Imaging
Photo-magnetic imaging: high resolution optical imaging modality
PAPER 9316-21
Alex T. Luk, Univ. of California, Irvine (USA), et al.

SUNDAY 8 FEBRUARY • 8:45 AM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 1: Surgical Guidance I
Human thyroid imaging using optical coherence tomography
PAPER 9313-1
Sarah J. Erickson-Bhatt, Univ. of Illinois at Urbana-Champaign (USA), et al.

SUNDAY 8 FEBRUARY • 9:00 AM

Conference 9315: Design and Quality for Biomedical Technologies VIII
SESSION 4: Imaging Technologies for Clinical Application
Bridging the gap in colonoscopy with optical and engineering solutions
PAPER 9315-10
Bhaskar Banerjee, The Univ. of Arizona (USA), et al.

SUNDAY 8 FEBRUARY • 9:25 AM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 1: Surgical Guidance I

Performance comparison of different compact NIR fluorescent imaging systems with goggle display for intraoperative Iimage-guidance

PAPER 9313-3

Shengkui Gao, Washington Univ. in St. Louis (USA), et al.

SUNDAY 8 FEBRUARY • 9:30 AM

Conference 9315: Design and Quality for Biomedical Technologies VIII
SESSION 4: Imaging Technologies for Clinical Application

All plastic fluorescence image guided goggle system

PAPER 9315-11

Rongguang Liang, The Univ. of Arizona (USA), et al.

SUNDAY 8 FEBRUARY • 9:40 AM

Conference 9314: Optics and Biophotonics in Low-Resource Settings
SESSION 5: Mobile Microscopy, Sensing and Diagnostics I

Pathology slide imaging using wide-field lensfree microscopy

PAPER 9314-20

Yibo Zhang, Univ. of California, Los Angeles (USA), et al.

SUNDAY 8 FEBRUARY • 9:45 AM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 1: Surgical Guidance I

Real-time fluorescence-guided tumor visualization for intraoperative surgical resection

PAPER 9313-4

David S. Kittle, Cedars-Sinai Medical Ctr. (USA), et al.

SUNDAY 8 FEBRUARY • 9:50 AM

Conference 9315: Design and Quality for Biomedical Technologies VIII
SESSION 4: Imaging Technologies for Clinical Application

Optical design of a dual-view endoscope

PAPER 9315-12

Rongguang Liang, The Univ. of Arizona (USA), et al.

SUNDAY 8 FEBRUARY • 10:40 AM

Conference 9315: Design and Quality for Biomedical Technologies VIII
SESSION 5: Imaging Technologies I

Spatial frequency domain imaging (SFDI): evolution of a translational system

PAPER 9315-13

Amaan Mazhar, Modulated Imaging, Inc. (USA), et al.

SUNDAY 8 FEBRUARY • 10:55 AM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 2: Surgical Guidance II

Smart surgical tools: real-time time-resolved fluorescence spectroscopy integration with surgical tools for intra-operative tumor detection

PAPER 9313-6

Pramod V. Butte, Cedars-Sinai Medical Ctr. (USA), et al.

SUNDAY 8 FEBRUARY • 11:10 AM

Conference 9315: Design and Quality for Biomedical Technologies VIII
SESSION 5: Imaging Technologies I

Multifocal confocal spectral microscope

PAPER 9315-14

Rongguang Liang, The Univ. of Arizona (USA), et al.

SUNDAY 8 FEBRUARY • 11:15 AM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 2: Surgical Guidance II

High spatial frequency structured light imaging for intraoperative breast tumor margin assessment

PAPER 9313-7

David M McClatchy, Thayer School of Engineering at Dartmouth (USA), et al.

SUNDAY 8 FEBRUARY • 1:30 PM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 3: Cancer Detection: Methods I

A 360 degree view endoscope using miniaturized panomorph optics for 3-D colon mapping

PAPER 9313-9

Qiyin Fang, McMaster Univ. (Canada), et al.

SUNDAY 8 FEBRUARY • 2:10 PM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 3: Cancer Detection: Methods I

In-situ photopolymerization and monitoring device for controlled shaping of tissue fillers, replacements and implants

PAPER 9313-11

Andreas Schmocker, Ecole Polytechnique Fédérale de Lausanne (Switzerland), et al.

SUNDAY 8 FEBRUARY • 3:10 PM

Conference 9315: Design and Quality for Biomedical Technologies VIII
SESSION 6: Design of Biomedical Imaging Technologies

A new engineering approach to reveal correlation of physiological change and spontaneous expression from video images

PAPER 9315-21

Sijung Hu, Loughborough Univ. (United Kingdom), et al.

SUNDAY 8 FEBRUARY • 3:30 PM

Conference 9320: Microfluidics, BioMEMS, and Medical Microsystems XIII
SESSION 6: Medical Devices II

New generation of neural prosthetic ECoG arrays using glassy carbon-based micromachined microelectrodes

PAPER 9320-22

Sam Kassegne, San Diego State Univ. (USA), et al.

SUNDAY 8 FEBRUARY • 3:40 PM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 4: Cancer Detection: Methods II

Pump-probe imaging of pigmented cutaneous melanoma gives insight into lesions' metastatic potential

PAPER 9313-14

Francisco E. Robles, Duke Univ. (USA), et al.

SUNDAY 8 FEBRUARY • 4:00 PM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 4: Cancer Detection: Methods II

High-area-throughput automated gigapixel imaging of whole prostate tumor resection surfaces using structured illumination microscopy

PAPER 9313-15

J. Quincy Brown, Tulane Univ. (USA), et al.

SUNDAY 8 FEBRUARY • 4:00 PM

Conference 9320: Microfluidics, BioMEMS, and Medical Microsystems XIII
SESSION 6: Medical Devices II

Beyond isolated cells: microfluidic transport of large tissue for pancreatic cancer diagnosis

PAPER 9320-23

Ronnie Das, Univ. of Washington (USA), et al.

SUNDAY 8 FEBRUARY • 5:00 PM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 4: Cancer Detection: Methods II

An Advanced Design of Non-radioactive Image Capturing and Management System for Applications in Non-invasive Skin Disorder Diagnosis

PAPER 9313-18

Carol Y. B. Liu, Hong Kong Productivity Council (Hong Kong, China), et al.

TRANSLATIONAL RESEARCH PAPERS

SUNDAY 8 FEBRUARY • 5:30 PM

Conference 9312: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX
SESSION PSun: Posters-Sunday

Optical coherence tomography imaging of tibialis anterial muscle for early diagnosis of sarcopenia in a rat model

PAPER 9312-106

Yeh-Chan Ahn, Pukyong National Univ. (Korea, Republic of), et al.

SUNDAY 8 FEBRUARY • 5:30 PM

Conference 9312: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX
SESSION PSun: Posters-Sunday

Volumetric Mouse Brain Imaging with Optical Coherence Tomography

PAPER 9312-109

Junwon Lee, Ulsan National Institute of Science and Technology (Korea, Republic of), et al.

SUNDAY 8 FEBRUARY • 5:30 PM

Conference 9312: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX
SESSION PSun: Posters-Sunday

Application of optical coherence tomography attenuation imaging for quantification of optical properties in medulloblastoma

PAPER 9312-110

Barry Vuong, Ryerson Univ. (Canada), et al.

SUNDAY 8 FEBRUARY • 5:30 PM

Conference 9312: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX
SESSION PSun: Posters-Sunday

Usefulness of optical coherence tomography to demonstrate the healing phase of achilles tendon rupture on rats

PAPER 9312-115

Yeh-Chan Ahn, Pukyong National Univ. (Korea, Republic of), et al.

SUNDAY 8 FEBRUARY • 5:30 PM

Conference 9312: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX
SESSION PSun: Posters-Sunday

Generic frequency-domain method for ultrafast and robust characterization of optical attenuation from OCT images

PAPER 9312-92

Wu Yuan, Johns Hopkins Univ. (USA), et al.

SUNDAY 8 FEBRUARY • 5:30 PM

Conference 9312: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX
SESSION PSun: Posters-Sunday

Signal simulation and signal processing for multiple reference optical coherence tomography

PAPER 9312-96

Kai Neuhaus, National Univ. of Ireland, Galway (Ireland), et al.

SUNDAY 8 FEBRUARY • 5:30 PM

Conference 9315: Design and Quality for Biomedical Technologies VIII
SESSION PSun: Posters-Sunday

A novel optical biopsy probe design combining elastic scattering spectroscopy and optical coherence tomography

PAPER 9315-30

Abel Swaan, Academisch Medisch Centrum (Netherlands), et al.

MONDAY 9 FEBRUARY • 8:40 AM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION 1: New Clinical Applications

Spectral changes in subcutaneous fat with weight loss measured by diffuse optical spectroscopy

PAPER 9319-2

Goutham Ganesan, Univ. of California, Irvine (USA), et al.

MONDAY 9 FEBRUARY • 9:00 AM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION 1: New Clinical Applications

Non-invasive response monitoring of lymphoma patients treated with chemotherapy, immunotherapy and radiation therapy using diffuse optics

PAPER 9319-3

So Hyun Chung, Univ. of Pennsylvania (USA), et al.

MONDAY 9 FEBRUARY • 9:05 AM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 5: Cancer Detection: Characterization

Multispectral fluorescence imaging of human ovarian and fallopian tube tissue for early stage cancer detection

PAPER 9313-20

Tyler Tate, The Univ. of Arizona (USA), et al.

MONDAY 9 FEBRUARY • 9:15 AM

Conference 9312: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX
SESSION 1: Ophthalmology I

Integrative advances for intraoperative OCT-guided ophthalmic surgery: microscope integration, surgical instrumentation, and heads-up display surgeon feedback

PAPER 9312-4

Yuankai K. Tao, The Cleveland Clinic (USA), et al.

MONDAY 9 FEBRUARY • 10:20 AM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION 2: Brain, Neuro, and Functional Imaging I

Fast computational subject-specific models for real-time diffuse optical imaging of the human brain

PAPER 9319-5

Hamid Dehghani, The Univ. of Birmingham (United Kingdom), et al.

MONDAY 9 FEBRUARY • 10:50 AM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION 2: Brain, Neuro, and Functional Imaging I

Atlas-based high-density diffuse optical tomography for imaging the whole human brain

PAPER 9319-6

Xue Wu, The Univ. of Birmingham (United Kingdom), et al.

MONDAY 9 FEBRUARY • 11:10 AM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION 2: Brain, Neuro, and Functional Imaging I

Evidence of ventricular contamination of the optical signal in preterm neonates with post hemorrhagic ventricle dilation

PAPER 9319-7

Jessica Kishimoto, Lawson Health Research Institute (Canada), et al.

MONDAY 9 FEBRUARY • 11:30 AM

Conference 9312: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX
SESSION 2: Light Sources and Technology

Optimal operational conditions for supercontinuum-based ultrahigh-resolution endoscopic OCT imaging

PAPER 9312-11

Wu Yuan, Johns Hopkins Univ. (USA), et al.

MONDAY 9 FEBRUARY • 1:30 PM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 7: Imaging Methods I

Thermal Imaging: (re)discovering the potentials for diagnostics and treatment evaluation in the clinical procedures (review)

PAPER 9313-27

Rudolf M. Verdaasdonk, Vrije Univ. Medical Ctr. (Netherlands), et al.

MONDAY 9 FEBRUARY • 1:50 PM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION 3: Breast Imaging I
Dynamic optical tomography for monitoring tumor response in breast cancer patients receiving neoadjuvant chemotherapy
PAPER 9319-11
Jacqueline E. Gunther, Columbia Univ. (USA), et al.

MONDAY 9 FEBRUARY • 2:00 PM

Conference 9312: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX
SESSION 3: Endoscopy / Intravascular I
Endoscopic and ophthalmic swept source polarization sensitive OCT
Paper 9312-15
Zhao Wang, Massachusetts Institute of Technology (USA), et al.

MONDAY 9 FEBRUARY • 2:30 PM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 7: Imaging Methods I
Needle tip tissue identification: Raman spectroscopy for epidural space
PAPER 9313-30
Jeon Woong Kang, Massachusetts Institute of Technology (USA), et al.

MONDAY 9 FEBRUARY • 2:50 PM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION 3: Breast Imaging I
Diffuse optical tomography measured macroscopic physiological and metabolic parameters correlate with microscopic proliferation and vessel area breastcancer biomarkers.
PAPER 9319-14
So Hyun Chung, Univ. of Pennsylvania (USA), et al.

MONDAY 9 FEBRUARY • 3:10 PM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION 3: Breast Imaging I
Predicting hormonal therapy response in breast cancer using diffuse optical spectroscopic imaging (DOSI): ongoing clinical study
PAPER 9319-15
T**homas D. O'Sullivan,** Univ. of California, Irvine (USA), et al.

MONDAY 9 FEBRUARY • 3:15 PM

Conference 9312: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX
SESSION 3: Endoscopy / Intravascular I
Portable, ultrahigh-resolution, distal end scanning endoscopic SD-OCT system at 800 nm
PAPER 9312-20
Jessica Mavadia-Shukla, Johns Hopkins Univ. (USA), et al.

MONDAY 9 FEBRUARY • 4:00 PM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION 4: Breast Imaging II
Multi-modal dynamic breast compression imaging using diffuse optical tomography and x-ray digital breast tomosynthesis (DBT)
PAPER 9319-16
Bin Deng, Massachusetts General Hospital (USA), et al.

MONDAY 9 FEBRUARY • 4:30 PM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 8: Imaging Methods II
Real-time quantitative lifetime unmixing of fluorophore mixtures using time resolved fluorescence spectroscopy
PAPER 9313-34
Fartash Vasefi, Cedars-Sinai Medical Ctr. (USA), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION PSun: Posters-Monday
Fluorescence detection of lymph node metastasis using 5-aminolevulinic acid in human colorectal cancer
PAPER 9313-45
Yoshinori Harada, Kyoto Prefectural Univ. of Medicine (Japan), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION PSun: Posters-Monday
Monitoring anticoagulation status using optical thromboelastography (OTEG)
PAPER 9313-56
Diane M. Tshikudi, Massachusetts General Hospital (USA), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION PMon: Posters-Monday
Characterizing infantile hemangiomas with a near-infrared spectroscopic handheld wireless device
PAPER 9319-71
Christopher J. Fong, Columbia Univ. (USA), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION PMon: Posters-Monday
Whole-body temperature modulated fluorescence tomography for small animals
PAPER 9319-72
Farouk Nouizi, Univ. of California, Irvine (USA), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION PMon: Posters-Monday
Monitoring the effect of strength training on muscle structure and metabolism with diffuse optical spectroscopy
PAPER 9319-73
Robert V. Warren, Univ. of California, Irvine (USA), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION PMon: Posters-Monday
Measuring the functional response of lower back muscles using diffuse optical spectroscopy
PAPER 9319-75
Gerard D. Tran, Beckman Laser Institute and Medical Clinic (USA), et al.

MONDAY 9 FEBRUARY • 7:15 PM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 6: Non-cancer Methods
Analysis of feature stability for laser-based determination of tissue thickness
PAPER 9313-25
Floris Ernst, Univ. zu Lübeck (Germany), et al.

TUESDAY 10 FEBRUARY • 8:45 AM

Conference 9312: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX
SESSION 5: Endoscopy / Intravascular II
First-in-human dual-modality optical coherence tomography (OCT) and near-infrared autofluorescence (NIRAF) molecular imaging of coronary arteries
PAPER 9312-30
Giovanni Jacopo J. Ughi, Wellman Ctr. for Photomedicine (USA), et al.

TRANSLATIONAL RESEARCH PAPERS

TUESDAY 10 FEBRUARY • 9:10 AM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 9: Vascular Methods I

Non-contact continuous-wave diffuse optical tomographic system to capture vascular dynamics in the foot

PAPER 9313-37

Jennifer W. Hoi, Columbia Univ. (USA), et al.

TUESDAY 10 FEBRUARY • 9:15 AM

Conference 9312: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX
SESSION 5: Endoscopy / Intravascular II

Ultrahigh speed endoscopic structural and angiographic OCT imaging

PAPER 9312-32

Hsiang-Chieh Lee, Massachusetts Institute of Technology (USA), et al.

TUESDAY 10 FEBRUARY • 9:30 AM

Conference 9312: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX
SESSION 5: Endoscopy / Intravascular II

Clinical experience with tethered capsule OCT endomicroscopy for screening for Barrett's esophagues

PAPER 9312-33

Michalina J. Gora, Wellman Ctr. for Photomedicine (USA), et al.

TUESDAY 10 FEBRUARY • 10:30 AM

Conference 9318: Optical Biopsy XIII: Toward Real-Time Spectroscopic Imaging and Diagnosis
SESSION 2: Imaging and Biomarkers II

Photoacoustic biopsy: a feasibility study

PAPER 9318-4

Guan Xu, Univ. of Michigan Medical School (USA), et al.

TUESDAY 10 FEBRUARY • 11:00 AM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 10: Vascular Methods II

Clinical evaluation of blood coagulation status in patients using optical thromboelastography (OTEG)

PAPER 9313-41

Markandey M. Tripathi, Massachusetts General Hospital (USA), et al.

TUESDAY 10 FEBRUARY • 11:00 AM

Conference 9318: Optical Biopsy XIII: Toward Real-Time Spectroscopic Imaging and Diagnosis
SESSION 2: Imaging and Biomarkers II

Raman spectroscopy complements optical coherent tomography in tissue classification and cancer detection

PAPER 9318-5

Wei-Chuan Shih, Univ. of Houston (USA), et al.

TUESDAY 10 FEBRUARY • 11:40 AM

Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
SESSION 10: Vascular Methods II

Noninvasive diagnosis and continuous monitoring of thrombosis in clinics by near-infrared spectroscopy

PAPER 9313-43

Ting Li, Univ. of Electronic Science and Technology of China (China), et al.

TUESDAY 10 FEBRUARY • 1:30 PM

Conference 9318: Optical Biopsy XIII: Toward Real-Time Spectroscopic Imaging and Diagnosis
SESSION 3: Instrumentation and Techniques I

Time resolved fluorescence spectroscopy using a single fiber probe for fluorescence lifetime assessment in real-time

PAPER 9318-8

Fartash Vasefi, Cedars-Sinai Medical Ctr. (USA), et al.

TUESDAY 10 FEBRUARY • 2:20 PM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION 7: Fluorescence II

Excitation light leakage suppression using temperature sensitive fluorescent agents

PAPER 9319-33

Farouk Nouizi, Univ. of California, Irvine (USA), et al.

TUESDAY 10 FEBRUARY • 2:30 PM

Conference 9312: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX
SESSION 7: Angiography and Vascular Imaging

Optical microangiography reveals collateral blood perfusion dynamics in mouse cerebral cortex after focal stroke

PAPER 9312-45

Ruikang K. Wang, Univ. of Washington (USA), et al.

TUESDAY 10 FEBRUARY • 2:40 PM

Conference 9318: Optical Biopsy XIII: Toward Real-Time Spectroscopic Imaging and Diagnosis
SESSION 3: Instrumentation and Techniques I

Intraoperative detection of glioma invasion beyond MRI enhancement with Raman spectroscopy in humans

PAPER 9318-11

Michael Jermyn, McGill Univ. (Canada), et al.

TUESDAY 10 FEBRUARY • 4:20 PM

Conference 9318: Optical Biopsy XIII: Toward Real-Time Spectroscopic Imaging and Diagnosis
SESSION 4: Instrumentation and Techniques II

Experimental evaluation of a hyperspectral imager for near-infrared fluorescent contrast agent studies

PAPER 9318-14

Siri Luthman, Univ. of Cambridge (United Kingdom), et al.

WEDNESDAY 11 FEBRUARY • 9:20 AM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION 9: Theory, Algorithms, and Modeling

Analytical model for sub-diffusive light reflection and the application to spatial frequency-domain imaging

PAPER 9319-45

Min Xu, Fairfield Univ. (USA), et al.

WEDNESDAY 11 FEBRUARY • 11:50 AM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION 10: Pre-Clinical / Clinical Applications

Diffuse correlation and optical spectroscopies for the monitoring and detection of spinal cord ischemia

PAPER 9319-51

Angela S. D'souza, Stony Brook Univ. (USA), et al.

WEDNESDAY 11 FEBRUARY • 1:40 PM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION 11: Advances in Time Domain Techniques

In-vivo time-resolved multidistance near infra-red spectroscopy of adult heads: time shift tolerance of measured reflectance to suppress the coupling between absorption and reduced scattering coefficients

PAPER 9319-52

Tadatoshi Tanifuji, Kitami Institute of Technology (Japan), et al.

WEDNESDAY 11 FEBRUARY • 4:00 PM

Conference 9312: Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX
SESSION 12: OCT Applications

Real-time, label-free optical property mapping for detecting glioma invasion with SSOCT for potential guidance of surgical intervention

PAPER 9312-77

Carmen Kut, The Johns Hopkins Hospital (USA), et al.

WEDNESDAY 11 FEBRUARY • 4:00 PM

Conference 9319: Optical Tomography and Spectroscopy of Tissue XI
SESSION 12: Advances in Instrumentation and Technology II

Long-term validation of a multi-wavelength frequency-domain diffuse optical spectroscopy instrument

PAPER 9319-57

Thomas D. O'Sullivan, Univ. of California, Irvine (USA), et al.

Clinical Technologies and Systems

(ORDERED BY PRESENTATION DATE AND TIME)

SATURDAY 7 FEBRUARY • 9:10 AM

Conference 9322: Dynamics and Fluctuations in Biomedical Photonics XII
SESSION 1: Speckle Technologies

Compact, transmission-based speckle sensor for clinical assessment of peripheral blood circulation and vascular tone

PAPER 9322-4

Tyler B. Rice, Laser Associated Sciences, LLC (USA), et al.

SATURDAY 7 FEBRUARY • 10:30 AM

Conference 9327: Optical Elastography and Tissue Biomechanics II
SESSION 2: Perspectives in Elastography

Ultrasound elastography: current systems, ongoing research and future potential

PAPER 9327-3

Jeffrey C. Bamber, The Institute of Cancer Research (United Kingdom), et al.

SATURDAY 7 FEBRUARY • 10:50 AM

Conference 9325: Design and Performance Validation of Phantoms Used in Conjunction with Optical Measurement of Tissue VII
SESSION 2: 3D, Multilayered, and Functional Phantoms

3D printing of tissue-simulating phantoms for standardized biomedical optical imaging

PAPER 9325-7

Ronald X. Xu, The Ohio State Univ. (USA), et al.

SATURDAY 7 FEBRUARY • 2:10 PM

Conference 9325: Design and Performance Validation of Phantoms Used in Conjunction with Optical Measurement of Tissue VII
SESSION 3: Standards and Phantoms in Biophotonics: Joint Session with Conferences 9315 and 9325

Making digital phantoms with spectral and spatial light modulators for quantitative applications of hyperspectral optical medical imaging devices

PAPER 9325-12

Jeeseong C. Hwang, National Institute of Standards and Technology (USA), et al.

SATURDAY 7 FEBRUARY • 3:10 PM

Conference 9322: Dynamics and Fluctuations in Biomedical Photonics XII
SESSION 3: Tissue and Cell Dynamics II

Application of new optical coherence elastography to monitor the mineralization processing in bone tissue engineering constructs

PAPER 9322-15

Ying Yang, Keele Univ. (United Kingdom), et al.

SATURDAY 7 FEBRUARY • 4:40 PM

Conference 9322: Dynamics and Fluctuations in Biomedical Photonics XII
SESSION 3: Tissue and Cell Dynamics II

Nanoporous gold disks for photothermal light harvesting and light-gated molecular release

PAPER 9322-18

Wei-Chuan Shih, Univ. of Houston (USA), et al.

SUNDAY 8 FEBRUARY • 8:00 AM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION 1: Clinical Applications

Monitoring cerebral venous blood oxygenation in neonates with a medical-grade optoacoustic system

PAPER 9323-1

Rinat O. Esenaliev, The Univ. of Texas Medical Branch (USA), et al.

SUNDAY 8 FEBRUARY • 9:00 AM

Conference 9326: Energy-based Treatment of Tissue and Assessment VIII
SESSION 1: Keynote SESSION

Utility and translatability of mathematical modeling, cell culture and small and large animal models in magnetic nanoparticle hyperthermia cancer treatment research

PAPER 9326-3

P. Jack Hoopes, Geisel School of Medicine at Dartmouth College (USA), et al.

SUNDAY 8 FEBRUARY • 9:15 AM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION 1: Clinical Applications

Clinical study of ex vivo photoacoustic imaging in endoscopic mucosal resection tissues

PAPER 9323-14

Liang Lim, Princess Margaret Cancer Ctr., Univ. Health Network (Canada), et al.

SUNDAY 8 FEBRUARY • 9:30 AM

Conference 9326: Energy-based Treatment of Tissue and Assessment VIII
SESSION 1: Keynote SESSION

Developing an open platform for evidence-based microwave thermal ablation treatment planning and validation

PAPER 9326-4

Garron Deshazer, Rhode Island Hospital (USA), et al.

SUNDAY 8 FEBRUARY • 9:45 AM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION 1: Clinical Applications

Recent advances in clinical application of photoacoustic flow cytometry for detection of circulating tumor cells and clots in vivo and ex vivo

PAPER 9323-7

Vladimir P. Zharov, Univ. of Arkansas for Medical Sciences (USA), et al.

SUNDAY 8 FEBRUARY • 10:45 AM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION 2: Preclinical Research

Optimizing the optical wavelength for the photoacoustic imaging of inflammatory arthritis

PAPER 9323-10

Guan Xu, Univ. of Michigan Medical School (USA), et al.

SUNDAY 8 FEBRUARY • 11:00 AM

Conference 9327: Optical Elastography and Tissue Biomechanics II
SESSION 6: Compression Elastography and Brillouin Microscopy

Full field OCT and tissue elasticity measurements: a critical view

PAPER 9327-21

A. Claude Boccara, Institut Langevin (France), et al.

SUNDAY 8 FEBRUARY • 11:15 AM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION 2: Preclinical Research

Developing a clinically translatable light-enhanced transesophageal echocardiography system for monitoring mixed venous oxygen saturation in vivo

PAPER 9323-12

Li Li, Harvard Medical School (USA), et al.

TRANSLATIONAL RESEARCH PAPERS

SUNDAY 8 FEBRUARY • 11:30 AM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION 2: Preclinical Research

High-resolution multispectral photoacoustic tomography of human lymph nodes based on multiple sources of intrinsic contrast

PAPER 9323-13

James A. Guggenheim, Univ. College London (United Kingdom), et al.

SUNDAY 8 FEBRUARY • 11:40 AM

Conference 9322: Dynamics and Fluctuations in Biomedical Photonics XII
SESSION 6: Functional Imaging and Spectroscopy

The role of camera and illumination choices in absolute blood velocity measurements

PAPER 9322-29

Jessica C. Ramella-Roman, Florida International Univ. (USA), et al.

SUNDAY 8 FEBRUARY • 2:15 PM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION 3: Animal Models

Evaluation of multispectral optoacoustic tomography (MSOT) performance in vitro and in vivo

PAPER 9323-18

Sarah E. Bohndiek, Univ. of Cambridge (United Kingdom), et al.

SUNDAY 8 FEBRUARY • 2:45 PM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION 3: Animal Models

Label free ultrasound-guided spectroscopic photoacoustic imaging of lymph node micrometastases

PAPER 9323-20

Geoffrey P. Luke, The Univ. of Texas at Austin (USA), et al.

SUNDAY 8 FEBRUARY • 3:50 PM

Conference 9326: Energy-based Treatment of Tissue and Assessment VIII
SESSION 4: Thermal Therapy

Development of an endoluminal high-intensity ultrasound applicator for image-guided thermal therapy of pancreatic tumors

PAPER 9326-14

Matthew Adams, Univ. of California, Berkeley (USA), et al.

SUNDAY 8 FEBRUARY • 4:30 PM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION 4: Dual Modality Systems

In vivo photoacoustic / optical coherence tomography imaging: human skin pathologies and their relation to subcutaneous vascular abnormalities

PAPER 9323-25

Behrooz Zabihian, Medizinische Univ. Wien (Austria), et al.

SUNDAY 8 FEBRUARY • 4:50 PM

Conference 9326: Energy-based Treatment of Tissue and Assessment VIII
SESSION 4: Thermal Therapy

Design and analysis of a conformal patch antenna for a wearable breast hyperthermia treatment system

PAPER 9326-17

Sergio Curto, Kansas State Univ. (USA), et al.

SUNDAY 8 FEBRUARY • 5:10 PM

Conference 9326: Energy-based Treatment of Tissue and Assessment VIII
SESSION 4: Thermal Therapy

Methods to adjust the lateral and depth heating patterns of microwave waveguide applicators

PAPER 9326-18

Paul R. Stauffer, Thomas Jefferson Univ. (USA), et al.

SUNDAY 8 FEBRUARY • 5:30 PM

Conference 9322: Dynamics and Fluctuations in Biomedical Photonics XII
SESSION PSun: Posters-Sunday

Imaging patients with glaucoma using spectral-domain optical coherence tomography and optical microangiography

PAPER 9322-42

Kelsey Auyeung, Castilleja School (USA), et al.

SUNDAY 8 FEBRUARY • 5:30 PM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION PSun: Posters-Sunday

Early detection of melanoma with the combined use of acoustic microscopy, infrared reflectance and Raman spectroscopy

PAPER 9323-101

Georgios T. Karagiannis, Univ. of Thessaly (Greece), et al.

SUNDAY 8 FEBRUARY • 5:30 PM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION PSun: Posters-Sunday

Development of photoacoustic imaging technology overlaid on ultrasound imaging and its clinical application

PAPER 9323-91

Miya Ishihara, National Defense Medical College (Japan), et al.

MONDAY 9 FEBRUARY • 8:00 AM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION 5: Endoscopic and other HiRes Imaging

In vivo intravascular photoacoustic imaging of atherosclerotic arteries in Ossabaw swine

PAPER 9323-31

Pu Wang, Purdue Univ. (USA), et al.

MONDAY 9 FEBRUARY • 8:00 AM

Conference 9326: Energy-based Treatment of Tissue and Assessment VIII
SESSION 5: Nanomedicine

Similarities and differences in ablative and non-ablative iron oxide nanoparticle hyperthermia cancer treatment

PAPER 9326-21

Alicia A. Petryk, Geisel School of Medicine at Dartmouth College (USA), et al.

MONDAY 9 FEBRUARY • 8:20 AM

Conference 9326: Energy-based Treatment of Tissue and Assessment VIII
SESSION 5: Nanomedicine

Magnetic nanoparticle hyperthermia cancer treatment efficacy dependence on cellular and tissue level particle concentration and particle heating properties

PAPER 9326-22

Alicia A. Petryk, Geisel School of Medicine at Dartmouth College (USA), et al.

MONDAY 9 FEBRUARY • 9:00 AM

Conference 9326: Energy-based Treatment of Tissue and Assessment VIII
SESSION 5: Nanomedicine

Macroscopic and microscopic biodistribution of intravenously administered iron oxide nanoparticles

PAPER 9326-24

Adwiteeya Misra, Thayer School of Engineering at Dartmouth (USA), et al.

MONDAY 9 FEBRUARY • 9:15 AM

Conference 9324: Biophotonics and Immune Responses X
SESSION 1: Light, Cancer, and Immune Responses - Past, Current, and Future

Stimulation of anti-tumor immune response after photodynamic therapy for cancer

PAPER 9324-4

Michael R. Hamblin, Wellman Ctr. for Photomedicine (USA), et al.

MONDAY 9 FEBRUARY • 10:30 AM

Conference 9326: Energy-based Treatment of Tissue and Assessment VIII
SESSION 6: Imaging

SWIFT-MRI imaging and quantitative assessment of IONPs in murine tumors following intra-tumor and systemic delivery

PAPER 9326-27

Russell Reeves, Geisel School of Medicine at Dartmouth College (USA), et al.

MONDAY 9 FEBRUARY • 10:50 AM

Conference 9326: Energy-based Treatment of Tissue and Assessment VIII
SESSION 6: Imaging

Evaluate high intensity focused ultrasound ablation of prostate tumor with hyperpolarized 13C imaging biomarkers

PAPER 9326-28

Jessie E. Lee, Univ. of California, San Francisco (USA), et al.

MONDAY 9 FEBRUARY • 11:00 AM

Conference 9324: Biophotonics and Immune Responses X
SESSION 2: PDT and Immune Responses

Development of photodynamic therapy regimens that control primary tumor growth and inhibit secondary disease

PAPER 9324-7

Sandra O. Gollnick, Roswell Park Cancer Institute (USA), et al.

MONDAY 9 FEBRUARY • 1:20 PM

Conference 9326: Energy-based Treatment of Tissue and Assessment VIII
SESSION 7: Simulations and Treatment Planning

Multiple-antenna microwave ablation: analysis of non-parallel antenna implants

PAPER 9326-31

Souvick Mukherjee, Kansas State Univ. (USA), et al.

MONDAY 9 FEBRUARY • 3:30 PM

Conference 9326: Energy-based Treatment of Tissue and Assessment VIII
SESSION 8: Electroporation and Nanopulse Effects

The working mechanism of the 'nanoknife': hot or not?

PAPER 9326-36

Rudolf M. Verdaasdonk, Vrije Univ. Medical Ctr. (Netherlands), et al.

MONDAY 9 FEBRUARY • 4:00 PM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION 7: New Imaging Methods and Systems

Lifetime-weighted photoacoustic imaging

PAPER 9323-53

Roger J. Zemp, Univ. of Alberta (Canada), et al.

MONDAY 9 FEBRUARY • 4:45 PM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION 7: New Imaging Methods and Systems

Multi-frequency intravascular imaging probe for ultrasound and frequency domain photoacoustic imaging

PAPER 9323-56

Robin F. Castelino, Univ. of Toronto (Canada), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION PMon: Posters-Monday

In vivo dual modality cystography: photoacoustic and fluorescence imaging using indocyanine green

PAPER 9323-122

Sungjo Park, Kyungpook National Univ. (Korea, Republic of), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION PMon: Posters-Monday

Noninvasive, optoacoustic detection and characterization of intra- and extracranial hematomas and cerebral hypoxia

PAPER 9323-135

Rinat O. Esenaliev, The Univ. of Texas Medical Branch (USA), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION PMon: Posters-Monday

Assessing carotid atherosclerosis by fiber-optic multispectral photoacoustic tomography

PAPER 9323-140

Jie Hui, Purdue Univ. (USA), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION PMon: Posters-Monday

Detecting inflammation and fibrosis in bowel wall with photoacoustic imaging in a Crohn's disease animal model

PAPER 9323-155

Guan Xu, Univ. of Michigan Medical School (USA), et al.

TUESDAY 10 FEBRUARY • 8:30 AM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION 8: Quantitative Tomography

Evaluation of Gleason scores by photoacoustic spectrum analysis

PAPER 9323-63

Guan Xu, Univ. of Michigan Medical School (USA), et al.

TUESDAY 10 FEBRUARY • 8:45 AM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION 8: Quantitative Tomography

Quantitative photoacoustic assessment of ex-vivo lymph nodes of colorectal cancer patients

PAPER 9323-64

Ashwin Sampathkumar, Riverside Research Institute (USA), et al.

TUESDAY 10 FEBRUARY • 11:05 AM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION 9: Image Guided and Monitoring Procedures

Real-time needle guidance with photoacoustic and laser-generated ultrasound probes

PAPER 9323-72

Adrien E. Desjardins, Univ. College London (United Kingdom), et al.

TUESDAY 10 FEBRUARY • 6:00 PM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
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Advanced laser systems for photoacoustic imaging

PAPER 9323-157

Marc Klosner, Light Age, Inc. (USA), et al.

TUESDAY 10 FEBRUARY • 6:00 PM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION PTue: Posters-Tuesday

A theoretical model for photoacoustic spectrum analysis

PAPER 9323-164

Guan Xu, Univ. of Michigan Medical School (USA), et al.

TUESDAY 10 FEBRUARY • 6:00 PM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION PTue: Posters-Tuesday

Photoacoustic physio-chemical analysis and its implementation in deep tissue with a catheter setup

PAPER 9323-165

Guan Xu, Univ. of Michigan Medical School (USA), et al.

TUESDAY 10 FEBRUARY • 6:00 PM

Conference 9323: Photons Plus Ultrasound: Imaging and Sensing 2015
SESSION PTue: Posters-Tuesday

Soft tissue imaging using a high voxel rate quantum-memory-based acousto-optic technique

PAPER 9323-171

Luke R. Taylor, Univ. of Otago (New Zealand), et al.

Biomedical Spectroscopy, Microscopy, and Imaging

(ORDERED BY PRESENTATION DATE AND TIME)

SATURDAY 7 FEBRUARY • 9:40 AM

Conference 9333: Biomedical Applications of Light Scattering IX
SESSION 1: Dynamic Light Scattering and Speckle I

Optical thromboelastography (OTEG) and blood coagulation

PAPER 9333-3

Seemantini K. Nadkarni, Harvard Medical School (USA), et al.

SUNDAY 8 FEBRUARY • 12:10 PM

Conference 9329: Multiphoton Microscopy in the Biomedical Sciences XV
SESSION 2: FLIM/FRET/FCS I

Imaging of oxygenation in 3D tissue models with multi-modal phosphorescent probes

PAPER 9329-97

Dmitri B. Papkovsky, Univ. College Cork (Ireland), et al.

SUNDAY 8 FEBRUARY • 1:20 PM

Conference 9333: Biomedical Applications of Light Scattering IX
SESSION 7: Novel Techniques

Determination of the reduced scattering coefficient from 3D imaging of thick tissues by second harmonic generation microscopy

PAPER 9333-23

Paul J. Campagnola, Univ. of Wisconsin-Madison (USA), et al.

SUNDAY 8 FEBRUARY • 3:30 PM

Conference 9336: Quantitative Phase Imaging
SESSION 4: QPI Algorithms and Imaging Processing

C++ software integration for a high-throughput slim platform

PAPER 9336-35

Mikhail E. Kandel, Univ. of Illinois at Urbana-Champaign (USA), et al.

SUNDAY 8 FEBRUARY • 5:30 PM

Conference 9329: Multiphoton Microscopy in the Biomedical Sciences XV
SESSION PSun: Posters-Sunday

Effects of anesthesia on the cerebral capillary blood flow in young and old mice

PAPER 9329-78

Mohammad Moeini, Ecole Polytechnique de Montréal (Canada), et al.

SUNDAY 8 FEBRUARY • 5:30 PM

Conference 9329: Multiphoton Microscopy in the Biomedical Sciences XV
SESSION PSun: Posters-Sunday

Determination of the spectral dependence of reduced scattering and quantitative SHG imaging for detection of fibrillar changes in ovarian cancer

PAPER 9329-79

Kirby R. Campbell, Univ. of Wisconsin-Madison (USA), et al.

MONDAY 9 FEBRUARY • 9:00 AM

Conference 9336: Quantitative Phase Imaging
SESSION 5: QPI of Cells and Tissues I

Differentiating neutrophils using the optical coulter counter

PAPER 9336-40

Ethan F. Schonbrun, Harvard Univ. (USA), et al.

MONDAY 9 FEBRUARY • 9:05 AM

Conference 9329: Multiphoton Microscopy in the Biomedical Sciences XV
SESSION 5: Technology Development and Application II

Breast cancer staging through nonlinear endomicroscopy

PAPER 9329-25

Gunnsteinn Hall, Johns Hopkins Univ. (USA), et al.

MONDAY 9 FEBRUARY • 11:20 AM

Conference 9329: Multiphoton Microscopy in the Biomedical Sciences XV
SESSION 6: Technology Development and Application III

Femtosecond pulse shaping enables molecular imaging using optical Kerr-effect dynamics

PAPER 9329-30

Francisco E. Robles, Duke Univ. (USA), et al.

MONDAY 9 FEBRUARY • 11:20 AM

Conference 9336: Quantitative Phase Imaging
SESSION 5: QPI of Cells and Tissues I

Prostate cancer diagnosis using quantitative phase imaging and machine learning algorithms

PAPER 9336-45

Tan H. Nguyen, Univ. of Illinois at Urbana-Champaign (USA), et al.

MONDAY 9 FEBRUARY • 11:40 AM

Conference 9328: Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XIII
SESSION 1: Functional Imaging

Qualitative and quantitative comparison of colonic microendoscopy image features to histopathology

PAPER 9328-10

Sandra P. Prieto, Univ. of Arkansas (USA), et al.

MONDAY 9 FEBRUARY • 1:30 PM

Conference 9329: Multiphoton Microscopy in the Biomedical Sciences XV
SESSION 7: SHG/THG Microscopy I

Combined wavelength dependent 3D SHG imaging, optical scattering and texture analysis to characterize changes collagen architecture and development of a classification system in human ovarian cancer

PAPER 9329-33

Paul J. Campagnola, Univ. of Wisconsin-Madison (USA), et al.

MONDAY 9 FEBRUARY • 2:05 PM

Conference 9329: Multiphoton Microscopy in the Biomedical Sciences XV
SESSION 7: SHG/THG Microscopy I

Combining wide-field assessment with nonlinear optical microscopy: possibilities for multimodal imaging in epithelial (pre)cancer

PAPER 9329-35

Rahul Pal, The Univ. of Texas Medical Branch (USA), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9330: Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXII
SESSION PMon: Posters-Monday

A novel method for image denoising of fluorescence molecular imaging based on fuzzy C-Means clustering

PAPER 9330-51

Jie Tian, Institute of Automation (China), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9336: Quantitative Phase Imaging
SESSION PMon: Posters-Monday

Optical parameters of living vs. fixed lymphocytes detectable by coherent phase microscopy

PAPER 9336-99

Tatiana V. Vyshenskaya, Moscow State Institute of Radiotechnics, Electronics and Automation (Russian Federation), et al.

TUESDAY 10 FEBRUARY • 9:25 AM

Conference 9329: Multiphoton Microscopy in the Biomedical Sciences XV
SESSION 9: Biomedical Applications of Coherent Raman I

Local organization of lipids in myelinated axons probed by polarization resolved coherent anti-stokes Raman scattering nonlinear microscopy

PAPER 9329-51

Paulina Gasecka, Institut Fresnel (France), et al.

TUESDAY 10 FEBRUARY • 9:40 AM

Conference 9328: Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XIII
SESSION 5: Spectral and Multiparameter Imaging II
Raman spectroscopy and chemometric analysis of non-penetrating peripheral nerve damage in swine: a tool for spectral pathology of nerve disease

PAPER 9328-28

Katherine E. Cilwa, Naval Medical Research Ctr. (USA), et al.

TUESDAY 10 FEBRUARY • 10:45 AM

Conference 9329: Multiphoton Microscopy in the Biomedical Sciences XV
SESSION 10: Biomedical Applications of Coherent Raman II
Detection of human brain tumors with SRS microscopy

PAPER 9329-54

Daniel A. Orringer, Univ. of Michigan Health System (USA), et al.

TUESDAY 10 FEBRUARY • 4:20 PM

Conference 9330: Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXII
SESSION 4: Instrumental Methods: Biology & Medicine

Pump probe microscopy of human hair
PAPER 9330-18

Naveen K. Balla, Institut Fresnel (France), et al.

WEDNESDAY 11 FEBRUARY • 10:20 AM

Conference 9376: Emerging Digital Micromirror Device Based Systems and Applications VII
SESSION 6: Novel and Emerging DMD Applications
The Si elegans connectome: A neuromimetic emulation of neural signal transfer with DMD-structured light

PAPER 9376-21

Axel W. Blau, Istituto Italiano di Tecnologia (Italy), et al.

WEDNESDAY 11 FEBRUARY • 10:40 AM

Conference 9330: Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXII
SESSION 6: Multidimensional Image Reconstruction and Analysis
Quantitative imaging of intact cardiac tissue using remote focusing microscopy

PAPER 9330-27

Alexander D. Corbett, Univ. of Oxford (United Kingdom), et al.

WEDNESDAY 11 FEBRUARY • 2:00 PM

Conference 9332: Optical Diagnostics and Sensing XV: Toward Point-of-Care Diagnostics
SESSION 3: In vitro Optical Blood Monitoring
Stamping surface-enhanced Raman spectroscopy for label-free, multiplexed, molecular sensing and imaging

PAPER 9332-13

Wei-Chuan Shih, Univ. of Houston (USA), et al.

THURSDAY 12 FEBRUARY • 10:50 AM

Conference 9332: Optical Diagnostics and Sensing XV: Toward Point-of-Care Diagnostics
SESSION 6: Optical Imaging for Diagnosis of Precancer and Cancer
Real time clinical diagnosis of Barrett's oesophagus by simple single element ATR-FTIR spectroscopy

PAPER 9332-27

Liberty Foreman, Univ. College London (United Kingdom), et al.

Nano/Biophotonics

(ORDERED BY PRESENTATION DATE AND TIME)

SATURDAY 7 FEBRUARY • 8:50 AM

Conference 9338: Colloidal Nanoparticles for Biomedical Applications X
SESSION 1: Medical Applications of Nanoparticles I
Stem cell/nanoparticle hybrids for targeted cancer therapy

PAPER 9338-3

Jacob M. Berlin, City of Hope Beckman Research Institute (USA), et al.

SATURDAY 7 FEBRUARY • 10:10 AM

Conference 9340: Plasmonics in Biology and Medicine XII
SESSION 1: Plasmonics and Surface-Enhanced Raman Spectroscopy I
Creatinine sensing in urine by stamping surface enhanced Raman scattering

PAPER 9340-38

Wei-Chuan Shih, Univ. of Houston (USA), et al.

SATURDAY 7 FEBRUARY • 11:00 AM

Conference 9340: Plasmonics in Biology and Medicine XII
SESSION 2: Plasmonics and Surface-Enhanced Raman Spectroscopy II
Optimization of gold nanorod arrays for SERS enumeration of CTCs

PAPER 9340-4

Jonathan Calderón, Univ. de València (Spain), et al.

SATURDAY 7 FEBRUARY • 2:10 PM

Conference 9341: Bioinspired, Biointegrated, Bioengineered Photonic Devices III
SESSION 3: Wearable Photonic Devices
A wearable, conformal, optical sensor bandage for the non-invasive, two-dimensional mapping of cutaneous oxygenation

PAPER 9341-7

Zongxi Li, Wellman Ctr. for Photomedicine, Harvard Medical School (USA), et al.

SATURDAY 7 FEBRUARY • 2:25 PM

Conference 9341: Bioinspired, Biointegrated, Bioengineered Photonic Devices III
SESSION 3: Wearable Photonic Devices
Optical design and modelling of tissue for application as wearable optoelectronic sensors

PAPER 9341-8

Olena Kulyk, Univ. of St. Andrews (United Kingdom), et al.

SATURDAY 7 FEBRUARY • 4:10 PM

Conference 9338: Colloidal Nanoparticles for Biomedical Applications X
SESSION 4: Fluorescent Nanoparticles I
Evidence of energy transfer in nanoparticle-porphyrins conjugates for radiation therapy enhancement

PAPER 9338-16

Konstantin Kudinov, The Univ. of Southern California (USA), et al.

SATURDAY 7 FEBRUARY • 5:00 PM

Conference 9341: Bioinspired, Biointegrated, Bioengineered Photonic Devices III
SESSION 4: Bioengineered Light Sources
Micro-patterning colloidal quantum dots based light sources for cellular array imaging

PAPER 9341-14

Xiaojing Zhang, Dartmouth College (USA), et al.

SUNDAY 8 FEBRUARY • 8:25 AM

Conference 9341: Bioinspired, Biointegrated, Bioengineered Photonic Devices III
SESSION 5: Bioinspired Photonics
Effect of ICG concentration on the fluorescence characteristics of erythrocyte-derived optical vectors

PAPER 9341-16

Jack Tang, Univ. of California, Riverside (USA), et al.

TRANSLATIONAL RESEARCH PAPERS

SUNDAY 8 FEBRUARY • 8:50 AM

Conference 9340: Plasmonics in Biology and Medicine XII
SESSION 5: Plasmonic Nanostructures
Plasmonic lenses and bioparticle separation
PAPER 9340-18
Ahmet A. Yanik, Univ. of California, Santa Cruz (USA), et al.

MONDAY 9 FEBRUARY • 8:30 AM

Conference 9339: Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications VII
SESSION 1: NIR and Other Fluorescent Dyes: Imaging and Other Applications
Cytotoxic mechanism of silica-phthalocyanine-based near infrared photoimmunotherapy
PAPER 9339-1
Hisataka Kobayashi, National Cancer Institute (USA), et al.

MONDAY 9 FEBRUARY • 9:50 AM

Conference 9339: Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications VII
SESSION 1: NIR and Other Fluorescent Dyes: Imaging and Other Applications
Results of the first-in-human clinical trial for MB-102, a novel fluorescent tracer agent for real-time measurement of glomerular filtration rate
PAPER 9339-4
Richard B. Dorshow, MediBeacon, LLC (USA), et al.

MONDAY 9 FEBRUARY • 1:40 PM

Conference 9339: Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications VII
SESSION 3: It's a 'NANO' World II
Activatable thermo-sensitive ICG encapsulated pluronic nanocapsules for temperature sensitive fluorescence tomography
PAPER 9339-10
Tiffany C. Kwong, Univ. of California, Irvine (USA), et al.

TUESDAY 10 FEBRUARY • 9:10 AM

Conference 9339: Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications VII
SESSION 5: Multimodal Imaging
A bi-functional contrast agent for simultaneous optical and magnetic resonance imaging in vivo
PAPER 9339-21
Alex T. Luk, Univ. of California, Irvine (USA), et al.

TUESDAY 10 FEBRUARY • 9:50 AM

Conference 9339: Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications VII
SESSION 5: Multimodal Imaging
Quantum dots targeted to VEGFR2 as a contrast agent for OCT/LIF dual-modality imaging of colorectal cancer in a mouse model
PAPER 9339-23
Jordan L. Carbary, The Univ. of Arizona (USA), et al.

THURSDAY 12 FEBRUARY • 11:00 AM

Conference 9337: Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications XII
SESSION 1: Nanoscale Imaging and Nanospectroscopy
Quantitative analysis of confocal images to characterize structural disorder in biological cells: a novel method to analyze cancerous and noncancerous cells
PAPER 9337-7
Peeyush Sahay, The Univ. of Memphis (USA), et al.

THURSDAY 12 FEBRUARY • 2:20 PM

Conference 9337: Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications XII
SESSION 2: Biosensing with Nanostructures and Nanoparticles
Label-free, in situ monitoring of single DNA hybridization using SERS on disk-shaped nanoporous gold nanoparticles
PAPER 9337-12
Wei-Chuan Shih, Univ. of Houston (USA), et al.

SPIE. PHOTONICS WEST LASE

THE PREMIER LASER TECHNOLOGY AND APPLICATIONS CONFERENCE

SYMPOSIUM CHAIRS:

Guido Hennig, Daetwyler Graphics AG (Switzerland)

Yongfeng Lu, Univ. of Nebraska-Lincoln (USA)

SYMPOSIUM CO-CHAIRS:

Bo Gu, Bos Photonics (USA)

Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

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Laser Source Engineering

Program Chair: **Gregory J. Quarles,** Optoelectronics Management Network (USA)

9342 **Solid State Lasers XXIV: Technology and Devices** (Clarkson, Shori) p. 224

9343 **Laser Resonators, Microresonators, and Beam Control XVII** (Kudryashov, Paxton, Ilchenko, Aschke, Washio) p. 228

9344 **Fiber Lasers XII: Technology, Systems, and Applications** (Shaw, Ballato) p. 233

9345 **High Power Lasers for Fusion Research III** (Awwal, Lane, Dunne, Li, Collier, Mima) p. 238

9346 **Components and Packaging for Laser Systems** (Glebov, Leisher) p. 240

Nonlinear Optics

9347 **Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications XIV** (Vodopyanov, Kalisky) p. 243

9360 **Organic Photonic Materials and Devices XVII** (Tabor, Kajzar, Kaino, Koike) p. 289

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Semiconductor Lasers and LEDs

Program Chair: **Klaus P. Streubel,** OSRAM AG (Germany)

9346 **Components and Packaging for Laser Systems** (Glebov, Leisher) p. 240

9348 **High-Power Diode Laser Technology and Applications XIII** (Zediker) p. 247

9349 **Vertical External Cavity Surface Emitting Lasers** (VECSELs) V (Guina) p. 250

9357 **Physics and Simulation of Optoelectronic Devices XXIII** (Witzigmann, Osiński, Henneberger, Arakawa) p. 270

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9382 **Novel In-Plane Semiconductor Lasers XIV** (Belyanin, Smowton) p. 357

9383 **Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XIX** (Streubel, Jeon, Tu, Strassburg) p. 361

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			LASE POSTER SESSION 6:00 to 8:00 pm	**LASE PLENARY SESSION** 10:20 am to 12:30 pm	

Laser Micro-/Nanoengineering

Program Chairs: **Henry Helvajian,** The Aerospace Corp. (USA) and **Alberto Piqué,** U.S. Naval Research Lab. (USA)

9350 **Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XX** (Roth, Nakata, Neuenschwander, Xu) p. 252

9351 **Laser-based Micro- and Nanoprocessing IX** (Klotzbach, Washio, Arnold) p. 256

9352 **Synthesis and Photonics of Nanoscale Materials XII** (Dubowski, Geohegan, Kabashin) p. 260

9353 **Laser 3D Manufacturing II** (Helvajian, Piqué, Wegener, Gu) p. 262

9374 **Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII** (von Freymann, Schoenfeld, Rumpf) p. 337

Laser Applications

9350 **Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XX** (Roth, Nakata, Neuenschwander, Xu) p. 252

9354 **Free-Space Laser Communication and Atmospheric Propagation XXVII** (Hemmati, Boroson) p. 265

9355 **Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications XV** (Heisterkamp, Herman, Meunier, Nolte) p. 267

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9380 **Laser Refrigeration of Solids VIII** (Epstein, Seletskiy, Sheik-Bahae) p. 353

CONFERENCE 9342
LOCATION: ROOM 132 (EXHIBIT LEVEL)

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Solid State Lasers XXIV: Technology and Devices

Conference Chairs: **W. Andrew Clarkson,** Univ. of Southampton (United Kingdom); **Ramesh K. Shori,** SPAWAR Systems Ctr. (USA)

Program Committee: **Patrick A. Berry,** Air Force Research Lab. (USA); **Marc Eichhorn,** Institut Franco-Allemand de Recherches de Saint-Louis (France); **Dennis G. Harris,** MIT Lincoln Lab. (USA); **Norman Hodgson,** Coherent, Inc. (USA); **Helena Jelínková,** Czech Technical Univ. in Prague (Czech Republic); **Christian Kränkel,** Univ. Hamburg (Germany); **Jacob I. Mackenzie,** Univ. of Southampton (United Kingdom); **Markus Pollnau,** Univ. Twente (Netherlands); **Narasimha S. Prasad,** NASA Langley Research Ctr. (USA); **David H. Titterton,** Defence Science and Technology Lab. (United Kingdom); **Masaki Tokurakawa,** The Univ. of Electro-Communications (Japan); **Matteo Vannini,** Istituto Nazionale di Ottica, CNR (Italy)

Sunday 8 February

SESSION 1
LOCATION: ROOM 132 (EXHIBIT LEVEL) . . . . . SUN 8:30 AM TO 10:00 AM

Crystal Fiber Lasers I
Session Chair: **Ramesh K. Shori,** SPAWAR Systems Ctr. (USA)

8:30 am: **Single crystal fiber for laser sources** *(Invited Paper)*, Xavier Delen, Institut d'Optique Graduate School (France); Adrien Aubourg, Institut d'Optique Graduate School (France) and Fibercryst SAS (France); Loic Deyra, Institut d'Optique Graduate School (France); Fabien Lesparre, Institut d'Optique Graduate School (France) and Fibercryst SAS (France); Igor Martial, Julien Didierjean, FiberCryst (France); François Balembois, Patrick Georges, Institut d'Optique Graduate School (France) . . . . . [9342-1]

9:00 am: **High power Yb:YAG single-crystal fiber amplifiers for femtosecond lasers**, Fabien Lesparre, Lab. Charles Fabry (France); Igor Martial, Julien Didierjean, FiberCryst (France); Jean-Thomas Gomes, Lab. Charles Fabry (France); Wolfgang P. Pallmann, Bojan Resan, JDSU Ultrafast Lasers AG (Switzerland); André Löscher, Jan-Philipp Negel, Thomas Graf, Marwan Abdou Ahmed, Univ. Stuttgart (Germany); François Balembois, Patrick Georges, Lab. Charles Fabry (France) . . . . . [9342-2]

9:20 am: **Rare-earth doped, single-crystal fibers grown from ceramic and single-crystal preforms**, Craig D. Nie, Subhabrata Bera, James A. Harrington, Rutgers, The State Univ. of New Jersey (USA); Nathan Taylor, Richard M. Laine, Elizabeth F. C. Dreyer, Stephen C. Rand, S. Trembath-Reichert, Univ. of Michigan (USA) . . . . . [9342-3]

9:40 am: **Investigation of the amplification in Ho:YAG single crystal fiber**, Yuan Li, Zeyu Zhang, Ian Buckley, Eric G. Johnson, Clemson Univ. (USA); Craig D. Nie, James A. Harrington, Rutgers, The State Univ. of New Jersey (USA); Saurabh Sharma, Ramesh K. Shori, SPAWAR Systems Ctr. (USA) . . . . . [9342-4]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 2
LOCATION: ROOM 132 (EXHIBIT LEVEL) . . . . SUN 10:30 AM TO 12:20 PM

Crystal Fiber Lasers II
Session Chair: **Ramesh K. Shori,** SPAWAR Systems Ctr. (USA)

10:30 am: **Crystal fibers for high power lasers**, Jasbinger S. Sanghera, Charles G. Askins, Woohong R. Kim, Shyam S. Bayya, L. Brandon Shaw, Daniel J. Gibson, U.S. Naval Research Lab. (USA); John R. Peele, Sotera Defense Solutions, Inc. (USA); Steven Bowman, U.S. Naval Research Lab. (USA) . . . . . [9342-5]

10:50 am: **Beam quality investigation in Nd:YAG crystal fiber amplifier pumped at >110w**, Aleksej M. Rodin, Ctr. for Physical Sciences and Technology (Lithuania); Aidas Aleknavicius, EKSPLA UAB (Lithuania); Andrejus Michailovas, Ctr. for Physical Sciences and Technology (Lithuania) and EKSPLA UAB (Lithuania); Aleksandr S. Dementjev, Ctr. for Physical Sciences and Technology (Lithuania) . . . . . [9342-6]

11:10 am: **High peak power Er-ZBLAN microchip seeded laser amplifier**, Rafael R. Gattass, L. Brandon Shaw, Jasbinder S. Sanghera, U.S. Naval Research Lab. (USA) . . . . . [9342-7]

11:30 am: **Laser diode pumped high efficiency Yb:YAG crystalline fiber waveguide lasers**, Xiaodong Mu, Stephanie Meissner, Helmuth E. Meissner, Onyx Optics Inc. (USA) . . . . . [9342-8]

11:50 am: **Templated growth of II-VI semiconductor optical fibre devices and progress towards laser operation** *(Invited Paper)*, Pier J. Sazio, Univ. of Southampton (United Kingdom); Justin Sparks, Rongrui He, Mahesh Krishnamurthi, Neil F. Baril, Subhasis Chaudhuri, The Pennsylvania State Univ. (USA); Anna C. Peacock, Noel Healy, Univ. of Southampton (United Kingdom); Venkatraman Gopalan, John V. Badding, The Pennsylvania State Univ. (USA) . . . . . [9342-9]

Lunch Break . . . . . Sun 12:20 pm to 1:30 pm

SESSION 3
LOCATION: ROOM 132 (EXHIBIT LEVEL) . . . . . SUN 1:30 PM TO 3:30 PM

Eye-Safe and Mid-IR Lasers
Session Chair: **Patrick A. Berry,** Air Force Research Lab. (USA)

1:30 pm: **2.2 W mid-infrared supercontinuum generation in a ZBLAN fiber pumped by a Q-switched mode-locked Tm^{3+}-doped fiber laser**, Christian Kneis, Institut Franco-Allemand de Recherches de Saint-Louis (France) and Lab. Ondes et Matière d'Aquitaine, CNRS, Univ. of Bordeaux (France); Antoine Berrou, Institut Franco-Allemand de Recherches de Saint-Louis (France); Inka B. Manek-Hönninger, Lab. Ondes et Matière d'Aquitaine (France); Marc Eichhorn, Christelle Kieleck, Institut Franco-Allemand de Recherches de Saint-Louis (France) . . . . . [9342-10]

1:50 pm: **Multi-wavelength resonant pumping of Er:YAG lasers for energy efficient trace gas detection systems**, Haro Fritsche, Technische Univ. Berlin (Germany) and DirectPhotonics Industries GmbH (Germany); Oliver Lux, Casey Schuett, Technische Univ. Berlin (Germany); Ronny Juhre, Andreas Grohe, DirectPhotonics Industries GmbH (Germany); Hans Joachim Eichler, Technische Univ. Berlin (Germany). . . . . [9342-11]

2:10 pm: **Ho:YLF non-planar ring laser with fractional image rotation**, Martin Schellhorn, Marc Eichhorn, Institut Franco-Allemand de Recherches de Saint-Louis (France) . . . . . [9342-12]

2:30 pm: **Gain-switched operation of ultrafast laser inscribed waveguides in Cr:ZnSe**, Sean McDaniel, Leidos, Inc. (USA); Patrick A. Berry, Air Force Research Lab. (USA); Kenneth L. Schepler, The College of Optics and Photonics, Univ. of Central Florida (USA); John R. Macdonald, Stephen J. Beecher, Ajoy K. Kar, Heriot-Watt Univ. (United Kingdom) . . . . . [9342-13]

2:50 pm: **Continuous wave Fe:ZnSe laser pumped by efficient Er:Y_2O_3 laser**, Jonathan W. Evans, Air Force Research Lab. (USA); Tigran Sanamyan, U.S. Army Research Lab. (USA); Patrick A. Berry, Air Force Research Lab. (USA) . . . . . [9342-14]

3:10 pm: **Radiation-enhanced thermal diffusion of transition metal ions into II-VI semiconductors**, Lamario J. Williams, Alan D. Martinez, Vladimir V. Fedorov, Sergey B. Mirov, The Univ. of Alabama at Birmingham (USA). [9342-15]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 4
LOCATION: ROOM 132 (EXHIBIT LEVEL) . . . . . SUN 4:00 PM TO 6:00 PM

Airborne and Space Qualified Lasers
Session Chair: **Narasimha S. Prasad,**
NASA Langley Research Ctr. (USA)

4:00 pm: **Radiation tests on erbium-doped garnet crystals for spaceborne CH_4-Lidar applications**, Ansgar Meissner, Martin Kreitler, Philipp Kucirek, Bastian Gronloh, Marco Höfer, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany). . . . . [9342-16]

4:20 pm: **Multi-pulse detection technique to improve the timing resolution in a scanning LADAR system**, Yury Y. Markushin, Renu Tripathi, Gour S. Pati, Delaware State Univ. (USA). . . . . [9342-17]

4:40 pm: **Single frequency and wavelength stabilized near infrared laser source for water vapor DIAL remote sensing application**, Ti Chuang, Brooke Walters, Timothy Shuman, Andrew Losee, Tom Schum, Ralph L. Burnham, Fibertek, Inc. (USA) . . . . . [9342-18]

5:00 pm: **Monolithic solid state lasers for spaceflight**, Michael A. Krainak, Anthony W. Yu, Mark A. Stephen, Scott Merritt, NASA Goddard Space Flight Ctr. (USA); Leonid B. Glebov, Larissa Glebova, Aleksandr Ryasnyanskiy, Vadim Smirnov, OptiGrate Corp. (USA) . . . . . [9342-19]

5:20 pm: **ICESat-2 laser transmitter technology readiness level evolution**, Nicholas W. Sawruk, Floyd E. Hovis, Fibertek, Inc. (USA) . . . . . [9342-20]

5:40 pm: **Laser amplifier development for the remote sensing of CO_2 from space**, Anthony W. Yu, James B. Abshire, NASA Goddard Space Flight Ctr. (USA); Mark Storm, Fibertek, Inc. (USA); Alexander A. Betin, Raytheon Space & Airborne Systems (USA) . . . . . [9342-21]

Monday 9 February

SESSION 5

LOCATION: ROOM 132 (EXHIBIT LEVEL) . . . . MON 8:00 AM TO 10:00 AM

UV and Visible Lasers

Session Chair: **Dennis G. Harris,** MIT Lincoln Lab. (USA)

8:00 am: **1W frequency-doubled VCSEL-pumped blue laser with high pulse energy**, Robert Van Leeuwen, Tong Chen, Laurence S. Watkins, Guoyang Xu, Jean-Francois Seurin, Qing Wang, Chuni L. Ghosh, Princeton Optronics, Inc. (USA) . . . . . [9342-22]

8:20 am: **High power lasers for gamma source**, Antoine Courjaud, Benoit Tropheme, Amplitude Systèmes (France); Franck Falcoz, Amplitude Technologies (France); Eric P. Mottay, Amplitude Systèmes (France); Gilles Riboulet, Amplitude Technologies (France). . . . . [9342-23]

8:40 am: **Development of high coherence, 200mW, 193nm solid state laser at 6 kHz**, Tomoharu Nakazato, Tokyo Univ. of Science (Japan); Mizuki Tsuboi, Tokyo Univ. of Science (Japan) and Osaka Univ. (Japan); Takashi Onose, Gigaphoton Inc. (Japan); Yuichi Tanaka, Tokyo Univ. of Science (Japan); Nobuhiko Sarukura, Osaka Univ. (Japan); Shinji Ito, Kouji Kakizaki, Gigaphoton Inc. (Japan); Shuntaro Watanabe, Tokyo Univ. of Science (Japan) . . . . [9342-24]

9:00 am: **Observation of ultraviolet lasing emission from a diamond nanoparticle film**, Ryo Niyuki, Hideaki Takashima, Hideki Fujiwara, Keiji Sasaki, Hokkaido Univ. (Japan) . . . . . [9342-25]

9:20 am: **Demonstration of miniaturized 20mW CW 280 and 266nm UV laser sources**, Nicolas Landru, Thierry Georges, Oxxius SA (France) . . . . . [9342-26]

9:40 am: **Nanosecond pulsed green laser source based on an extra-cavity frequency conversion from a 20µm core Yb-doped fiber amplifier**, Enkeleda Balliu, Magnus Engholm, Joan Jesus Montiel i Ponsoda, Mid Sweden Univ. (Sweden); Jonas Hellström, Gunnar Elgcrona, Håkan Karlsson, Cobolt AB (Sweden) . . . . . [9342-27]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

SESSION 6

LOCATION: ROOM 132 (EXHIBIT LEVEL) . . . . MON 10:30 AM TO 12:30 PM

Disk Lasers

Session Chair: **Helena Jelínková,**
Czech Technical Univ. in Prague (Czech Republic)

10:30 am: **Front end for high repetition rate thin disk-pumped OPCPA beamline at ELI-beamlines**, Jonathan T. Green, ELI Beamlines (Czech Republic); Jakub Novák, ELI Beamlines (Czech Republic) and Czech Technical Univ. in Prague (Czech Republic); Roman Antipenkov, ELI Beamlines (Czech Republic); Frantisek Batysta, ELI Beamlines (Czech Republic) and Czech Technical Univ. in Prague (Czech Republic); Charalampos Zervos, Jack A. Naylon, Tomás Mazanec, Martin Horácek, Pavel Bakule, Bedrich Rus, ELI Beamlines (Czech Republic) . . . . . [9342-28]

10:50 am: **Multi-pass thin-disk amplifier**, Karsten R. F. Schuhmann, ETH Zürich (Switzerland); Aldo S. Antognini, Paul Scherrer Institut (Switzerland); Randolf Pohl, Max-Planck-Institut für Quantenoptik (Germany); Marwan Abdou Ahmed, Andreas Voss, Thomas Graf, Univ. Stuttgart (Germany); Klaus S. Kirch, ETH Zürich (Switzerland); Birgit Weichelt, Univ. Stuttgart (Germany). . . [9342-29]

11:10 am: **Ultrafast thin-disk multipass amplifier with 1.4 kW average power and 4.7 mJ pulse energy at 1030nm converted to 820 w and 2.7 mJ at 515nm**, Jan-Philipp Negel, André Löscher, Andreas Voss, Univ. Stuttgart (Germany); Dominik Bauer, Dirk H. Sutter, Alexander Killi, TRUMPF Laser GmbH (Germany); Marwan Abdou Ahmed, Thomas Graf, Univ. Stuttgart (Germany) . . . . . [9342-30]

11:30 am: **First demonstration of passively mode-locked Yb:CaF_2 thin-disk laser**, Benjamin Dannecker, Xavier Délen, Katrin S. Wentsch, Birgit Weichelt, Univ. Stuttgart (Germany); Clemens Hönninger, Amplitude Systèmes (France); Andreas Voss, Marwan Abdou Ahmed, Thomas Graf, Univ. Stuttgart (Germany) . . . . . [9342-31]

11:50 am: **Polarization and wavelength selective grating mirror enables efficient generation of kW-class CW green radiation**, Marwan Abdou Ahmed, Martin Rumpel, Univ. Stuttgart (Germany); Montasser Bouzid, Christian Stolzenburg, Alexander Killi, TRUMPF Laser GmbH & Co. KG (Germany); Thomas Graf, Univ. Stuttgart (Germany). . . . . [9342-32]

12:10 pm: **Latest advances in high brightness disk lasers**, Tracey Ryba, TRUMPF Inc. (USA); Alexander Killi, Tina Gottwald, Sven-Silvius Schad, Christian Stolzenburg, Vincent Kuhn, TRUMPF Laser GmbH & Co. KG (Germany) . . . . . [9342-33]

Lunch Break . . . . . Mon 12:30 pm to 2:00 pm

SESSION 7

LOCATION: ROOM 132 (EXHIBIT LEVEL) . . . . . MON 2:00 PM TO 3:20 PM

Novel Concepts I

Session Chair: **David H. Titterton**

2:00 pm: **Double-beam-mode-controlling diode-side-pumped Nd:YLF laser with near 60% efficiency**, Alessandro M. Deana, UNINOVE (Brazil); Niklaus U. Wetter, Instituto de Pesquisas Energéticas e Nucleares (Brazil). . . . . [9342-34]

2:20 pm: **LED side-pumped Nd^{3+}:YVO_4 laser at room temperature**, Adrien Barbet, Institut d'Optique Graduate School (France); Amandine Paul, Jean-Philippe Blanchot, EFFILUX (France); François Balembois, Frédéric Druon, Patrick Georges, Institut d'Optique Graduate School (France). . . . . [9342-35]

2:40 pm: **Direct vortex generation from a diode-pumped Alexandrite laser**, Gabrielle M. Thomas, Imperial College London (United Kingdom); Ara Minassian, Unilase Ltd. (United Kingdom); Michael J. Damzen, Imperial College London (United Kingdom) . . . . . [9342-36]

3:00 pm: **Testing of antireflective surface structures on windows for high energy laser systems in operational environments**, Lynda E. Busse, Jesse A. Frantz, U.S. Naval Research Lab. (USA); Menelaos K. Poutous, Rajendra Joshi, The Univ. of North Carolina at Charlotte (USA); Ishwar D. Aggarwal, Sotera Defense Solutions, Inc. (USA); L. Brandon Shaw, Jas S. Sanghera, U.S. Naval Research Lab. (USA) . . . . . [9342-37]

Coffee Break . . . . . Mon 3:20 pm to 3:50 pm

SESSION 8

LOCATION: ROOM 132 (EXHIBIT LEVEL) . . . . . MON 3:50 PM TO 5:50 PM

Novel Concepts II

Session Chair: **David H. Titterton**

3:50 pm: **Generation of radially-polarized and azimuthally-polarized beams in the two-micron band using a space-variant half-wave plate**, Di Lin, Peter Shardlow, Alex C. Butler, Martynas Beresna, Peter G. Kazansky, W. Andrew Clarkson, Optoelectronics Research Ctr. (United Kingdom) . . . [9342-38]

4:10 pm: **Fully vectorial laser resonator modeling by vector extrapolation methods**, Daniel Asoubar, Friedrich-Schiller-Univ. Jena (Germany) and LightTrans VirtualLab UG (Germany); Michael Kuhn, LightTrans Virtual Lab UG (Germany); Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany) . . [9342-39]

4:30 pm: **Fully dielectric high efficiency and broadband pulse compression gratings for CPA laser systems**, Martin Rumpel, Univ. Stuttgart (Germany); Michael Moeller, AMO GmbH (Germany); Marwan Abdou Ahmed, Thomas Graf, Univ. Stuttgart (Germany) . . . . . [9342-40]

4:50 pm: **Tube solid-state laser with zigzag propagation of pump and laser beam**, Michael S. Savich, Consultant (USA). . . . . [9342-41]

5:10 pm: **In-phase synchronization of array laser using intra-Talbot-cavity second harmonic generation**, Kenichi Hirosawa, Fumihiko Kannari, Keio Univ. (Japan); Takayuki Yanagisawa, Mitsubishi Electric Corp. (Japan) . . . . . [9342-42]

5:30 pm: **Control of random lasing properties within a submicrometer-sized ZnO spherical particle film**, Hideki Fujiwara, Ryo Niyuki, Hokkaido Univ. (Japan); Yoshie Ishikawa, National Institute of Advanced Industrial Science and Technology (Japan); Naoto Koshizaki, Hokkaido Univ. (Japan); Takeshi Tsuji, Shimane Univ. (Japan); Keiji Sasaki, Hokkaido Univ. (Japan). . . . . [9342-43]

CONFERENCE 9342
LOCATION: ROOM 132 (EXHIBIT LEVEL)

Tuesday 10 February

SESSION 9
LOCATION: ROOM 132 (EXHIBIT LEVEL) . . . . . TUE 8:20 AM TO 10:00 AM

Laser Materials and Characterization

Session Chair: **Matteo Vannini,** Istituto Nazionale di Ottica (Italy)

8:20 am: **Metrology of low-symmetry monoclinic crystals for laser applications: The case of europium-doped borate crystals**, Yannick G. Petit, Matias Velázquez, Véronique Jubera, Alain Garcia, Philippe Veber, Rekia Belhoucif, Institut de Chimie de la Matière Condensée de Bordeaux (France); Frédéric Adamietz, Vincent Rodriguez, Institut des Sciences Moléculaires (France); Simon Joly, Institut des Sciences Moléculaires (France) and Univ. of Bordeaux (France); Daniel Ritz, FEE (Germany); Germano Montemezzani, Lab. Matériauy Optiques, Photonique et Systèmes (France); Philippe Goldner, Chimie de la Matière Condensée de Paris (France); Patricia Lauren, Institut NÉEL (France) and Univ. of Alpes (France); Corine Félix, Jérôme Debray, Bertrand Ménaert, Benoit Boulanger, Patricia Segonds, Institut NÉEL (France) and Univ. of Grenoble Alpes (France); Inka B. Manek-Hönninger, Lab. Ondes et Matière d'Aquitaine (France) . . . . . [9342-44]

8:40 am: **Er and Yb co-doped glasses for eye-safe lasers**, Simi A. George, SCHOTT North America, Inc. (USA) . . . . . [9342-46]

9:00 am: **Glass development for an exawatt laser architecture**, Simi A. George, Nathan Carlie, Joseph S. Hayden, Eric H. Urruti, SCHOTT North America, Inc. (USA) . . . . . [9342-47]

9:20 am: **Schlieren imaging of bulk scattering in transparent ceramics**, Saurabh Sharma, Univ. of California, Los Angeles (USA) and SPAWAR System Ctr. (USA); J. Keith Miller, Naval Air Warfare Ctr. Weapons Div. (USA); Ramesh K. Shori, SPAWAR Systems Ctr. (USA); Mark S. Goorsky, Univ. of California, Los Angeles (USA). . . . . [9342-48]

9:40 am: **Energy transfer upconversion measurements for popular neodymium-doped crystals**, Sung Jin Yoon, Univ. of Southampton (United Kingdom); Ren Peng Yan, Univ. of Southampton (United Kingdom) and Harbin Institute of Technology (China); Stephen J. Beecher, Jacob I. Mackenzie, Univ. of Southampton (United Kingdom) . . . . . [9342-49]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 10
LOCATION: ROOM 132 (EXHIBIT LEVEL) . . . . . TUE 10:30 AM TO 12:30 PM

Ultrafast Lasers

Session Chair: **Jacob I. Mackenzie,**
Univ. of Southampton (United Kingdom)

10:30 am: **First experimental results towards a 100W wavelength-tunable femtosecond OPCPA**, Mark J. Prandolini, Helmholtz Institute Jena (Germany); Hauke Höppner, Deutsches Elektronen-Synchrotron (Germany); Arvid Hage, Queen's Univ. Belfast (United Kingdom); Michael Schulz, Deutsches Elektronen-Synchrotron (Germany); Robert Riedel, Helmholtz Institute Jena (Germany); Franz Tavella, SLAC National Accelerator Lab. (USA) . . . . . [9342-50]

10:50 am: **High energy, multiwatt, femtosecond diode-pumped Yb:$CaAlGdO_4$ and Yb:CaF_2 regenerative amplifiers**, Etienne Caracciolo, Univ. degli Studi di Pavia (Italy) and High Q Laser, a Newport Corp. Brand (Austria); Matthias Kemnitzer, Annalisa Guandalini, High Q Laser, a Newport Corp. Brand (Austria); Federico Pirzio, Antonio Agnesi, Univ. degli Studi di Pavia (Italy); Juerg Aus-der-Au, High Q Laser, a Newport Corp. Brand (Austria) . . . . . [9342-51]

11:10 am: **Single grating mirror intracavity stretcher design for chirped pulse regenerative amplification**, Etienne Caracciolo, Univ. degli Studi di Pavia (Italy) and High Q Laser, a Newport Corp. Brand (Austria); Matthias Kemnitzer, High Q Laser, a Newport Corp. Brand (Austria); Martin Rumpel, Univ. Stuttgart (Germany); Annalisa Guandalini, Florian Kienle, High Q Laser, a Newport Corp. Brand (Austria); Federico Pirzio, Univ. degli Studi di Pavia (Italy); Thomas Graf, Marwan Abdou Ahmed, Univ. Stuttgart (Germany); Antonio Agnesi, Univ. degli Studi di Pavia (Italy); Juerg Aus-der-Au, High Q Laser, a Newport Corp. Brand (Austria) . . . . . [9342-52]

11:30 am: **Compact, multi-pass OPCPA system at 100kHz repetition rate with a CPA-free pump source**, Jan Ahrens, Thomas Binhammer, Oliver Prochnow, VENTEON Laser Technologies GmbH (Germany); Tino Lang, Laser Zentrum Hannover e.V. (Germany); Stefan Rausch, VENTEON Laser Technologies GmbH (Germany); Bastian Schulz, Maik Frede, neoLASE GmbH (Germany); Uwe Morgner, Leibniz Univ. Hannover (Germany) . . . . . [9342-53]

11:50 am: **CEP-stable, few-cycle OPCPA system at high repetition rates**, Jan Ahrens, Oliver Prochnow, Thomas Binhammer, Stefan Rausch, VENTEON Laser Technologies GmbH (Germany); Tino Lang, Leibniz Univ. Hannover (Germany); Anne Harth, Chen Guo, Arthur Losquin, Cord L. Arnold, Anne L'Huillier, Lund Univ. (Sweden); Uwe Morgner, Leibniz Univ. Hannover (Germany) . . . . . [9342-54]

12:10 pm: **High average power picosecond laser for selective material processing at 1342nm wavelength**, Aleksej M. Rodin, Ctr. for Physical Sciences and Technology (Lithuania); Mikhail Grishin, Andrejus Michailovas, Ctr. for Physical Sciences and Technology (Lithuania) and EKSPLA Ltd. (Lithuania); Gediminas Chazevskis, EKSPLA UAB (Lithuania); Nortautas Ulevichius, Vilnius Univ. (Lithuania). . . . . [9342-55]

Lunch/Exhibition Break . . . . . Tue 12:30 pm to 2:20 pm

SESSION 11
LOCATION: ROOM 132 (EXHIBIT LEVEL) . . . . . TUE 2:20 PM TO 3:00 PM

Pulsed Lasers I

Session Chair: **W. Andrew Clarkson,**
Univ. of Southampton (United Kingdom)

2:20 pm: **1mJ single-rod fiber Er:glass laser for rangefinding**, Vladimir V. Vitkin, Andrey A. Mak, Vadim M. Polyakov, Artem A. Kharitonov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Vyacheslav A. Buchenkov, Andrey Y. Rodionov, Olga S. Dymshits, Alexander A. Zhilin, S.I. Vavilov State Optical Institute (Russian Federation) . . . . . [9342-56]

2:40 pm: **A cryo-cooled high-energy DPSSL system delivering ns-pulses at 10 J and 10 Hz**, Klaus G. Ertel, Saumyabrata Banerjee, Thomas J. Butcher, Mariastefania De Vido, Paul D. Mason, Paul J. Phillips, David Richards, Waseem Shaikh, Jodie M. Smith, Cristina Hernandez-Gomez, Justin Greenhalgh, John L. Collier, Rutherford Appleton Lab. (United Kingdom). . . . . [9342-57]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 12
LOCATION: ROOM 132 (EXHIBIT LEVEL) . . . . . TUE 3:30 PM TO 4:50 PM

Pulsed Lasers II

Session Chair: **W. Andrew Clarkson,**
Univ. of Southampton (United Kingdom)

3:30 pm: **Mode-locking in intracavity frequency doubled Nd:YVO_4 laser**, Anton V. Kovalev, Vadim M. Polyakov, Sergey G. Alekseev, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Oleg A. Orlov, D.I. Mendeleyev Institute for Metrology (Russian Federation); Andrey A. Mak, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation). . . . . [9342-59]

3:50 pm: **Current status of Kumgang laser system**, Hong Jin Kong, Sangwoo Park, Hee Kyung Ahn, Hwihyeong Lee, Jungsuk Oh, KAIST (Korea, Republic of); Jom Sool Kim, Laser Spectronix Co., Ltd. (Korea, Republic of) . . . . . [9342-60]

4:10 pm: **50W CW output power and 12mJ pulses from a quasi-2-level Yb:YAG ceramic rod laser end-pumped at the 969nm zero-phonon line**, Christian Fries, Marco Weitz, Christian Theobald, Photonik-Zentrum Kaiserslautern e.V. (Germany); Patric v. Loewis of Menar, Jürgen Bartschke, Xiton Photonics GmbH (Germany); Johannes A. L'huillier, Photonik-Zentrum Kaiserslautern e.V. (Germany) . . . . . [9342-61]

4:30 pm: **Investigation of mechanically Q-switched lasers**, Brian J. Cole, Lew Goldberg, Nate Hough, John E. Nettleton, U.S. Army RDECOM CERDEC NVESD (USA). . . . . [9342-62]

POSTERS-TUESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . TUE 6:00 TO 8:00 PM

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Numerical simulations of the optical gain of crystalline fiber doped by rare earth and transition ion, Abdel Kader Daoui, B. Boubir, A. Adouane, Nacer-Eddine Demagh, M. Ghoumazi, Ctr. de Développement des Téchnologies Avancées (Algeria) . . . . . [9342-63]

Diode-pumped actively Q-switched Nd:YLF/$SrWO_4$ Raman laser, Yang Liu, Zhaojun Liu, Jinbao Xia, Sasa Zhang, Shandong Univ. (China) . . . . . [9342-64]

Temperature influence on diode pumped Er:CaF_2 laser, Jan Sulc, Richard Svejkar, Michal Nemec, Helena Jelínková, Czech Technical Univ. in Prague (Czech Republic); Maxim E. Doroshenko, Pavel P. Fedorov, Vyacheslav V. Osiko, A. M. Prokhorov General Physics Institute (Russian Federation) . . . . . [9342-67]

Wavelength tunability of laser based on Yb-doped YGAG ceramics, Jan Sulc, Helena Jelínková, Czech Technical Univ. in Prague (Czech Republic); Venkatesan Jambunathan, Taisuke Miura, Akira Endo, Antonio Lucianetti, Tomas Mocek, Institute of Physics of the ASCR, v.v.i. (Czech Republic) . . . . . [9342-68]

On the efficiency of Tm-doped 2µm lasers, Koop van Dalfsen, Shanmugam Aravazhi, Univ. Twente (Netherlands); Christos Grivas, Univ. of Southampton (United Kingdom); Sonia M. García-Blanco, Univ. Twente (Netherlands); Markus Pollnau, KTH Royal Institute of Technology (Sweden) . . . . . [9342-69]

Fe:ZnSe and Fe:ZnMgSe lasers pumped by Er:YSGG radiation, Helena Jelínková, Czech Technical Univ. in Prague (Czech Republic); Maxim E. Doroshenko, A. M. Prokhorov General Physics Institute (Russian Federation); Michal Jelínek, Jan Sulc, Michal Nemec, Václav Kubecek, Czech Technical Univ. in Prague (Czech Republic); Yuriy A. Zagoruiko, Nazar O. Kovalenko, Andriy S. Gerasimenko, Vyacheslav M. Puzikov, Vitaliy K. Komar, Institute for Single Crystals (Ukraine) . . . . . [9342-70]

Moderate high power 1 to 20µs and kHz Ho:YAG thin disk laser pulses for laser lithotripsy, Günther Renz, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [9342-71]

Influence of temperature on spectroscopic and lasing properties of Pr:YLF crystal, Martin Fibrich, Czech Technical Univ. in Prague (Czech Republic) and Institute of Physics of the ASCR, v.v.i. (Czech Republic); Jan Sulc, Helena Jelínková, Czech Technical Univ. in Prague (Czech Republic) . . . . . [9342-72]

60W Ho:YLF oscillator-amplifier system, Wayne S. Koen, Cobus Jacobs, Lorinda Wu, Hencharl J. Strauss, Council for Scientific and Industrial Research (South Africa) . . . . . [9342-73]

Development of a closed-loop cryogenically cooled sub-picosecond regenerative amplifier, Pawel Sikocinski, Institute of Physics of the ASCR, v.v.i. (Czech Republic) and Czech Technical Univ. in Prague (Czech Republic); Taisuke Miura, Venkatesan Jambunathan, Jens Linnemann, Akira Endo, Tomas Mocek, Institute of Physics of the ASCR, v.v.i. (Czech Republic) . . . . . [9342-74]

Continuous-wave hybrid index-antiguided and thermal-guided planar waveguide laser with large mode area, Yuanye Liu, Tsing-Hua Her, Lee W. Casperson, The Univ. of North Carolina at Charlotte (USA) . . . . . [9342-75]

Underwater laser detection system, Walid Gomaa Abd Elwaheed, Military Technical College (Egypt) . . . . . [9342-76]

Transmitted beam profile for determining bulk scattering in transparent ceramics, Saurabh Sharma, Univ. of California, Los Angeles (USA) and SPAWAR Systems Ctr. (USA); J. Keith Miller, Naval Air Warfare Ctr. Weapons Div. (USA); Ramesh K. Shori, SPAWAR Systems Ctr. (USA); Mark S. Goorsky, Univ. of California, Los Angeles (USA) . . . . . [9342-77]

Angle resolved scatter measurement of bulk scattering in transparent ceramics, Saurabh Sharma, Univ. of California, Los Angeles (USA) and SPAWAR Systems Ctr. (USA); J. Keith Miller, Naval Air Warfare Ctr. Weapons Div. (USA); Ramesh K. Shori, SPAWAR Systems Ctr. (USA); Mark S. Goorsky, Univ. of California, Los Angeles (USA) . . . . . [9342-78]

Multiplexed pulsed quantum cascade laser based hypertemporal real-time headspace measurements, Charles C. Harb, Toby K. Boyson, The Univ. of New South Wales (Australia); Timothy Day, William B. Chapman, David B. Caffey, Leigh J. Bromley, Daylight Solutions Inc. (USA) . . . . . [9342-80]

Spectroscopic characterization of Cr^{2+} ions in ZnSe/ZnS crystals under visible excitation, Jeremy M. Peppers, Vladimir V. Fedorov, Sergey B. Mirov, The Univ. of Alabama at Birmingham (USA) . . . . . [9342-81]

CONFERENCE 9343
LOCATION: ROOM 122 (EXHIBIT LEVEL)

Monday–Thursday 9–12 February 2015 • Proceedings of SPIE Vol. 9343

Laser Resonators, Microresonators, and Beam Control XVII

Conference Chairs: **Alexis V. Kudryashov,** Moscow State Open Univ. (Russian Federation); **Alan H. Paxton,** Air Force Research Lab. (USA); **Vladimir S. Ilchenko,** OEwaves, Inc. (USA)

Conference Co-Chairs: **Lutz Aschke,** LIMO Lissotschenko Mikrooptik GmbH (Germany); **Kunihiko Washio,** Paradigm Laser Research Ltd. (Japan)

Program Committee: **Andrea M. Armani,** The Univ. of Southern California (USA); **Gaurav Bahl,** Univ. of Illinois at Urbana-Champaign (USA); **Yanne K. Chembo,** FEMTO-ST (France); **Jean-Claude M. Diels,** The Univ. of New Mexico (USA); **Hans Joachim Eichler,** Laser- und Medizin-Technologie GmbH, Berlin (Germany); **Andrew Forbes,** CSIR National Laser Ctr. (South Africa); **Pierre Galarneau,** INO (Canada); **Thomas Graf,** Univ. Stuttgart (Germany); **Tobias J. Kippenberg,** Ecole Polytechnique Fédérale de Lausanne (Switzerland); **James R. Leger,** Univ. of Minnesota, Twin Cities (USA); **Andrey B. Matsko,** OEwaves, Inc. (USA); **Gualtiero Nunzi Conti,** Istituto di Fisica Applicata Nello Carrara (Italy); **Andrew W. Poon,** Hong Kong Univ. of Science and Technology (Hong Kong, China); **Michelle L. Povinelli,** The Univ. of Southern California (USA); **Michael J. Scaggs,** Neoteric Concepts, LLC (USA); **Haiyin Sun,** ChemImage Corp. (USA); **Lei Xu,** Fudan Univ. (China); **Lan Yang,** Washington Univ. in St. Louis (USA)

Monday 9 February

SESSION 1

LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . . MON 8:15 AM TO 10:05 AM

Microresonator Optomechanics I

Session Chair: **Vladimir S. Ilchenko,** OEwaves, Inc. (USA)

8:15 am: **Asymmetric response function of the transduction spectrum for a microsphere pendulum**, Jonathan M. Ward, Yong Yang, Ramgopal Madugani, Síle G. Nic Chormaic, Okinawa Institute of Science and Technology (Japan) . . . . . [9343-1]

8:35 am: **Electrooptomechanical systems for microwave-optical information transfer** *(Invited Paper)*, Andrew N. Cleland, Univ. of Chicago (USA) . . . . . [9343-2]

9:00 am: **Observation of optical non-reciprocity in a Brillouin optomechanical system**, Junhwan Kim, Kewen Han, Gaurav Bahl, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9343-3]

9:20 am: **Brillouin scattering induced transparency in a silica microsphere** *(Invited Paper)*, Chunhua Dong, Zhen Shen, Chang-Ling Zou, Guang-Can Guo, Univ. of Science and Technology of China (China) . . . . . [9343-4]

9:45 am: **Acoustic whispering gallery modes within the theory of elasticity**, Ingo Breunig, Univ. of Freiburg (Germany); Boris I. Sturman, Institute of Automation and Electrometry (Russian Federation); Karsten Buse, Univ. of Freiburg (Germany) and Fraunhofer-Institut für Physikalische Messtechnik (Germany) . . . . . [9343-5]

Coffee Break . . . . . Mon 10:05 am to 10:30 am

SESSION 2

LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . MON 10:30 AM TO 12:10 PM

Microresonator Optomechanics II

Session Chair: **Tobias J. Kippenberg,**
Ecole Polytechnique Fédérale de Lausanne (Switzerland)

10:30 am: **Brillouin lasers, frequency combs, and optical frequency division using high-Q silica resonators** *(Invited Paper)*, Kerry J. Vahala, California Institute of Technology (USA) . . . . . [9343-6]

10:55 am: **Dynamical characteristics of AlGaInAs/InP microdisk lasers subject to optical injection** *(Invited Paper)*, Yong-Zhen Huang, Ling-Xiu Zou, Bo-Wen Liu, Yue-De Yang, Heng Long, Jin-Long Xiao, Yun Du, Institute of Semiconductors (China) . . . . . [9343-7]

11:20 am: **Connecting microwave and optical frequencies with a vibrational degree of freedom** *(Invited Paper)*, Reed W. Andrews, Robert W. Peterson, Thomas P. Purdy, JILA (USA); Katarina Cicak, Raymond W. Simmonds, National Institute of Standards and Technology (USA); Cindy A. Regal, Konrad W. Lehnert, JILA (USA) . . . . . [9343-8]

11:45 am: **Superfluid optomechanics** *(Invited Paper)*, Glen I. Harris, David L. McAuslan, Eoin E. Sheridan, Warwick P. Bowen, The Univ. of Queensland (Australia) . . . . . [9343-9]

Lunch Break . . . . . Mon 12:10 pm to 1:20 pm

SESSION 3

LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . . MON 1:20 PM TO 2:55 PM

Microresonator Combs, THz, and RF Photonics I

Joint Session with Conferences 9343 and 9347

Session Chair: **Andrea M. Armani,**
The Univ. of Southern California (USA)

1:20 pm: **Diamond frequency combs** *(Invited Paper)*, Marko Loncar, Harvard Univ. (USA) . . . . . [9343-10]

1:45 pm: **On chip temporal solitons and coherent dispersive waves in SiN optical micro resonators for octave spanning frequency combs** *(Invited Paper)*, Tobias J. Kippenberg, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9343-11]

2:10 pm: **Precision frequency metrology with microresonator combs** *(Invited Paper)*, Scott Diddams, Scott B. Papp, National Institute of Standards and Technology (USA) . . . . . [9343-12]

2:35 pm: **Broadband 2.5-6μm frequency comb source for dual-comb molecular spectroscopy**, Viktor O. Smolski, Konstantin L. Vodopyanov, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9347-1]

Coffee Break . . . . . Mon 2:55 pm to 3:20 pm

SESSION 4

LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . . MON 3:20 PM TO 5:50 PM

Microresonator Combs, THz, and RF Photonics II

Joint Session with Conferences 9343 and 9347

Session Chairs: **Konstantin L. Vodopyanov,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Gualtiero Nunzi Conti,** Istituto di Fisica Applicata Nello Carrara (Italy)

3:20 pm: **Terabit/s communications using chip-scale frequency comb sources** *(Invited Paper)*, Christian Koos, Karlsruher Institut für Technologie (Germany); Tobias J. Kippenberg, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Larry R. Dalton, Univ. of Washington (USA); Liam P. Barry, Dublin City Univ. (Ireland); Wolfgang Freude, Karlsruher Institut für Technologie (Germany); Juerg Leuthold, Karlsruher Institut für Technologie (Germany) and ETH Zürich (Switzerland); Joerg Pfeifle, Claudius Weimann, Matthias Lauermann, Stefan Wolf, Karlsruher Institut für Technologie (Germany); Victor Brasch, Tobias Herr, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Delwin L. Elder, Univ. of Washington (USA); Vidak Vujicic, Regan T. Watts, Dublin City Univ. (Ireland) . . . . . [9343-13]

3:45 pm: **Towards efficient octave-spanning comb with micro-structured crystalline resonator** *(Invited Paper)*, Nan Yu, Ivan S. Grudinin, Jet Propulsion Lab. (USA) . . . . . [9343-14]

4:10 pm: **Ultrafast nonlinear Si optics** *(Invited Paper)*, Alexander L. Gaeta, Cornell Univ. (USA) . . . . . [9347-2]

4:35 pm: **Making microwaves visible: Parametric frequency conversion in whispering gallery mode resonators** *(Invited Paper)*, Harald G. L. Schwefel, Max-Planck-Institut für die Physik des Lichts (Germany) . . . . . [9343-15]

5:00 pm: **Advances in Kerr optical frequency comb generation** *(Invited Paper)*, Guoping Lin, Irina V. Balakireva, Khaldoun Saleh, Souleymane Diallo, Romain Martinenghi, Rémi Henriet, Aurelien Coillet, Yanne K. Chembo, FEMTO-ST (France). . . . . [9343-16]

5:25 pm: **Analysis of third order nonlinearity effects in high-Q WGM resonator by cavity ring down** *(Invited Paper)*, Patrice Féron, Vincent Huet, Alphonse L. Rasoloniaina, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France); Maurizio Ferrari, Istituto di Fotonica e Nanotecnologie (Italy); Stéphane Balac, Yannick Dumeige, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France) . . . . . [9343-17]

Tuesday 10 February

SESSION 5

LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . . TUE 8:00 AM TO 10:15 AM

Microresonator Sensors

Session Chair: **Yanne K. Chembo,** FEMTO-ST (France)

8:00 am: **Hydrogen gas sensing using palladium-coated microdisk microresonators**, Mustafa Eryurek, Koç Univ. (Turkey); Yasin Karadag, Marmara Univ. (Turkey); Nevin Tasaltin, TÜBITAK Marmara Research Ctr. (Turkey); Necmettin Kilinc, Koç Univ. (Turkey) and Gebze Institute of Technology (Turkey); Alper Kiraz, Koç Univ. (Turkey) . . . . . [9343-18]

8:20 am: **Non-linear fluorescence excitation of Rhodamine 6G and TRITC labeled IgG in whispering gallery mode microresonators**, Silvia Soria Huguet, Istituto di Fisica Applicata Nello Carrara (Italy); Daniele Farnesi, Istituto di Fisica Applicata Nello Carrara (Italy) and Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi (Italy); Giancarlo C. Righini, Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi (Italy) and Istituto di Fisica Applicata Nello Carrara (Italy); Gualtiero Nunzi Conti, Istituto di Fisica Applicata Nello Carrara (Italy); M. Pilar Marco, Carme Pastells, Consejo Superior de Investigaciones Científicas (Spain) and Ctr. de Investigación Biomédica en Red en Bioingeniería, Biomateriales y Nanomedicina (Spain); Pablo Loza-Alvarez, David Merino-Arranz, ICFO - Institut de Ciències Fotòniques (Spain); Laura Pasquardini, Cecilia Pederzolli, Fondazione Bruno Kessler (Italy) . . . . . [9343-19]

8:40 am: **Raman lasing dynamics in split-mode microcavity and single-nanoparticle detection** *(Invited Paper)*, Yun-Feng Xiao, Peking Univ. (China) . . . . . [9343-20]

9:05 am: **Optically active silica and polymeric materials for microcavity lasers and sensors** *(Invited Paper)*, Andrea M. Armani, Michele Lee, Andre Kovach, Eda Gungor, Kelvin Kuo, Vinh Diep, The Univ. of Southern California (USA) . . . . . [9343-21]

9:30 am: **Explore optical gain in whispering-gallery microresonators for functional devices** *(Invited Paper)*, Sahin K. Ozdemir, Bo Peng, Jiangang Zhu, Huzeyfe Yilmaz, Faraz Monifi, Steven H. Huang, Lan Yang, Washington Univ. in St. Louis (USA) . . . . . [9343-22]

9:55 am: **High frequency ultrasound detection with ultra-high-Q silica microspheres**, Maria V. Chistiakova, Andrea M. Armani, The Univ. of Southern California (USA) . . . . . [9343-23]

Coffee Break . . . . . Tue 10:15 am to 10:45 am

SESSION 6

LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . . TUE 10:45 AM TO 12:05 PM

Beam Shaping I

Session Chair: **Michael J. Scaggs,** Haas Laser Technologies, Inc. (USA)

10:45 am: **Generation of shape-invariant flat-top laser beams**, Kamel Äit-Ameur, ENSICAEN (France); Darryl Naidoo, Sandile S. Ngcobo, Council for Scientific and Industrial Research (South Africa); Michael Fromager, ENSICAEN (France); Igor A. Litvin, Council for Scientific and Industrial Research (South Africa); Abdelkrim Hasnaoui, Ali Hasnaoui, Univ. des Sciences et de la Technologie Houari Boumediene (Algeria); Andrew Forbes, Council for Scientific and Industrial Research (South Africa) . . . . . [9343-24]

11:05 am: **Optical trapping with superfocused high-M^2 laser diode beam**, Grigorii S. Sokolovskii, Vladislav V. Dudelev, Ioffe Physical-Technical Institute (Russian Federation); Vasileia Melissinaki, Foundation for Research and Technology-Hellas (Greece); Sergey N. Losev, Ioffe Physical-Technical Institute (Russian Federation); Ksenya K. Soboleva, Saint-Petersburg State Polytechnical Univ. (Russian Federation); Anton G. Deryagin, Ioffe Physical-Technical Institute (Russian Federation); Vladimir I. Kuchinskii, Saint Petersburg Electrotechnical Univ. "LETI" (Russian Federation) and Ioffe Physical-Technical Institute (Russian Federation); Maria Farsari, Foundation for Research and Technology-Hellas (Greece); Wilson Sibbett, Univ. of St. Andrews (United Kingdom); Edik U. Rafailov, Aston Univ. (United Kingdom) . . . . . [9343-25]

11:25 am: **Formation of the desired light intensity distribution on the target with bimorph deformable mirror**, Alexis V. Kudryashov, Moscow Univ. of Mechanical Engineering (Russian Federation) and Active Optics Night N Ltd. (France); Julia Sheldakova, Ann Lylova, Moscow Univ. of Mechanical Engineering (Russian Federation) . . . . . [9343-26]

11:45 am: **Transverse intensity transformation by laser amplifiers**, Hencharl J. Strauss, CSIR National Laser Ctr. (South Africa); Gary King, Council for Scientific and Industrial Research (South Africa); Oliver J. P. Collett, Heriot-Watt Univ. (United Kingdom); Igor A. Litvin, Council for Scientific and Industrial Research (South Africa). . . . . [9343-27]

Lunch/Exhibition Break . . . . . Tue 12:05 pm to 1:35 pm

SESSION 7

LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . . TUE 1:35 PM TO 3:15 PM

Beam Delivery and Shaping

Joint Session with Conferences 9343 and 9356

Session Chair: **Friedhelm Dorsch,** TRUMPF Laser- und Systemtechnik GmbH (Germany)

1:35 pm: **Hollow core fiber delivery of sub-ps pulses from a TruMicro 5000 Femto edition thin disk amplifier**, Sebastian Pricking, Raphael Gebs, Robert Fleischhaker, Jochen D. Kleinbauer, Dirk H. Sutter, Alexander Killi, TRUMPF Laser GmbH & Co. KG (Germany); Benoít Beaudou, GLOphotonics SAS (France); Benoit Debord, XLIM Institut de Recherche (France); Frédéric Gérôme, Fetah A. Benabid, GLOphotonics SAS (France) and XLIM Institut de Recherche (France); Sascha Weiler, TRUMPF Inc. (USA) . . . . . [9356-1]

1:55 pm: **Industrial beam delivery system for ultra-short pulsed laser**, Max C. Funck, Björn Wedel, Ilya Kayander, Jörg Niemeyer, PT Photonic Tools (Germany) . . . . . [9356-2]

2:15 pm: **Wavefront-sensor-induced beam size error: Physical mechanism, sensitivity analysis, and correction-method**, Wouter D. Koek, TNO Science and Industry (Netherlands); Erwin J. van Zwet, TNO (Netherlands) . . . . . [9356-3]

2:35 pm: **Wavelength- and magnification adaptive beam expansion with one set of components**, Ulrike Fuchs, asphericon GmbH (Germany) . . . . . [9356-4]

2:55 pm: **Effect of large deflection angle on the laser intensity profile produced by AOD scanners in high precision manufacturing**, Tiansi Wang, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Chong Zhang, Aleksandar Aleksov, Islam A. Salama, Intel Corp. (USA); Aravinda Kar, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9356-32]

Coffee Break . . . . . Tue 3:15 pm to 3:45 pm

LASE

CONFERENCE 9343
LOCATION: ROOM 122 (EXHIBIT LEVEL)

SESSION 8
LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . . TUE 3:45 PM TO 5:25 PM

Beam Shaping

Joint Session with Conferences 9343 and 9356

Session Chair: **Lutz Aschke,**
LIMO Lissotschenko Mikrooptik GmbH (Germany)

3:45 pm: **Analysis and demonstration of a wavefront sensor based on binary pixellated transmission filters**, Jie Qiao, Lauren Taylor, Rochester Institute of Technology (USA); Gaozan Ding, Wheaton College (USA) and Rochester Institute of Technology (USA); Danny Dang, Rochester Institute of Technology (USA); Christophe Dorrer, Aktiwave LLC (USA). . . . . [9356-6]

4:05 pm: **Generation of doughnut spot for high-power laser technologies using refractive beam shaping**, Alexander V. Laskin, Vadim V. Laskin, AdlOptica Optical Systems GmbH (Germany); Aleksei Ostrun, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9356-7]

4:25 pm: **Optical alignment influenced aberrations in laser beam delivery systems and their correction**, Michael J. Scaggs, Gilbert J. Haas, Haas Laser Technologies, Inc. (USA) . . . . . [9343-28]

4:45 pm: **Beam uniformity of flat top lasers**, Chao Chang, Larry Cramer, Don Danielson, James Norby, Continuum (USA) . . . . . [9343-29]

5:05 pm: **Ultra-narrow UV laser lines for surface processing**, Mikhail M. Ivanenko, Vyacheslav Grimm, Lisa Kleinschmidt, Aliaksei Krasnaberski, Markus Wiesner, LIMO Lissotschenko Mikrooptik GmbH (Germany) . . . . . [9343-30]

POSTERS-TUESDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . TUE 6:00 TO 8:00 PM

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Selective higher order fiber mode excitation using a monolithic setup of a phase plate at a fiber face, Johannes Wilde, Michael Duparré, Christian Schulze, Robert Brüning, Friedrich-Schiller-Univ. Jena (Germany); Siegmund Schröter, Leibniz-Institut für Photonische Technologien e.V. (Germany) . . . . . [9343-56]

Investigation of the impact of fiber Bragg grating bandwidth on the efficiency of a Raman resonator, Leanne J. Henry, Air Force Research Lab. (USA); Michael Klopfer, Ravinder K. Jain, The Univ. of New Mexico (USA) . . . . . [9343-62]

Improving the intensity of a focused laser beam, Kamel Äit-Ameur, ENSICAEN (France); Sofiane Haddadi, Ctr. de Développement des Téchnologies Avancées (Algeria); Michael Fromager, ENSICAEN (France); Djelloul Louhibi, Ctr. de Développement des Téchnologies Avancées (Algeria); Abdelkrim Hasnaoui, Ali Harfouche, Univ. des Sciences et de la Technologie Houari Boumediene (Algeria); Emmanuel Cagniot, ENSICAEN (France) . . . . . [9343-63]

Laser beam shape converter using spatially variable wave plate made by nanogratings inscription in fused silica, Kirilas Michailovas, EKSPLA UAB (Lithuania) and Vilnius Univ. (Lithuania); Titas Gertus, Altechna R&D (Lithuania); Andrejus Michailovas, EKSPLA UAB (Lithuania) and Ctr. for Physical Sciences and Technology (Lithuania); Virginija Pektrauskiene, EKSPLA UAB (Lithuania) . . . . . [9343-64]

Role of geometry in optothermal response of toroidal ultra-high-Q cavities, Soheil Soltani, Andrea M. Armani, The Univ. of Southern California (USA) . . . . . [9343-65]

Whispering-gallery mode lasers for biosensing: Reducing the lasing threshold, Alexandre François, Nicolas Riesen, Tanya M. Monro, The Univ. of Adelaide (Australia) . . . . . [9343-66]

Self organization of multiple single emitters in an unstructured broad area diode laser using a spectral beam combining architecture, Christof Zink, Univ. Potsdam (Germany); Nils Werner, Univ. of Potsdam (Germany); Andreas Jechow, Axel Heuer, Ralf Menzel, Univ. Potsdam (Germany) . . . . . [9343-68]

High-speed transient sensing using dielectric micro-resonators, Amir R. Ali, Volkan Otugen, Tindaro Ioppolo, Southern Methodist Univ. (USA) . . . . [9343-69]

Short-and-long-term highly stable oscillation and amplification of linearly polarized passively mode-locked solitonic fiber laser resonators, Mauro Brotons I Gisbert, Univ. de València (Spain); Guillermo E. Villanueva, Univ. Politècnica de València (Spain); Giovanni Serafino, Scuola Superiore Sant'Anna (Italy); Antonella Bogoni, Consorzio Nazionale Interuniversitario per le Telecomunicazioni (Italy); Miguel V. Andrés, Univ. de València (Spain); Pere Pérez-Millán, Univ. Politècnica de València (Spain) and FYLA LASER SL (Spain) . . . . . [9343-70]

Predicting the whispering gallery mode spectra of microresonators, Jonathan M. Hall, The Univ. of Adelaide (Australia) . . . . . [9343-71]

Production of freeform optics and diffractive optical elements in glass for laser beam shaping in larger quantities, Michael Wolz, Ullrich Blöcher, Gerhard Dross, GD Optical Competence GmbH (Germany); Christian Bischoff, TOPAG Lasertechnik GmbH (Germany); Jana Schmitt, Hochschule RheinMain (Germany) . . . . . [9343-72]

Small refractive index, high performance: Magnesium fluoride whispering gallery mode resonators for refractometric sensing, Florian Sedlmeir, Richard Zeltner, Harald G. Schwefel, Max-Planck-Institut für die Physik des Lichts (Germany) . . . . . [9343-73]

High-speed tunable laser based on novel electro-optic effect, Pengfei Wu, Nankai Univ. (China) . . . . . [9343-74]

Wednesday 11 February

SESSION 9
LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . . WED 8:30 AM TO 9:50 AM

Beam Shaping III

Session Chair: **Kunihiko Washio,**
Paradigm Laser Research Ltd. (Japan)

8:30 am: **Minimal-effort planning of active alignment processes for beam-shaping optics**, Sebastian Haag, Matthias Schranner, Tobias Müller, Daniel Zontar, Christian Brecher, Fraunhofer-Institut für Produktionstechnologie (Germany); Christian Schlette, Daniel Losch, Jürgen Rossmann, Institute for Man-Machine Interaction (Germany). . . . . [9343-31]

8:50 am: **Latest developments and experimental results of adaptive optics for ultra intense lasers**, Nicolas A. Lefaudeux, Xavier Levecq, Imagine Optic SA (France) . . . . . [9343-32]

9:10 am: **FPGA-accelerated adaptive optics wavefront control, part II**, Erik Beckert, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Steffen Mauch, Alexander Barth, Johann Reger, Technische Univ. Ilmenau (Germany); Claudia Reinlein, Michael Appelfelder, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany). . . . . [9343-33]

9:30 am: **New concepts of electro-optical light deflection: EO-slab and phased EO-array**, Volker Wirth, Aliaksei Krasnaberski, Mikhail M. Ivanenko, LIMO Lissotschenko Mikrooptik GmbH (Germany) . . . . . [9343-34]

Coffee Break . . . . . .Wed 9:50 am to 10:20 am

LASE PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . WED 10:20 AM TO 12:30 PM

Session Chairs: **Guido Hennig**, Daetwyler Graphics AG (Switzerland); **Yongfeng Lu**, Univ. of Nebraska-Lincoln (USA)

10:20 am: **Welcome and Opening Remarks**
Guido Hennig, Daetwyler Graphics AG (Switzerland); **Yongfeng Lu,** Univ. of Nebraska-Lincoln (USA)

10:25 am: **Announcement of the Green Photonics Best Paper Award and the 3D Printing, Fabrication, and Manufacturing Best Paper Award**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA); **Henry Helvajian,** The Aerospace Corp. (USA)

10:30 am: **NASA's Optical Communications Program: 2015 and Beyond**
Donald M. Cornwell Jr., NASA Headquarters, Space Communications and Navigation Program (USA) . . [9354-201]

11:10 am: **Coherent Combination of Ultrafast Laser Pulses: A Route to Joule-Class High Repetition Rate Femtosecond Lasers**
Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9344-202]

11:50 am: **Laser 3D Printing of Metallic Components and its Industrial Applications: Technical Breakthroughs and Opportunities**
Xiaoyan Zeng, Wuhan National Lab. for Optoelectronics (China). . . . . [9353-203]

Lunch/Exhibition Break . . . . . .Wed 12:30 pm to 1:30 pm

SESSION 10

LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . . WED 1:30 PM TO 3:30 PM

Microresonator Fundamentals, Novel Topologies, and Devices I

Session Chair: **Lei Xu,** Fudan Univ. (China)

1:30 pm: **Femtosecond laser direct writing of high-Q microresonators in glass and crystals** *(Invited Paper)*, Jintian Lin, Shanghai Institute of Optics and Fine Mechanics (China); Yingxin Xu, Zhejiang Univ. (China); Jiangxin Song, Shanghai Institute of Optics and Fine Mechanics (China); Jialei Tang, SIOM (China); Zhiwei Fang, Shanghai Tech University (China); Min Wang, SIOM (China); Wei Fang, Zhejiang Univ. (China); Ya Cheng, Shanghai Institute of Optics and Fine Mechanics (China). . . . . [9343-35]

1:55 pm: **Nanowire-induced nanocavities in nanophotonics platform** *(Invited Paper)*, Masaya Notomi, NTT Basic Research Labs. (Japan) and NTT Nanophotonics Ctr. (Japan) . . . . . [9343-36]

2:20 pm: **Hybrid silicon unidirectional-emission microspiral disk lasers for optical interconnect applications** *(Invited Paper)*, Andrew W. Poon, Yu Zhang, Lei Zhang, Hong Kong Univ. of Science and Technology (China) . . . . . [9343-37]

2:45 pm: **Propagation of polariton condensate in a one-dimensional microcavity at room temperature** *(Invited Paper)*, Yanjing Ling, Wei Xie, Yao Yao, Xuechu Shen, Zhanghai Chen, Fudan Univ. (China) . . . . . [9343-38]

3:10 pm: **PDMS quasi-droplet microbubble resonator**, Jonathan M. Ward, Yong Yang, Síle G. Nic Chormaic, Okinawa Institute of Science and Technology (Japan). . . . . [9343-39]

Coffee Break . . . . . .Wed 3:30 pm to 4:00 pm

SESSION 11

LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . . WED 4:00 PM TO 5:55 PM

Microresonator Fundamentals, Novel Topologies, and Devices II

Session Chair: **Andrey B. Matsko,** OEwaves, Inc. (USA)

4:00 pm: **Optimal coupling to high-Q whispering gallery modes with a sub-wavelength metallic grating coupler** *(Invited Paper)*, Yanyan Zhou, Nanyang Technological Univ. (Singapore) and Singapore Institute of Manufacturing Technology (Singapore); Bobo Gu, Nanyang Technological Univ. (Singapore); Xia Yu, Singapore Institute of Manufacturing Technology (Singapore); Feng Luan, Nanyang Technological Univ. (Singapore) . . . . . [9343-40]

4:25 pm: **Strong localization of whispering gallery modes in an optical fiber via asymmetric perturbation of the translation symmetry** *(Invited Paper)*, Misha Sumetsky, Aston Institute for Photonics Technologies (United Kingdom) . . . . . [9343-41]

4:50 pm: **Manipulating high-order scattering processes in ultrasmall optical resonators to control far-field emission** *(Invited Paper)*, Brandon Redding, Yale Univ. (USA); Li Ge, College of Staten Island (USA); Qinghai Song, Harbin Institute of Technology (China); Glenn S. Solomon, National Institute of Standards and Technology (USA); Hui Cao, Yale Univ. (USA) . . . . . [9343-42]

5:15 pm: **Cladding modes fiber coupling to silica micro-resonators based on long period gratings**, Daniele Farnesi, Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi (Italy); Francesco Chiavaioli, Franco Cosi, Istituto di Fisica Applicata Nello Carrara (Italy); Giancarlo C. Righini, Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi (Italy); Silvia Soria Huguet, Cosimo Trono, Gualtiero Nunzi Conti, Istituto di Fisica Applicata Nello Carrara (Italy) . . . . . [9343-43]

5:35 pm: **Polymer waveguide couplers for ultra-high-Q low index open crystalline cavities**, Anatoliy A. Savchenkov, OEwaves, Inc. (USA); Hari Mahalingam, The Univ. of Southern California (USA); Vladimir S. Ilchenko, OEwaves, Inc. (USA); Satsuki Takahashi, The Univ. of Southern California (USA); Andrey B. Matsko, OEwaves, Inc. (USA); William H. Steier, The Univ. of Southern California (USA); Lute Maleki, OEwaves, Inc. (USA) . . . . . [9343-44]

Thursday 12 February

SESSION 12

LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . . THU 8:35 AM TO 10:00 AM

Coupled Resonators and Phased Arrays

Session Chair: **Alan H. Paxton,** Air Force Research Lab. (USA)

8:35 am: **Uncovering the physical origin of self phasing in coupled fiber lasers** *(Invited Paper)*, James R. Leger, Univ. of Minnesota, Twin Cities (USA) . . . . . [9343-45]

9:00 am: **Dynamics of passively phased regenerative high power fiber amplifier arrays**, Mohammad R. Zunoubi, State Univ. of New York at New Paltz (USA); Erik J. Bochove, Air Force Research Lab. (USA) . . . . . [9343-46]

9:20 am: **Dynamics of high power fiber laser arrays with active phase control**, Erik J. Bochove, Air Force Research Lab. (USA); Brendan Neschke, The Univ. of Tennessee (USA) and Oak Ridge National Lab. (USA); Alejandro B. Aceves, Southern Methodist Univ. (USA); Mohammad R. Zunoubi, State Univ. of New York at New Paltz (USA); Yehuda Braiman, Oak Ridge National Lab. (USA) . . . . . [9343-47]

9:40 am: **Coupled mode description of external cavity-coupled laser array dynamics**, Niketh S. Nair, Oak Ridge National Lab. (USA) and Univ. of Tennessee (USA); Erik J. Bochove, Air Force Research Lab. (USA); Alejandro B. Aceves, Southern Methodist Univ. (USA); Mohammad R. Zunoubi, State Univ. of New York at New Paltz (USA); Yehuda Braiman, Oak Ridge National Lab. (USA) and Univ. of Tennessee (USA). . . . . [9343-48]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 13

LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . .THU 10:30 AM TO 11:30 AM

Diagnostics

Session Chair: **Alexis V. Kudryashov,** Moscow State Open Univ. (Russian Federation)

10:30 am: **Time-resolved deformation measurement of Yb:YAG thin disk using wavefront sensor**, Michal Chyla, Siva S. Nagisetty, Patricie Severová, Taisuke Miura, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Klaus Mann, Institute of Physics of the ASCR, v.v.i. (Czech Republic) and Laser-Lab. Göttingen e.V. (Germany); Akira Endo, Tomás Mocek, Institute of Physics of the ASCR, v.v.i. (Czech Republic) . . . . . [9343-49]

10:50 am: **Single shot M^2 measurement for near infrared high energy laser pulses**, Siva S. Nagisetty, Institute of Physics of the ASCR, v.v.i. (Czech Republic) and Czech Technical Univ. in Prague (Czech Republic); Taisuke Miura, Akira Endo, Tomás Mocek, Martin Smrz, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Václav Kube?ek, Czech Technical Univ. in Prague (Czech Republic) . . . . . [9343-50]

11:10 am: **Characterization of vorticity in fluids by a spatially shaped laser beam**, Anton Ryabtsev, Shahram Pouya, Manoochehr Koochesfahani, Marcos M. Dantus, Michigan State Univ. (USA). . . . . [9343-51]

Lunch/Exhibition Break . . . . . Thu 11:30 am to 1:40 pm

CONFERENCE 9343
LOCATION: ROOM 122 (EXHIBIT LEVEL)

SESSION 14
LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . . .THU 1:40 PM TO 3:00 PM

Laser Mode Control I

Session Chair: **James R. Leger,** Univ. of Minnesota, Twin Cities (USA)

1:40 pm: **Direct generation of radially polarized beams from a Nd:YVO_4 laser chip with a gold ring pattern**, Takeshi Sumi, Yuichi Kozawa, Shunichi Sato, Tohoku Univ. (Japan) . . . . . [9343-52]

2:00 pm: **Thermal depolarization compensation using full vectorial beam propagation method in cylindrical laser amplifiers**, Rainer Hartmann, Christoph Pflaum, Thomas Graupeter, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) . . . . . [9343-54]

2:20 pm: **Lasing mode selection by active transformation optics**, Li Ge, College of Staten Island (USA) . . . . . [9343-55]

2:40 pm: **1600W monolithic CW single mode fiber laser oscillator at 1080 nm**, Wei Shi, Tianjin Univ. (China); Qiang Fang, Qihang Zhang, HFB Photonics Co., Ltd. (China) . . . . . [9343-57]

Coffee Break . . . . . Thu 3:00 pm to 3:30 pm

SESSION 15
LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . . .THU 3:30 PM TO 4:55 PM

Laser Mode Control II

Session Chair: **Erik J. Bochove,** Air Force Research Lab. (USA)

3:30 pm: **Controlling light's handedness inside laser resonators** *(Invited Paper)*, Andrew Forbes, CSIR National Laser Ctr. (South Africa) and Stellenbosch Univ. (South Africa) and Univ. of KwaZulu-Natal (South Africa); Darryl Naidoo, CSIR National Laser Ctr. (South Africa) and Stellenbosch Univ. (South Africa); Filippus S. Roux, CSIR National Laser Ctr. (South Africa); Lorenzo Marrucci, Univ. degli Studi di Napoli Federico II (Italy) and CNR-SPIN (Italy); Igor A. Litvin, Angela Dudley, CSIR National Laser Ctr. (South Africa) . . . . . [9343-58]

3:55 pm: **The effect of grating on red-emitting external cavity diode laser with high optical power and narrow linewidth**, Jiyeon Park, Hong Joo Song, Jong-Hwan Park, Gaye Park, Hong Man Na, Jun-Ho Lee, Korea Electronics Technology Institute (Korea, Republic of); Ilgu Yun, Yonsei Univ. (Korea, Republic of) . . . . . [9343-59]

4:15 pm: **Wavefront control in high average-power multi-slab laser system**, Jan Pilar, Institute of Physics of the ASCR, v.v.i. (Czech Republic) and Czech Technical Univ. in Prague (Czech Republic); Stefano Bonora, IFN-CNR LUXOR Lab. (Italy) and Institute of Physics of the ASCR, v.v.i. (Czech Republic); Paul J. Phillips, Jodie M. Smith, John L. Collier, Rutherford Appleton Lab. (United Kingdom); Helena Jelínková, Czech Technical Univ. in Prague (Czech Republic); Antonio Lucianetti, Tomás Mocek, Institute of Physics of the ASCR, v.v.i. (Czech Republic) . . . . . [9343-60]

4:35 pm: **Ultra stable carbon fibre high power CO_2 laser with high quality laser beam and AOM implementation**, Markus Bohrer, Dr. Bohrer Lasertec GmbH (Austria) and Vienna Technical Univ. (Austria) . . . . . [9343-61]

CONFERENCE 9344
LOCATION: ROOM 131 (EXHIBIT LEVEL)

Monday–Thursday 9–12 February 2015 • Proceedings of SPIE Vol. 9344

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Fiber Lasers XII: Technology, Systems, and Applications

Conference Chair: **L. Brandon Shaw,** U.S. Naval Research Lab. (USA)

Conference Co-Chair: **John Ballato,** Clemson Univ. (USA)

Program Committee: **Thomas Tanggaard Alkeskjold,** NKT Photonics A/S (Denmark); **Paulo Almeida,** Fianium Ltd. (United Kingdom); **Adrian L. Carter,** Nufern (USA); **Fabio Di Teodoro,** The Aerospace Corp. (USA); **Ingmar Hartl,** Deutsches Elektronen-Synchrotron (Germany); **Clifford Headley III,** OFS Labs. (USA); **Sami T. Hendow,** Adaptive Laser Processing (USA); **Stuart D. Jackson,** Macquarie Univ. (Australia); **Jens Limpert,** Friedrich-Schiller-Univ. Jena (Germany); **Jian Liu,** PolarOnyx (USA); **John D. Minelly,** Coherent, Inc. (USA); **Peter F. Moulton,** Q-Peak, Inc. (USA); **Martin H. Muendel,** JDSU (USA); **Siddharth Ramachandran,** Boston Univ. (USA); **Craig Robin,** Lockheed Martin Aculight (USA); **Akira Shirakawa,** The Univ. of Electro-Communications (Japan); **Ji Wang,** Corning Incorporated (USA); **Pu Wang,** Beijing Univ. of Technology (China); **Yoann Zaouter,** Amplitude Systèmes (France); **Michalis N. Zervas,** Univ. of Southampton (United Kingdom)

Monday 9 February

OPENING REMARKS

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . 8:30 AM TO 8:40 AM

L. Brandon Shaw, U.S. Naval Research Lab. (USA)

SESSION 1

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . MON 8:40 AM TO 10:10 AM

Novel Fibers and Designs I

Session Chair: **Thomas Tanggaard Alkeskjold,** NKT Photonics A/S (Denmark)

8:40 am: **Large mode area Yb-doped photonic bandgap fiber lasers** *(Invited Paper)*, Liang Dong, ECE/COMSET, Clemson Univ. (USA); Fanting Kong, Guancheng Gu, Thomas W. Hawkins, Joshua Parsons, Maxwell Jones, Christopher D. Dunn, Monica T. Kalichevsky-Dong, Clemson Univ. (USA); Kunimasa Saitoh, Hokkaido Univ. (Japan); Benjamin Pulford, Iyad Dajani, Air Force Research Lab. (USA) . . . . . [9344-1]

9:10 am: **Polarizing 50µm core Yb-doped photonic bandgap fiber**, Fanting Kong, Guancheng Gu, Thomas W. Hawkins, Joshua Parsons, Maxwell Jones, Christopher D. Dunn, Monica T. Kalichevsky-Dong, Clemson Univ. Research Foundation (USA); Benjamin Pulford, Iyad Dajani, Air Force Research Lab. (USA); Kunimasa Saitoh, Hokkaido Univ. (Japan); Liang Dong, Clemson Univ. Research Foundation (USA) . . . . . [9344-2]

9:30 am: **Yb-doped large mode area fibers with reduced cladding symmetry**, Federica Poli, Enrico Coscelli, Annamaria Cucinotta, Stefano Selleri, Univ. degli Studi di Parma (Italy); François Salin, EOLITE Systems (France) . . . . . [9344-3]

9:50 am: **Assymptotically single-mode hybrid fiber with a high anomalous dispersion in the 1µm wavelength region**, Svetlana S. Aleshkina, Mikhail E. Likhachev, Andrei K. Senatorov, Mikhail M. Bubnov, Fiber Optics Research Ctr. (Russian Federation); Mikhail V. Yashkov, Institute of Chemistry of High-Purity Substances (Russian Federation) and N.I. Lobachevsky State Univ. of Nizhni Novgorod (Russian Federation); Mikhail Y. Salaganskii, Alexei N. Guryanov, Institute of Chemistry of High-Purity Substances (Russian Federation) . . [9344-4]

Coffee Break . . . . . Mon 10:10 am to 10:40 am

SESSION 2

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . MON 10:40 AM TO 12:00 PM

Narrow Linewidth

Session Chair: **Akira Shirakawa,** The Univ. of Electro-Communications (Japan)

10:40 am: **High-power narrow-linewidth large mode area photonic bandgap fiber amplifier**, Benjamin Pulford, Iyad Dajani, Thomas Ehrenreich, Roger H. Holten, Christopher L. Vergien, Air Force Research Lab. (USA); Guancheng Gu, Fanting Kong, Thomas W. Hawkins, Liang Dong, Clemson Univ. (USA) . [9344-5]

11:00 am: **158W core-pumped single-frequency amplifier at kHz linewidth using a standard ytterbium-doped single-mode fiber**, Thomas Theeg, Christoph Ottenhues, Hakan Sayinc, Jörg Neumann, Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany) . . . . . [9344-6]

11:20 am: **Record peak power single-frequency erbium-doped fiber amplifiers**, Leonid V. Kotov, Fiber Optics Research Ctr. (Russian Federation) and Moscow Institute of Physics and Technology (Russian Federation); Mikhail E. Likhachev, Mikhail M. Bubnov, Vladimir M. Paramonov, Mikhail I. Belovolov, Fiber Optics Research Ctr. (Russian Federation); Denis S. Lipatov, Institute of Chemistry of High-Purity Substances (Russian Federation) and N.I. Lobachevsky State Univ. of Nizhni Novgorod (Russian Federation); Aleksei N. Guryanov, Institute of Chemistry of High-Purity Substances (Russian Federation) . . . . . [9344-7]

11:40 am: **High-power single-frequency fiber MOPA at 1178 nm**, Mingchen Chen, Akira Shirakawa, The Univ. of Electro-Communications (Japan); Christina B. Olausson, Thomas Tanggaard Alkeskjold, NKT Photonics A/S (Denmark) . . . . . [9344-8]

Lunch Break . . . . . Mon 12:00 pm to 1:30 pm

SESSION 3

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . MON 1:30 PM TO 3:10 PM

Applications

Session Chair: **Sami T. Hendow,** Adaptive Laser Processing (USA)

1:30 pm: **Fiber based stimulated Raman scattering spectroscopy** *(Invited Paper)*, Christian W. Freudiger, Invenio Imaging Inc. (USA); Wenlong Yang, Gary R. Holtom, Harvard Univ. (USA); Jay Trautman, Invenio Imaging Inc. (USA); Khanh Q. Kieu, College of Optical Sciences, The Univ. of Arizona (USA); Xiaoliang S. Xie, Harvard Univ. (USA) . . . . . [9344-9]

2:00 pm: **High stability single-frequency Yb fiber amplifier for next generation gravity missions**, Markus Herper, Oliver Fitzau, Martin Giesberts, Fraunhofer-Institut für Lasertechnik (Germany); Kolja Nicklaus, SpaceTech GmbH (Germany); Geoffrey P. Barwood, Ross A. Williams, Patrick Gill, National Physical Lab. (United Kingdom); Harald Kögel, Airbus Defence and Space (Germany); Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) . . . . . [9344-10]

2:20 pm: **High-intensity nanosecond all-fiber-coiled laser and extreme ultraviolet generation**, Chun-Lin L. Chang, National Taiwan Univ. (USA); Yen-Yin Li, National Taiwan Univ. (Taiwan); Po-Yen Lai, National Central Univ. (Taiwan); Yi-Ping Lai, Chien-Wei Huang, National Taiwan Univ. (Taiwan); Shih-Hung Chen, National Central Univ. (Taiwan); Sheng-Lung L. Huang, National Taiwan Univ. (Taiwan) . . . . . [9344-11]

2:40 pm: **Fiber lasers for directed energy** *(Invited Paper)*, Don D. Seeley, High Energy Laser Joint Technology Office (USA); John M. Slater, LeAnn D. Brasure, Schafer Corp. (USA) . . . . . [9344-12]

Coffee Break . . . . . Mon 3:10 pm to 3:40 pm

SESSION 4

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . MON 3:40 PM TO 5:20 PM

Fiber Components and Novel Architectures

Session Chair: **Clifford Headley III,** OFS Fitel LLC (USA)

3:40 pm: **Femtosecond inscribed mode modulators in large mode area fibers: Experimental and theoretical analysis**, Ria G. Krämer, Philipp Gelszinnis, Christian Voigtländer, Christian Schulze, Jens U. Thomas, Daniel Richter, Michael Duparré, Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9344-13]

LASE

4:00 pm: **High power cladding mode stripper**, Lalitkumar Bansal, V. R. Supradeepa, Sean P. Sullivan, Clifford Headley III, OFS Fitel LLC (USA) . . . . . [9344-14]

4:20 pm: **Electrically tunable fiber-integrated Yb-doped laser covering 74 nm based on a fiber Bragg grating array**, Tobias Tiess, Manfred Rothhardt, Leibniz-Institut für Photonische Technologien e.V. (Germany); Christoph Chojetzki, FBGS Technologies GmbH (Germany); Matthias Jäger, Leibniz-Institut für Photonische Technologien e.V. (Germany); Hartmut Bartelt, Leibniz-Institut für Photonische Technologien e.V. (Germany) and Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9344-15]

4:40 pm: **Fiber laser pumping devices based on directional coupling via fused silica ridge waveguide arrays**, Benjamin Weigand, Photonik-Zentrum Kaiserslautern e.V. (Germany); Christian Dautermann, Technische Univ. Kaiserslautern (Germany); Christian Theobald, Photonik-Zentrum Kaiserslautern e.V. (Germany); Sandra Wolff, Technische Univ. Kaiserslautern (Germany); Johannes A. L'huillier, Photonik-Zentrum Kaiserslautern e.V. (Germany) . . . . . [9344-16]

5:00 pm: **Superluminescent diode versus Fabry-Perot laser diode seeding in pulsed MOPA fiber laser systems for SBS suppression**, Miguel Melo, MWTechnologies, Lda (Portugal) and Univ. of Porto (Portugal) and Multiwave Photonics, S.A. (Portugal); João M. Sousa, Datalogic Automation S.r.l. (Italy); José R. Salcedo, Multiwave Photonics, S.A. (Portugal) . . . . . [9344-17]

Tuesday 10 February

SESSION 5

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . TUE 8:30 AM TO 10:00 AM

Characterization

Session Chair: **John D. Minelly,** Coherent, Inc. (USA)

8:30 am: **Recent progress in the understanding of mode instabilities** *(Invited Paper)*, Cesar Jauregui-Misas, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9344-18]

9:00 am: **Spectral analysis of SRS suppression in photonic bandgap fibers**, Malte Karow, Yuta Suzuki, Henrik Tünnermann, Akira Shirakawa, The Univ. of Electro-Communications (Japan) . . . . . [9344-20]

9:20 am: **Influence of signal bandwidth on mode instability threshold of fiber amplifiers**, Jesse J. Smith, Arlee V. Smith, AS-Photonics, LLC (USA) . . . . . [9344-21]

9:40 am: **Impact of coupling strength on self-focusing in multicore fibers**, Henrik Tünnermann, Akira Shirakawa, The Univ. of Electro-Communications (Japan) . . . . . [9344-22]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 6

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . TUE 10:30 AM TO 12:00 PM

15 Years of Fiber Supercontinuum

Session Chair: **L. Brandon Shaw,** U.S. Naval Research Lab. (USA)

10:30 am: **Supercontinuum, solitons, and instabilities** *(Invited Paper)*, Goëry Genty, Tampere Univ. of Technology (Finland) . . . . . [9344-23]

11:00 am: **Fiber supercontinuum generation: Innovation through blue sky research** *(Invited Paper)*, Jinendra K. Ranka, Intelligence Advanced Research Projects Activity (USA). . . . . [9344-24]

11:30 am: **Fibre based supercontinua: Past, present, and future** *(Invited Paper)*, James R. Taylor, Imperial College London (United Kingdom) . . . . . [9344-25]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:30 pm

SESSION 7

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . TUE 1:30 PM TO 3:00 PM

Novel Fibers and Designs II

Session Chair: **John Ballato,** Clemson Univ. (USA)

1:30 pm: **Novel hollow core fibers** *(Invited Paper)*, Jonathan C. Knight, Univ. of Bath (United Kingdom) . . . . . [9344-26]

2:00 pm: **Picosecond Yb-doped single-trench-fiber amplifier with diffraction-limited output**, Deepak Jain, Univ. of Southampton (United Kingdom); Philip M. Gorman, Christophe A. Codemard, SPI Lasers UK Ltd. (United Kingdom); Yongmin Jung, Univ. of Southampton (United Kingdom); Michalis N. Zervas, SPI Lasers UK Ltd. (United Kingdom) and Univ. of Southampton (United Kingdom); Jayanta K. Sahu, Univ. of Southampton (United Kingdom) . . . . . [9344-27]

2:20 pm: **Monolithic sub-MW peak power tapered ytterbium-doped fiber amplifier**, Konstantin K. Bobkov, Fiber Optics Research Ctr. (Russian Federation); Maxim Y. Koptev, Institute of Applied Physics (Russian Federation) and N.I. Lobachevsky State Univ. of Nizhni Novgorod (Russian Federation); Andrei E. Levchenko, Svetlana S. Aleshkina, Segrey L. Semenov, Alexander N. Denisov, Mikhail M. Bubnov, Fiber Optics Research Ctr. (Russian Federation); Denis S. Lipatov, Alexander Y. Laptev, Alexey N. Guryanov, Institute of Chemistry of High-Purity Substances (Russian Federation); Elena A. Anashkina, Sergey V. Muravyev, Alexey V. Andrianov, Arkady V. Kim, Institute of Applied Physics (Russian Federation) and N.I. Lobachevsky State Univ. of Nizhni Novgorod (Russian Federation); Mikhail E. Likhachev, Fiber Optics Research Ctr. (Russian Federation). . . . . [9344-28]

2:40 pm: **High peak power amplification in large-core all-solid triple-clad Yb fibers with an index-elevated pump clad and a low numerical aperture core**, Martin Leich, Wenbin He, Matthias Jäger, Stephan Grimm, Jens Kobelke, Jörg Bierlich, Yuan Zhu, Hartmut Bartelt, Leibniz-Institut für Photonische Technologien e.V. (Germany) . . . . . [9344-29]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 8

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . TUE 3:30 PM TO 6:00 PM

Frequency Conversion

Session Chair: **Jian Liu,** PolarOnyx, Inc. (USA)

3:30 pm: **Power scaling of Raman fiber lasers** *(Invited Paper)*, Yan Feng, Shanghai Institute of Optics and Fine Mechanics (China) . . . . . [9344-30]

4:00 pm: **Four-wave mixing based optical parametric oscillator producing high energy, tunable, chirped femtosecond pulses**, Thomas Gottschall, Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9344-31]

4:20 pm: **Fiber laser driven ultrafast RGB source based on simultaneous second harmonic generation from a dual zero dispersion wavelength fiber source**, Yuhong Yao, Wayne H. Knox, Univ. of Rochester (USA) . . . . . [9344-32]

4:40 pm: **White light 50W supercontinuum: Roadmap to kW truly white lasers**, Lucy E. Hooper, Mridu P. Kalita, Adam L. Devine, John R. Clowes, Ana Orec-Archer, Fianium Ltd. (United Kingdom). . . . . [9344-33]

5:00 pm: **Ultraviolet-enhanced supercontinuum generation in uniform photonic crystal fiber pumped by a giant-chirped fiber laser**, Shoufei Gao, Beijing Univ. of Technology (China) . . . . . [9344-34]

5:20 pm: **High power mid-infrared supercontinuum generation in a single-mode ZBLAN fiber pumped by amplified picosecond pulses at 2 µm**, Kun Liu, Jiang Liu, Hongxing Shi, Fangzhou Tan, Yijian Jiang, Pu Wang, Beijing Univ. of Technology (China) . . . . . [9344-35]

5:40 pm: **Yellow laser light generation by frequency doubling of the output from a master oscillator fiber power amplifier system**, Manuel Ryser, Univ. Bern (Switzerland); Carlos A. F. Marques, Rogério N. Nogueira, Instituto de Telecomunicações (Portugal); Valerio Romano, Univ. of Bern (Switzerland) . . . . . [9344-36]

POSTERS-TUESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) ..... TUE 6:00 TO 8:00 PM

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

The influence of photodarkening on the mode instability threshold of high-power fiber laser systems, Cesar Jauregui-Misas, Hans-Jürgen Otto, Norbert Modsching, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany). . . . . [9344-68]

Wavelength dependence of maximal diffraction-limited output power of fiber lasers, Hans-Jürgen Otto, Norbert Modsching, Cesar Jauregui-Misas, Friedrich-Schiller-Univ. Jena (Germany); Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany) and Fraunhofer Institute for Applied Physics and Precision Engineering (Germany) . . . . . [9344-69]

Sb_2Te_3 topological insulator based saturable absorber for Er-doped mode-locked fiber lasers, Jaroslaw Z. Sotor, Grzegorz J. Sobon, Jakub Boguslawski, Jan Tarka, Krzysztof M. Abramski, Wroclaw Univ. of Technology (Poland) . . . . . [9344-70]

Polarization-maintaining amplifier based on 3C fiber structures, Jun Enokidani, OPT- i Co., Ltd (Japan); Rumi Ito, Tokai Univ. (Japan); Tsutomu Sakurai, Sumida Shin, OPT- i Co., Ltd (Japan); Kazuyoku Tei, Tokai Univ. (Japan). . . . . [9344-71]

Impact of chromatic dispersion and spectral filtering in an all-fiber mode-locked ytterbium laser, Simon Boivinet, Multitel A.S.B.L. (Belgium) and Univ. de Mons (Belgium); Jean-Bernard Lecourt, Yves Hernandez, Multitel A.S.B.L. (Belgium); Andrei A. Fotiadi, Marc Wuilpart, Patrice Mégret, Univ. de Mons (Belgium) . . . . . [9344-72]

100w femtosecond fiber amplifier and harmonic generation from IR to UV, Julien Saby, EOLITE Systems (France). . . . . [9344-73]

Transient-fiber-Bragg grating spectra in self-swept Fabry-Perot fiber lasers, Pavel Peterka, Pavel Honzátko, Pavel Koska, Ondrej Podrazky, Ivan Kasik, Institute of Photonics and Electronics of the ASCR, v.v.i. (Czech Republic) . . . . . [9344-74]

A high energy green fiber laser in the ns regime for advanced material processing applications, Eran Tal, Doron Sinai, Eitan E. Rowen, Jacob Lasri, Eran Inbar, V-Gen Ltd. (Israel). . . . . [9344-75]

Measuring bend losses in large-mode-area fibers, Changgeng Ye, Joona J. Koponen, Ville Aallos, Teemu Kokki, Laeticia C. Petit, Ossi Kimmelma, nLIGHT Corp., Lohja (Finland). . . . . [9344-76]

Continuously one-dimensional steering of coherently combined beam utilizing phased array of liquid crystal optical phased arrays (PALCOPA), Jian Chen, Lingjiang Kong, Feng Xiao, Zhenming Yang, Univ. of Electronic Science and Technology of China (China); Xiangru Wang, Univ of Electronic Science and Technology of China (China) . . . . . [9344-77]

Pulse shaping in fiber lasers for high energy micromachining applications, Doron Barness, Eitan E. Rowen, Nir Shalev, Jacob Lasri, Eran Inbar, V-Gen Ltd. (Israel) . . . . . [9344-78]

High-average-output-power mode-locked figure-eight all-fiber Yb master oscillator, Sergey M. Kobtsev, Yurii Fedotov, Aleksey V. Ivanenko, Novosibirsk State Univ. (Russian Federation). . . . . [9344-79]

Binary phase shaping for mitigating self-phase modulation, Gennady Rasskazov, Marcos M. Dantus, Michigan State Univ. (USA) . . . . . [9344-80]

MW-level, kHz-repetition rate femtosecond fiber-CPA system operating at 1555 nm, Grzegorz J. Sobon, Pawel R. Kaczmarek, Aleksander Gluszek, Jaroslaw Z. Sotor, Jan Tarka, Krzysztof M. Abramski, Wroclaw Univ. of Technology (Poland) . . . . . [9344-81]

Self-injection locking of the DFB laser through ring fiber optic resonator, Vasily V. Spirin, Cesar A. López-Mercado, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico); José Luis Bueno Escobedo, Alfredo Márquez Lucero, Ctr. de Investigación en Materiales Avanzados, S.C. (Mexico); Patrice Mégret, Andrei A. Fotiadi, Faculté Polytechnique de Mons (Belgium) . . . . . [9344-82]

Characterization of mode-locking in an all-fiber, all normal dispersion ytterbium based fiber oscillator, Andras Cserteg, Furukawa Electric Institute of Technology Ltd. (Hungary); Veronika Sagi, Budapest Univ. of Technology and Economics (Hungary); Andras Drozdy, ELI-HU Nonprofit Kft. (Hungary); Zoltan Varallyay, Gabor Gajdatsy, Furukawa Electric Institute of Technology Ltd. (Hungary) . . . . . [9344-83]

2 µm actively Q-switched all fiber laser based on Tm-doped silica fiber, Shijie Fu, Wei Shi, Quan Sheng, Jianquan Yao, Tianjin Univ. (China). . . [9344-84]

Phase stabilization of an actively mode-locked ring laser, Akira Takada, Makoto Saika, Shigenori Nagano, Topcon Corp. (Japan). . . . . [9344-85]

Genetic algorithm based optimization of pulse profile for MOPA based high power fiber lasers, Ming Tang, Jiawei Zhang, Jun Shi, Songnian Fu, Lihua Li, Ying Liu, Huazhong Univ. of Science and Technology (China); Xueping Cheng, Jian Liu, JPT Electronics Co., Ltd. (China); Ping Shum, Nanyang Technological Univ. (Singapore) . . . . . [9344-86]

Bi-directional pump configuration for increasing thermal modal instabilities threshold in high power fiber amplifiers, Zeinab Sanjabi Eznaveh, Univ. of Central Florida (USA); Rodrigo Amezcua Correa, Gisela López-Galmiche, Jose E. Antonio-López, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA). . . . . [9344-87]

1.3 µm optical amplification with double-clad Bi doped silica fiber, Soichi Kobayashi, Mikoto Takahashi, Tatsuya Fujii, Chitose Institute of Science and Technology (Japan); Yusuke Fujii, Photonic Science Technology, Inc. (Japan). . . . . [9344-88]

Optimized mode-field adaptor for low-loss fused fiber bundle signal and pump combiners, Pavel Koska, Yauhen Baravets, Pavel Peterka, Institute of Photonics and Electronics of the ASCR, v.v.i. (Czech Republic); Michael Pisarik, Jan Bohata, Czech Technical Univ. in Prague (Czech Republic) . . . . . [9344-89]

A loss-compensating fiber loop applicable short pulse laser and that application in water detection, Jinhwan Kim, Chanh D. T. Nguyen, Seungryeol Oh, Kyung-Soo Kim, Soohyun Kim, KAIST (Korea, Republic of) . . . . . [9344-90]

A Mach-Zehnder interferometry with double cavity arms for achieving multiple ring-down interferograms, Jinhwan Kim, Won Sik Kwon, Hyub Lee, Kyung-Soo Kim, Soohyun Kim, KAIST (Korea, Republic of). . . . . [9344-91]

Thermal stability of multi-longitudinal mode laser beating frequencies in hybrid semiconductor-fiber ring lasers, Ahmed Shebl, Ain Shams Univ. (Egypt) and Si-Ware Systems (Egypt); Khaled Hassan, Si-Ware Systems (Egypt); Fares Al-Arifi, Mohammed Al-Otaibi, King Abdulaziz City for Science and Technology (Saudi Arabia); Yasser M. Sabry, Diaa Khalil, Ain Shams Univ. (Egypt) and Si-Ware Systems (Egypt) . . . . . [9344-92]

Bidirectional single-longitudinal mode SOA-fiber ring laser based on optical filter-assisted gain starvation, Kamal Khalil, Ain Shams Univ. (Egypt); Fares Al-Arifi, Mohammed Al-Otaibi, King Abdulaziz City for Science and Technology (Saudi Arabia); Yasser M. Sabry, Diaa Khalil, Ain Shams Univ. (Egypt) . . . . . [9344-93]

Synchronization of a programmable laser and Ti:Sapphire laser using an optical feedback, Bryan Burgoyne, Rajeev Yadav, André Archambault, Mathieu Giguère, Alexandre Dupuis, Youngjae Kim, Alain Villeneuve, Genia Photonics Inc. (Canada) . . . . . [9344-94]

Compression of chirp pulses from a femtosecond fiber based amplifier, Rumi Ito, Ken-ichi Takiuchi, Kazuyoku Tei, Shigeru Yamaguchi, Tokai Univ. (Japan); Jun Enokidani, Shin Sumida, OPT- i Co., Ltd (Japan). . . . . [9344-95]

Group-velocity dispersion analysis of large mode-area doped fibers, implemented in a laser cavity in operation, Tobias Baselt, Christopher Taudt, Peter Hartmann, Westsächsische Hochschule Zwickau (Germany). . . . [9344-96]

All-PM-fiber normal dispersion femtosecond optical parametric oscillator pumped by Yb-doped fiber laser, Khanh Q. Kieu, Dmitriy E. Churin, Roopa Gowda, College of Optical Sciences, The Univ. of Arizona (USA); Takefumi Ota, Yukihiro Inoue, Shinichiro Uno, Canon USA, Inc. (USA); Nasser Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9344-97]

Low-threshold supercontinuum generation for a gain-switched 1126nm fiber laser, Igor V. Melnikov, National Research Univ. of Electronic Technology (Russian Federation) and Univ. of Illinois in Urbana-Champaign (USA); J. Gary Eden, Univ. of Illinois at Urbana-Champaign (USA); Andrey A. Machnev, Pavel B. Novozhylov, National Research Univ. of Electronic Technology (Russian Federation) . . . . . [9344-98]

Generation of stable high order harmonic noise-like pulses in a passively mode-locked double clad fiber ring laser, Juan C. Hernández-Garcia, Univ. de Guanajuato (Mexico); Olivier J. M. Pottiez, Ctr. de Investigaciones en Óptica, A.C. (Mexico); Baldemar Ibarra-Escamilla, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Julián Móises M. Estudillo-Ayala, Roberto Rojas-Laguna, Univ. de Guanajuato (Mexico); Evgeny A. Kuzin, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Alberto Muñoz-Lopez, José D. Filoteo-Razo, Univ. de Guanajuato (Mexico) . . . . . [9344-99]

Experimental study of backscattering pulses and broadband generation in a Q-switched MOPA, Mrinmay Pal, Sourav Daschowdhury, Nishant Shekhar, Aditi Ghosh, Ranjan Sen, Central Glass and Ceramic Research Institute (India) . . . . . [9344-100]

Reduction of self-phase-modulation induced phase jitter in multiplexing repetition rate of actively mode-locked laser for photonic analog-to-digital converters, Si Chen, Guang Yang, Weiwen Zou, Shanghai Jiao Tong Univ. (China) . . . . . [9344-101]

CW seed with no mode structure for high power Yb-doped fiber amplifier, Aleksandr I. Ryasnyanskiy, Vadim Smirnov, Oleksiy Mokhun, OptiGrate Corp. (USA); George B. Venus, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Alexei L. Glebov, OptiGrate Corp. (USA); Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9344-102]

Linear cavity all-fiber dual-wavelength actively Q-switched fiber laser with a Sagnac interferometer, Manuel Durán-Sánchez, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) and Univ. Tecnológica de Puebla (Mexico); Baldemar Ibarra-Escamilla, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Olivier J. M. Pottiez, Ctr. de Investigaciones en Óptica, A.C. (Mexico); Evgeny A. Kuzin, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Ricardo I. Álvarez-Tamayo, Antonio Barcelata-Pinzón, Univ. Tecnológica de Puebla (Mexico) . . . . . [9344-104]

Theoretical treatment of modal instability in high-power cladding-pumped Raman amplifiers, Shadi A. Naderi, Ball Aerospace & Technologies Corp. (USA); Iyad Dajani, Jacob Grosek, Timothy Madden, Air Force Research Lab. (USA) . . . . . [9344-105]

Wednesday 11 February

SESSION 9

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . WED 8:00 AM TO 9:50 AM

Materials and Fabrications

Session Chair: **Adrian L. Carter,** Nufern (USA)

8:00 am: **Photodarkening resistive optical fibers for high power application** *(Invited Paper)*, Ji Wang, Corning Incorporated (USA) . . . . . [9344-37]

8:30 am: **Erbium nanoparticle doped fibers for efficient, resonantly-pumped Er-doped fiber lasers**, E. Joseph Friebele, Colin Baker, Charles G. Askins, U.S. Naval Research Lab. (USA); John R. Peele, Sotera Defense Solutions, Inc. (USA); Jake Fontana, Barbara M. Wright, Woohong R. Kim, U.S. Naval Research Lab. (USA); Jun Zhang, Radha K. Pattnaik, Larry D. Merkle, Mark Dubinskii, U.S. Army Research Lab. (USA) . . . . . [9344-38]

8:50 am: **Fabrication of transparent polycrystalline ceramic fibers for optical applications**, Hyun Jun Kim, UES, Inc. (USA); Geoff E. Fair, Air Force Research Lab. (USA); Randall G. Corns, HeeDong Lee, UES, Inc. (USA); Matthew O'Malley, Nicholas G. Usechak, F. Kenneth Hopkins, Randall S. Hay, Air Force Research Lab. (USA) . . . . . [9344-39]

9:10 am: **A double clad ytterbium fibre laser operating at 280°C**, Jae M. O. Daniel, Nikita Simakov, Defence Science and Technology Organisation (Australia) and Univ. of Southampton (United Kingdom); Alexander V. Hemming, Defence Science and Technology Organisation (Australia); W. Andrew Clarkson, Univ. of Southampton (United Kingdom); John Haub, Defence Science and Technology Organisation (Australia) . . . . . [9344-40]

9:30 am: **Long-term optical reliability and lifetime predictability of double clad fibers**, Harish Govindarajan, Wells Cunningham, Jaroslaw Abramczyk, Douglas P. Guertin, Kanishka Tankala, Nufern (USA) . . . . . [9344-41]

Coffee Break . . . . . .Wed 9:50 am to 10:20 am

LASE PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . WED 10:20 AM TO 12:30 PM

Session Chairs: **Guido Hennig**, Daetwyler Graphics AG (Switzerland); **Yongfeng Lu**, Univ. of Nebraska-Lincoln (USA)

10:20 am: **Welcome and Opening Remarks**
Guido Hennig, Daetwyler Graphics AG (Switzerland); **Yongfeng Lu,** Univ. of Nebraska-Lincoln (USA)

10:25 am: **Announcement of the Green Photonics Best Paper Award and the 3D Printing, Fabrication, and Manufacturing Best Paper Award**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA); **Henry Helvajian,** The Aerospace Corp. (USA)

10:30 am: **NASA's Optical Communications Program: 2015 and Beyond**
Donald M. Cornwell Jr., NASA Headquarters, Space Communications and Navigation Program (USA) . . [9354-201]

11:10 am: **Coherent Combination of Ultrafast Laser Pulses: A Route to Joule-Class High Repetition Rate Femtosecond Lasers**
Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9344-202]

11:50 am: **Laser 3D Printing of Metallic Components and its Industrial Applications: Technical Breakthroughs and Opportunities**
Xiaoyan Zeng, Wuhan National Lab. for Optoelectronics (China) . . . . . [9353-203]

Lunch/Exhibition Break . . . . . .Wed 12:30 pm to 2:10 pm

SESSION 10

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . WED 2:10 PM TO 3:20 PM

Ultrashort Pulse Lasers I

Session Chair: **Yoann Zaouter,** Amplitude Systèmes (France)

2:10 pm: **Divided-pulse techniques in short-pulse generation** *(Invited Paper)*, Frank W. Wise, Cornell Univ. (USA) . . . . . [9344-42]

2:40 pm: **Sub-8fs, 353µj pulses with 53W average power by nonlinear compression of a fiber chirped pulse amplifier**, Steffen Hädrich, Jan Rothhardt, Arno Klenke, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany); Stefan Demmler, Armin Hoffmann, Tino Eidam, Thomas Gottschall, Manuel Krebs, Friedrich-Schiller-Univ. Jena (Germany); Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) . . . . . [9344-43]

3:00 pm: **Experimental demonstration of multidimensional amplification of ultrashort pulses**, Marco Kienel, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz-Institute Jena (Germany); Michael Mueller, Friedrich-Schiller-Univ. Jena (Germany); Arno Klenke, Tino Eidam, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz-Institute Jena (Germany); Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) . . . . . [9344-44]

Coffee Break . . . . . .Wed 3:20 pm to 3:50 pm

SESSION 11

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . WED 3:50 PM TO 5:30 PM

Ultrashort Pulse Lasers II

Session Chair: **Ingmar Hartl,**
Deutsches Elektronen-Synchrotron (Germany)

3:50 pm: **5.7mJ fiber-CPA system delivering 23.5 gW of peak power**, Arno Klenke, Steffen Hädrich, Tino Eidam, Marco Kienel, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) . . . . . [9344-45]

4:10 pm: **Coherent pulse stacking in fiber chirped-pulse amplification systems**, Tong Zhou, John M. Ruppe, Cheng Zhu, I-Ning Hu, John A. Nees, Univ. of Michigan (USA); Russell B. Wilcox, Lawrence Berkeley National Lab. (USA); Almantas Galvanauskas, Univ. of Michigan (USA) . . . . . [9344-46]

4:30 pm: **Chirped- and divided-pulse Sagnac fiber amplifier**, Florent Guichard, Lab. Charles Fabry (France); Yoann Zaouter, Amplitude Systèmes (France); Marc Hanna, Lab. Charles Fabry (France); Franck Morin, Clemens Hönninger, Eric P. Mottay, Amplitude Systèmes (France); Patrick Georges, Lab. Charles Fabry (France) . . . . . [9344-47]

4:50 pm: **Phase stabilization of multidimensional amplification architectures amplifying ultrashort pulses**, Michael Mueller, Friedrich-Schiller-Univ. Jena (Germany); Marco Kienel, Arno Klenke, Tino Eidam, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany); Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany) . . . . . [9344-48]

5:10 pm: **Erbium:ytterbium fiber-laser system delivering watt-level femtosecond pulses using divided pulse amplification**, Robert Herda, Armin Zach, TOPTICA Photonics AG (Germany). . . . . [9344-49]

Thursday 12 February

SESSION 12

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . THU 8:20 AM TO 10:10 AM

High Power

Session Chair: **Jens Limpert,** Friedrich-Schiller-Univ. Jena (Germany)

8:20 am: **High power performance limits of fiber components** *(Invited Paper)*, Nigel Holehouse, ITF Labs. (Canada) . . . . . [9344-50]

8:50 am: **2.1 kW single mode continuous wave monolithic fiber laser**, Andrea Rosales-Garcia, OFS Labs. (USA); Hideaki Tobioka, Furukawa Electric Co., Ltd. (Japan); Kazi S. Abedin, Hao Dong, OFS Labs. (USA); Zoltan Varallyay, Aron Szabo, Furukawa Electric Institute of Technology Ltd. (Hungary); Thierry F. Taunay, Sean P. Sullivan, Clifford Headley III, OFS Labs. (USA) . . . . . [9344-51]

9:10 am: **6.8kW peak power quasi-continuous wave tandem-pumped ytterbium amplifier at 1071nm**, Franz Beier, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Institute of Applied Physics (Germany); Maximilian Strecker, Johannes Nold, Nicoletta Haarlammert, Thomas Schreiber, Ramona Eberhardt, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Institute of Applied Physics (Germany). . . . . [9344-52]

9:30 am: **High power 1018nm continuous wave ytterbium- doped fiber lasers and amplifiers**, Wupeng Gong, Yuhao Xue, Hong Zhang, China South Industries Group (China); Renli Zhang, Academy of Opto-Electronics (China) . . . . . [9344-53]

9:50 am: **200W single mode monolithic fibre laser at a wavelength of 1018 nm**, Christoph Ottenhues, Thomas Theeg, Katharina Hausmann, Mateusz Wysmolek, Hakan Sayinc, Jörg Neumann, Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany) . . . . . [9344-54]

Coffee Break . . . . . Thu 10:10 am to 10:40 am

SESSION 13

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . THU 10:40 AM TO 12:00 PM

2 µm Fiber Lasers I

Session Chair: **Peter F. Moulton,** Q-Peak, Inc. (USA)

10:40 am: **Sub-700fs pulses at 152W average power from a Tm-doped fiber CPA system**, Christian Gaida, Fabian Stutzki, Martin Gebhardt, Friedrich-Schiller-Univ. Jena (Germany); Florian Jansen, TRUMPF Laser GmbH & Co. KG (Germany); Andreas Wienke, Laser Zentrum Hannover e.V. (Germany); Uwe D. Zeitner, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Institute of Applied Physics (Germany); Frank Fuchs, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Cesar Jauregui-Misas, Friedrich-Schiller-Univ. Jena (Germany); Dieter Wandt, Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany); Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) and Helmoltz Institute (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Institute of Applied Physics (Germany) and Helmoltz Institute (Germany) . . . . . [9344-55]

11:00 am: **Sub-100 fs passively mode-locked holmium-doped fiber oscillator operating at 2.06 µm**, Peng Li, Axel Ruehl, Ingmar Hartl, Deutsches Elektronen-Synchrotron (Germany). . . . . [9344-56]

11:20 am: **High-power linearly-polarized thulium-doped all-fiber picosecond master-oscillator power-amplifier**, Jiang Liu, Yijian Jiang, Hongxing Shi, Kun Liu, Fangzhou Tan, Pu Wang, Beijing Univ. of Technology (China) . . . . [9344-57]

11:40 am: **Peak power scaling of thulium-doped ultrafast fiber laser systems**, Martin Gebhardt, Christian Gaida, Fabian Stutzki, Cesar Jauregui-Misas, Friedrich-Schiller-Univ. Jena (Germany); Jens Limpert, Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) and Helmholtz Institute Jena (Germany) . . . . . [9344-58]

Lunch/Exhibition Break . . . . . Thu 12:00 pm to 1:40 pm

SESSION 14

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . THU 1:40 PM TO 3:00 PM

2 µm Fiber Lasers II

Session Chair: **Stuart D. Jackson,** Macquarie Univ. (Australia)

1:40 pm: **160W average power single-polarization, nanosecond pulses generation from diode-seeded thulium-doped all-fiber MOPA system**, Hongxing Shi, Jiang Liu, Kun Liu, Fangzhou Tan, Pu Wang, Beijing Univ. of Technology (China) . . . . . [9344-59]

2:00 pm: **Polarized picosecond pulses amplification in a Tm-doped large mode-area photonic crystal fiber amplifier**, Mateusz Wysmolek, Laser Zentrum Hannover e.V. (Germany); Alex M. Sincore, Robert Ryan, Ali Abdulfattah, Lawrence Shah, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Hakan Sayinc, Jörg Neumann, Laser Zentrum Hannover e.V. (Germany); Samir Lamrini, LISA Laser Products (Germany); Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Uwe Morgner, Laser Zentrum Hannover e.V. (Germany) and Leibniz Univ. Hannover (Germany); Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany). . . . . [9344-60]

2:20 pm: **Self-efficiency improvement and cooling in thulium-doped fibers**, Cesar Jauregui-Misas, Fabian Stutzki, Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) . . . . . [9344-61]

2:40 pm: **Resonantly pumped amplification in a Tm-doped large mode-area photonic crystal fiber**, Alex M. Sincore, Lawrence Shah, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Mateusz Wysmolek, Laser Zentrum Hannover e.V. (Germany); Robert Ryan, Ali Abdulfattah, Martin C. Richardson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9344-62]

Coffee Break . . . . . Thu 3:00 pm to 3:30 pm

SESSION 15

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . THU 3:30 PM TO 5:10 PM

Beam Combining and Mode Conversion

Session Chair: **Craig A. Robin,** Lockheed Martin Aculight (USA)

3:30 pm: **Coherent combining of fiber-laser-pumped frequency converters using all-fiber electro-optic modulator for active phase control**, Pierre Bourdon, Anne Durécu, Guillaume Canat, Julien Le Gouët, Didier Goular, Laurent Lombard, ONERA (France). . . . . [9344-63]

3:50 pm: **Interferometric phase measurement techniques for coherent beam combining**, Marie Antier, Jérôme Bourderionnet, Christian Larat, Eric Lallier, Thales Research & Technology (France); Jérôme Primot, ONERA (France); Arnaud Brignon, Thales Research & Technology (France). . . . [9344-64]

4:10 pm: **Beam combining and SBS suppression in white noise and pseudo-random modulated amplifiers**, Brian E. Anderson, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Angel Flores, Iyad Dajani, Air Force Research Lab. (USA) . . . . . [9344-65]

4:30 pm: **A higher-order mode fiber amplifier with an axicon for output mode conversion**, Jeffrey W. Nicholson, John M. Fini, Robert S. Windeler, Paul S. Westbrook, Tristan Kremp, Anthony M. DeSantolo, Clifford Headley III, David J. DiGiovanni, OFS Labs. (USA) . . . . . [9344-66]

4:50 pm: **Brightness enhancement of a multi-mode ribbon fiber laser using transmitting Bragg gratings**, Brian E. Anderson, George B. Venus, Daniel Ott, Ivan B. Divliansky, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Jay W. Dawson, Derrek R. Drachenberg, Michael J. Messerly, Paul H. Pax, John B. Tassano, Lawrence Livermore National Lab. (USA); Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA). . . . . [9344-67]

AWARD PRESENTATIONS AND CONCLUDING REMARKS

LOCATION: ROOM 131 (EXHIBIT LEVEL) . . . . . 5:10 PM TO 5:30 PM

CONFERENCE 9345
LOCATION: ROOM 222 (MEZZANINE)

Tuesday and Thursday 10 and 12 February 2015 • Proceedings of SPIE Vol. 9345

High Power Lasers for Fusion Research III

Conference Chairs: **Abdul A. S. Awwal,** Lawrence Livermore National Lab. (USA); **Monya A. Lane,** Lawrence Livermore National Lab. (USA)

Conference Co-Chairs: **Mike Dunne,** SLAC National Accelerator Lab. (USA); **Ruxin Li,** Shanghai Institute of Optics and Fine Mechanics (China); **John L. Collier,** Rutherford Appleton Lab. (United Kingdom); **Kinioki Mima,** Osaka Univ. (Japan)

Program Committee: **Ghaleb M. Abdulla,** Lawrence Livermore National Lab. (USA); **Christopher P. J. Barty,** Lawrence Livermore National Lab. (USA); **Mark Bowers,** Lawrence Livermore National Lab. (USA); **Genevieve M. Chabassier,** Commissariat à l'Énergie Atomique (France); **Gilles Chériaux,** Lab. d'Optique Appliquée (France); **Jean-Michel G. Di Nicola,** Lawrence Livermore National Lab. (USA); **Constantin L. Haefner,** Lawrence Livermore National Lab. (USA); **John E. Heebner,** Lawrence Livermore National Lab. (USA); **Laurent Hilsz,** Commissariat à l'Énergie Atomique (France); **Tae Moon Jeong,** Gwangju Institute of Science and Technology (Korea, Republic of); **Brian E. Kruschwitz,** Univ. of Rochester (USA); **Richard R. Leach Jr.,** Lawrence Livermore National Lab. (USA); **Catherine Le Blanc,** Lab. LULI, Ecole Polytechnique (France); **Bruno J. Le Garrec,** ELI Beamlines (Czech Republic); **Zunqi Lin,** Shanghai Institute of Optics and Fine Mechanics (China); **Noriaki Miyanaga,** Hamamatsu Photonics K.K. (Japan); **Mark A. Newton,** Lawrence Livermore National Lab. (USA); **Takayoshi Norimatsu,** Osaka Univ. (Japan); **Shahida I. Rana,** Lawrence Livermore National Lab. (USA); **John M. Soures,** Univ. of Rochester (USA); **Kazuo A. Tanaka,** Osaka Univ. (Japan); **Julien B. Xavier,** Commissariat à l'Énergie Atomique (France); **Changhe Zhou,** Shanghai Institute of Optics and Fine Mechanics (China)

Tuesday 10 February

POSTERS-TUESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . TUE 6:00 TO 8:00 PM

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

COMBINE*: An integrated opto-mechanical tool for LASER performance modeling, Margareta Rehak, Jean-Michel G. Di Nicola, Tiziana C. Bond, Lawrence Livermore National Lab. (USA) . . . . . [9345-18]

Centroid stabilization in alignment of FOA Corner Cube: designing of a match filter, Abdul A. S. Awwal, Karl Wilhelmsen, Randy S. Roberts, Richard R. Leach Jr., Roger R. Lowe-Webb, Tony Huu Nguyen Ngo, Lawrence Livermore National Lab. (USA) . . . . . [9345-19]

The virtual beamline (VBL) laser simulation code, Richard A. Sacks, Kathleen P. McCandless, Eyal Feigenbaum, Jean-Michel G. Di Nicola, Lawrence Livermore National Lab. (USA); Kevin J. Luke, Columbia Univ. (USA); William Riedel, Apple, Inc. (USA); Benjamin J. Kraines, Rochester Institute of Technology (USA) . . . . . [9345-20]

FM-to-AM conversion in angular filtering with transmitting volume Bragg gratings, Xiao Yuan, Xiang Zhang, Dengsheng Wu, Jiansheng Feng, Kuaisheng Zou, Fan Gao, Soochow Univ. (China) . . . . . [9345-21]

Stretching of ultrashort laser pulses with chirped volume Bragg gratings, Xiao Yuan, Jiansheng Feng, Xiang Zhang, Fan Gao, Kuaisheng Zou, Soochow Univ. (China) . . . . . [9345-22]

Impact of FM-AM conversion on smoothing by spectral dispersion, Denis Penninckx, Hervé Coic, Adrien Leblanc, Commissariat à l'Énergie Atomique (France); Aurore Chatagnier, Univ. Bordeaux 1 (France); Antoine Bourgeade, Commissariat à l'Énergie Atomique (France); Emmanuel d'Humières, Univ. Bordeaux 1 (France); Pacal Loiseau, Commissariat à l'Énergie Atomique (France) . . . . . [9345-23]

A robust in-situ warp-correction algorithm for VISAR streak camera data at the National Ignition Facility, George R. Labaria, Univ. of California, Santa Cruz (USA) and Lawrence Livermore National Lab. (USA); Abbie L. Warrick, Peter M. Celliers, Daniel H. Kalantar, Lawrence Livermore National Lab. (USA) . . . . . [9345-24]

Diagnostics of pulse contrast for petewatt laser in SGII, Xiaoping Ouyang, Daizhong Liu, Baoqiang Zhu, Shanghai Institute of Optics and Fine Mechanics (China); Jian Zhu, Shanghai Institute of Laser Plasma (China); Jianqiang Zhu, Shanghai Institute of Optics and Fine Mechanics (China) . . . . . [9345-25]

Thursday 12 February

SESSION 1

LOCATION: ROOM 222 (MEZZANINE) . . . . . THU 8:00 AM TO 10:20 AM

High Power Laser Facilities

Session Chair: **Monya A. Lane,**
Lawrence Livermore National Lab. (USA)

8:00 am: **Status of NIF laser**, Peter J. Wisoff, Lawrence Livermore National Lab. (USA) . . . . . [9345-26]

8:20 am: **The LMJ: Overview of recent advancements and very first experiments**, Pierre A. Vivini, Marc G. Nicolaizeau, Commissariat à l'Énergie Atomique (France) . . . . . [9345-1]

8:40 am: **High peak power diode stacks for high energy lasers**, Viorel C. Negoita, Thilo Vethake, Ching-Long Jiang, Robert Roff, Ming Shih, Richard Duck, Marc C. Bauer, Konstantin M. Boucke, Georg Treusch, TRUMPF Photonics (USA) . . . . . [9345-2]

9:00 am: **The laser infrastructure of the ELI attosecond light pulse source** *(Invited Paper)*, Károly Osvay, Patricio Antici, Dimitris Charalambidis, Eric Cormier, Zsolt Diveki, Peter Dombi, József A. Fülöp, Mikhail Kalashnikov, Nelson Lopes, Rodrigo López-Martens, Giuseppe Sansone, Ervin Racz, Kahaly Subhendu, Zoltan Varallyay, Katalin Varju, ELI-HU Nonprofit Kft. (Hungary) . . . . . [9345-3]

9:30 am: **Inertial fusion power plant concept of operations and maintenance**, Brad Knutson, Parsons Corp. (USA); Mike Dunne, Lawrence Livermore National Lab. (USA); Jack Kasper, Timothy Sheehan, Parsons Corp. (USA); Dwight Lang, Tom Anklam, Valerie Roberts, Lawrence Livermore National Lab. (USA); Derek Mau, Parsons Corp. (USA). . . . . [9345-4]

9:50 am: **DiPOLE: The development of combined high average and high peak power lasers at RAL** *(Invited Paper)*, John L. Collier, Rutherford Appleton Lab. (United Kingdom). . . . . [9345-5]

Coffee Break . . . . . Thu 10:20 am to 10:50 am

SESSION 2

LOCATION: ROOM 222 (MEZZANINE) . . . . . .THU 10:50 AM TO 12:20 PM

High Power Optical Materials

Session Chair: **Abdul A. S. Awwal,**
Lawrence Livermore National Lab. (USA)

10:50 am: **Laser damage resistance qualification of large optics for high power laser** *(Invited Paper)*, Laurent Lamaignère, Maxime Chambonneau, Romain Diaz, Roger Courchinoux, Thierry Donval, Commissariat à l'Énergie Atomique (France) . . . . . [9345-6]

11:20 am: **Optical damage performance measurements of multilayer dielectric gratings for high energy short pulse lasers**, David A. Alessi, Christopher W. Carr, Raluca A. Negres, Richard P. Hackel, Kenneth A. Stanion, David A. Cross, Gabriel M. Guss, James D. Nissen, Ronald L. Luthi, James E. Fair, Jerald A. Britten, Constantin L. Haefner, Lawrence Livermore National Lab. (USA) . . . . . [9345-8]

11:40 am: **In-situ investigation of damage processes on fused silica induced by a pulsed 355nm laser with high repetition rate**, Jian Chen, Jingtao Dong, Zhouling Wu, ZC Optoelectronic Technologies, Ltd. (China) . . . . . [9345-9]

12:00 pm: **Roughness reduction on aspheric surfaces**, Sven R. Kiontke, asphericon GmbH (Germany) . . . . . [9345-27]

Lunch/Exhibition Break . . . . . Thu 12:20 pm to 1:50 pm

SESSION 3

LOCATION: ROOM 222 (MEZZANINE) . . . . . THU 1:50 PM TO 3:30 PM

Simulations and Experiments

Session Chair: **Jean-Michel G. Di Nicola,**
Lawrence Livermore National Lab. (USA)

1:50 pm: **Dynamics of molecular clouds: Observations, simulations, and NIF experiments** *(Invited Paper)*, Jave Kane, David A. Martinez, Lawrence Livermore National Lab. (USA); Marc W. Pound, Univ. of Maryland, College Park (USA); Robert F. Heeter, Lawrence Livermore National Lab. (USA); Alexis Casner, Commissariat à l'Énergie Atomique (France); Roberto C. Mancini, Univ. of Nevada, Reno (USA) . . . . . [9345-10]

2:20 pm: **Near field intensity trends of main laser alignment images**, Richard R. Leach Jr., Roger Lowe-Webb, Ilona Beltsar, Victoria J. Miller-Kamm, Karl Wilhelmsen, Scott C. Burkhart, Lawrence Livermore National Lab. (USA) . . . . . [9345-11]

2:40 pm: **Laser performance operations model (LPOM): The computational system that automates the setup and performance analysis of the National Ignition Facility** *(Invited Paper)*, Michael J. Shaw, Ronald House, Lawrence Livermore National Lab. (USA) . . . . . [9345-12]

3:10 pm: **Advanced scheme for high-yield laser driven proton-boron fusion reaction**, Daniele Margarone, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Antonino Picciotto, Fondazione Bruno Kessler (Italy); Georg Korn, Institute of Physics of the ASCR, v.v.i. (Czech Republic) . . . . . [9345-13]

Coffee Break . . . . . Thu 3:30 pm to 4:00 pm

SESSION 4

LOCATION: ROOM 222 (MEZZANINE) . . . . . THU 4:00 PM TO 5:20 PM

Laser Subsystems/Diagnostics

Session Chair: **Mark W. Bowers,**
Lawrence Livermore National Lab. (USA)

4:00 pm: **High bandwidth measurement and control of FM-AM modulation**, Sebastien Montant, Vanessa Moreau, Jacques Luce, Commissariat à l'Énergie Atomique (France) . . . . . [9345-14]

4:20 pm: **The multiple-pulse driver line on the OMEGA laser**, Tanya Z. Kosc, John H. Kelly, Elizabeth M. Hill, Leon J. Waxer, Univ. of Rochester (USA) . . . . . [9345-15]

4:40 pm: **The commissioning of the advanced radiographic capability laser system: Experimental and modeling results at the main laser output**, Jean-Michel G. Di Nicola, Steven T. Yang, Charles D. Boley, John K. Crane, John E. Heebner, Phillip A. Arnold, Christopher P. J. Barty, Mark W. Bowers, Tracy S. Budge, Kim Christensen, Jay W. Dawson, Gaylen Erbert, Eyal Feigenbaum, Gabriel M. Guss, Constantin L. Haefner, Mark R. Hermann, Doug Homoelle, Jeffrey A. Jarboe, Janice K. Lawson, Kathleen P. McCandless, Brent McHale, Lawrence J. Pelz, Phil P. Pham, Matthew A. Prantil, Matthew A. Rever, Michael C. Rushford, Richard A. Sacks, Michael J. Shaw, David A. Smauley, Larry K. Smith, Thomas M. Spinka, Gregory L. Tietbohl, Paul J. Wegner, Clay C. Widmayer, Lawrence Livermore National Lab. (USA). . . . . [9345-16]

5:00 pm: **Freeform beam shaping in optical systems of high-power lasers**, Alexander V. Laskin, Vadim V. Laskin, AdlOptica Optical Systems GmbH (Germany); Aleksei Ostrun, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9345-17]

CONFERENCE 9346

LOCATION: ROOM 309 (ESPLANADE) AND ROOM 272 (MEZZANINE)

Monday–Thursday 9–12 February 2015 • Proceedings of SPIE Vol. 9346

Components and Packaging for Laser Systems

New

Conference Chairs: **Alexei L. Glebov,** OptiGrate Corp. (USA); **Paul O. Leisher,** Rose-Hulman Institute of Technology (USA)

Program Committee: **Igor Anisimov,** Air Force Research Lab. (USA); **Kristian J. Buchwald,** Ibsen Photonics A/S (Denmark); **Te-Yuan Chung,** National Central Univ. (Taiwan); **Joseph L. Dallas,** Avo Photonics, Inc. (USA); **Martin Forrer,** FISBA OPTIK AG (Switzerland); **Daniel M. Grasso,** Coherent, Inc. (USA); **Michael A. Karavitis,** Cutera, Inc. (USA); **Alexander V. Laskin,** AdlOptica Optical Systems GmbH (Germany); **Victor Liu,** Xi'an Focuslight Technologies Co., Ltd. (China); **Jens Meinschien,** LIMO Lissotschenko Mikrooptik GmbH (Germany); **Christian V. Poulsen,** NKT Photonics Inc. (USA); **Mark A. Stephen,** NASA Goddard Space Flight Ctr. (USA); **Takunori Taira,** Institute for Molecular Science (Japan); **Torsten Vahrenkamp,** ficonTEC Service GmbH (Germany); **Alexander Yusim,** IPG Photonics Corp. (USA); **Arnaud Zoubir,** ALPhANOV (France)

Monday 9 February

SESSION 1

LOCATION: ROOM 309 (ESPLANADE) . . . . . MON 3:40 PM TO 5:40 PM

Laser Diode Packaging and Components

Joint Session with Conferences 9346 and 9348

Session Chairs: **Paul O. Leisher,** Rose-Hulman Institute of Technology (USA); **Kurt J. Linden,** N2 Biomedical (USA)

3:40 pm: **Copper-based micro-channel cooler reliably operated using solutions of distilled-water and ethanol as a coolant**, Aland Chin, Somerville Laser Technology, LLC (USA); Alan Nelson, Richard H. Chin, Science Research Lab., Inc. (USA); Rick K. Bertaska, New England Analytical, LLC (USA); Jonah H. Jacob, Science Research Lab., Inc. (USA) . . . . . [9348-34]

4:00 pm: **Beam vignetting effect in micro-optic collimation and transmission for high power diode laser arrays**, Martin Forrer, Hansruedi Moser, Dzelal Kura, Hans Forrer, FISBA OPTIK AG (Switzerland) . . . . . [9346-1]

4:20 pm: **Coupling of a high-power tapered diode laser beam into a single-mode-fiber within a compact module**, Daniel Jedrzejczyk, Alexander Sahm, Ferdinand-Braun-Institut (Germany); Christian Carstens, Gerald A. Urban, C2GO inprocess solutions GmbH (Germany); Markus Pulka, FCC FibreCableConnect GmbH (Germany); Bernd Eppich, Ferdinand-Braun-Institut (Germany); Friedemann Scholz, Eagleyard Photonics GmbH (Germany); Katrin Paschke, Ferdinand-Braun-Institut (Germany) . . . . . [9348-35]

4:40 pm: **High-brightness power delivery for fiber laser pumping: Simulation and measurement of low-NA fiber guiding**, Dan Yanson, Moshe Levi, Ophir Peleg, Noam Rappaport, Moshe Shamay, Yuri Berk, Nir Dahan, Genadi Klumel, Ilya Baskin, SCD SemiConductor Devices (Israel) . . . . . [9346-2]

5:00 pm: **Maximizing coupling-efficiency of high-power diode lasers utilizing hybrid assembly technology**, Daniel Zontar, Fraunhofer-Institut für Produktionstechnologie (Germany); Mehmet Dogan, Stephen F. Fulghum, Science Research Lab., Inc. (USA); Tobias Müller, Sebastian Haag, Fraunhofer-Institut für Produktionstechnologie (Germany); Christian Brecher, RWTH Aachen (Germany); Jonah H. Jacob, Science Research Lab., Inc. (USA) . . . . . [9348-36]

5:20 pm: **High power diode laser stack development using gold-tin bonding technology**, Dong Hou, Jingwei Wang, Xi'an Focuslight Technologies Co., Ltd. (China); Pu Zhang, Xi'an Institute of Optics and Precision Mechanics (China); Ye Dai, Yingjie Li, Xingsheng Liu, Xi'an Focuslight Technologies Co., Ltd. (China) . . . . . [9346-3]

Tuesday 10 February

SESSION 2

LOCATION: ROOM 272 (MEZZANINE) . . . . . TUE 8:30 AM TO 10:00 AM

NOTE ROOM CHANGE

LD Components and Packaging I

Session Chair: **Joseph Louis Dallas,** Avo Photonics, Inc. (USA)

8:30 am: **Advances in bonding technology for high power diode laser bars** *(Invited Paper)*, Jingwei Wang, Xingsheng Liu, Xi'an Focuslight Technologies Co., Ltd. (China) . . . . . [9346-4]

9:00 am: **Innovative hybride heat sink materials with high thermal conductivities and tailored CTE**, Michael Kitzmantel, Technische Univ. Wien (Austria); Erich Neubauer, RHP-Technology GmbH & Co. KG (Austria) . . [9346-5]

9:20 am: **Effect of interface layer on the performance of high power diode laser arrays**, Pu Zhang, Xi'an Institute of Optics and Precision Mechanics (China); Jingwei Wang, Xi'an Focuslight Technologies Co., Ltd. (China); Zhiyong Zhang, Xi'an Institute of Optics and Precision Mechanics (China) and Chinese Academy of Sciences (China); Zhenfu Wang, Lingling Xiong, Xi'an Institute of Optics and Precision Mechanics (China) and Chinese Academy of Sciences (China); Xingsheng Liu, Xi'an Focuslight Technologies Co., Ltd. (China) . [9346-6]

9:40 am: **760nm: A new laser diode wavelength for hair removal modules**, Martin Wölz, Martin Zorn, Agnieszka Pietrzak, JENOPTIK Diode Lab GmbH (Germany); Alex Kindsvater, Jens Meusel, JENOPTIK Laser GmbH (Germany); Ralf Hülsewede, Jürgen Sebastian, JENOPTIK Diode Lab GmbH (Germany) . . . . . [9346-7]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 3

LOCATION: ROOM 272 (MEZZANINE) . . . . . TUE 10:30 AM TO 11:50 AM

LD Components and Packaging II

Session Chair: **Victor Liu,**
Xi'an Focuslight Technologies Co., Ltd. (China)

10:30 am: **Universal solders for direct bonding and packaging of optical devices** *(Invited Paper)*, Sungho Jin, Univ. of California, San Diego (USA); Anthony W. Yu, NASA Goddard Space Flight Ctr. (USA) . . . . . [9346-8]

10:50 am: **PQ:PMMA-based volume Bragg grating for external cavity diode laser**, Te-Yuan Chung, Yu-Hua Hsieh, Long-Chi Du, National Central Univ. (Taiwan) . . . . . [9346-9]

11:10 am: **Multiwavelength diode laser source based on multiplexed volume Bragg grating notch filters**, Daniel Ott, Ivan B. Divliansky, George B. Venus, Leonid B. Glebov, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9346-10]

11:30 am: **Effects of packaging on the performances of high brightness 9xx nm CW mini-bar diode lasers**, Xiaoning Li, Xi'an Institute of Optics and Precision Mechanics (China); Jingwei Wang, Xi'an Focuslight Technologies Co., Ltd. (China); Xingsheng Liu, Focuslight Technologies Co., Ltd. (China) . [9346-11]

Lunch/Exhibition Break . . . . . Tue 11:50 am to 1:30 pm

SESSION 4

LOCATION: ROOM 272 (MEZZANINE) . . . . . TUE 1:30 PM TO 3:00 PM

Optics Assembly and Reliability I

Session Chair: **Torsten Vahrenkamp,** ficonTEC Service GmbH (Germany)

1:30 pm: **Rugged laser and component packaging challenges and strategies** *(Invited Paper)*, Thomas L. Haslett, Joseph L. Dallas, Avo Photonics, Inc. (USA). . . . . [9346-12]

2:00 pm: **Strategies for precision adhesive bonding of micro-optical systems**, Tobias Müller, Sebastian Haag, Daniel Zontar, Christian Brecher, Fraunhofer-Institut für Produktionstechnologie (Germany). . . . . [9346-13]

2:20 pm: **Airborne molecular contamination: Quality criterion for laser and optical components**, Michael Otto, M+W Group GmbH (Germany) . . . [9346-14]

2:40 pm: **Autofly: Highly flexible assembly solution for photonic applications**, Moritz Seyfried, Achim Weber, Detlef Rose, Frederik Truter, Torsten Vahrenkamp, ficonTEC Service GmbH (Germany); Friedemann Scholz, Georgios Tsianos, Hendrick Thiem, Eagleyard Photonics GmbH (Germany); Gunnar Böttger, Henning Schröder, Sebastian Marx, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany). . . . . [9346-15]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 5

LOCATION: ROOM 272 (MEZZANINE) . . . . . TUE 3:30 PM TO 4:50 PM

Optics Assembly and Reliability II

Session Chair: **Martin Forrer,** FISBA OPTIK AG (Switzerland)

3:30 pm: **Space qualification of the optical filter assemblies for the ICESat-2/ATLAS instrument**, Elisavet Troupaki, Stewart T. Wu, NASA Goddard Space Flight Ctr. (USA); Zachary H. Denny, Sigma Space Corp. (USA); Luis A. Ramos-Izquierdo, William B. Cook, NASA Goddard Space Flight Ctr. (USA) . . . . . [9346-16]

3:50 pm: **Virtual commissioning of automated micro-optical assembly**, Christian Schlette, Daniel Losch, RWTH Aachen Univ. (Germany); Sebastian Haag, Daniel Zontar, Fraunhofer-Institut für Produktionstechnologie (Germany); Jürgen Rossmann, RWTH Aachen Univ. (Germany); Christian Brecher, Fraunhofer-Institut für Produktionstechnologie (Germany). . . . . [9346-17]

4:10 pm: **Polarization techniques for optimal performance of one and two color wavelength laser range finders and designators**, Marco A. Avila, Raytheon Co. (USA) . . . . . [9346-18]

4:30 pm: **Adjustable mounting device for high-volume production of beam-shaping systems for high-power diode lasers**, Sebastian Haag, Henning Bernhardt, Fraunhofer-Institut für Produktionstechnologie (Germany); Volker R. Sinhoff, INGENERIC GmbH (Germany); Tobias Müller, Daniel Zontar, Christian Brecher, Fraunhofer-Institut für Produktionstechnologie (Germany) . . . [9346-19]

POSTERS-TUESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . TUE 6:00 TO 8:00 PM

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Building beam shaping optics for micromachining, Alexander V. Laskin, AdlOptica Optical Systems GmbH (Germany); Valdemaras Juzumas, Aivaras Urniezius, Altechna R&D (Lithuania); Vadim V. Laskin, AdlOptica Optical Systems GmbH (Germany); Gintas Slekys, Altechna R&D (Lithuania); Aleksei Ostrun, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9346-41]

Modeling laser beam propagation through components with internal multiple reflections, Site Zhang, Zongzhao Wang, Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany). . . . . [9346-42]

Packaging of 4mm full-bar high power diode laser on micro-channel cooler using a complete AuSn bonding technology, Feifei Feng, Focuslight Technologies Co., Ltd. (China); Dong Hou, Jingwei Wang, Xingsheng Liu, Xi'an Focuslight Technologies Co., Ltd. (China) . . . . . [9346-43]

Optical components for improved normal-incidence optically-pumped VECSELs, Kelly R. Farner, Stephen M. Misak, Paul O. Leisher, Rose-Hulman Institute of Technology (USA) . . . . . [9346-44]

Integrated RGB laser light module for autostereoscopic outdoor displays, Jörg Reitterer, Franz Fidler, Christian Hambeck, Ferdinand Saint Julien-Wallsee, TriLite Technologies GmbH (Austria); Stephen P. Najda, Piotr Perlin, Szymon Stanczyk, Robert Czernecki, TopGaN Sp. z o.o. (Poland); Stewart D. McDougall, Wyn Meredith, Compound Semiconductor Technologies Global Ltd. (United Kingdom); Garrie Vickers, Kennedy Landles, Optocap Ltd. (United Kingdom); Ulrich Schmid, Technische Univ. Wien (Austria) . . . . . [9346-45]

Characterization of far field of diode laser by three dimensional measurement, Hui Liu, Xi'an Focuslight Technologies Co., Ltd. (China) and Chinese Academy of Sciences (China); Zhiyuan Yuan, Long Cui, Di Wu, Xingsheng Liu, Xi'an Focuslight Technologies Co., Ltd. (China). . . . . [9346-46]

Wednesday 11 February

SESSION 6

LOCATION: ROOM 272 (MEZZANINE) . . . . . WED 8:20 AM TO 9:50 AM

Solid-State and Fiber Laser Components

Session Chair: **Alexander Yusim,** IPG Photonics Corp. (USA)

8:20 am: **Part I: Growth and characterization of highly doped Nd:YAG crystal; Part II: Sensitive saturable absorption response of Bi_2Te_3 and application in low-threshold solid-sate pulsed lasers** *(Invited Paper)*, Mitch M. C. Chou, Chao-Kuei Lee, National Sun Yat-Sen Univ. (Taiwan) . . . . . [9346-20]

8:50 am: **Lithium niobate Q-switch to prevent pre-lasing of high gain lasers operating over a wide temperature range**, Dieter H. Jundt, Gooch & Housego, Palo Alto (USA); Peter E. MacKay, Gooch & Housego plc (United Kingdom) . . . . . [9346-21]

9:10 am: **Rigorous modeling of laser light propagation through uniaxial and biaxial crystals**, Site Zhang, Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9346-22]

9:30 am: **Optical isolators for 2-micron fibre lasers**, Gary Stevens, Thomas H. Legg, Gooch & Housego Systems Technology Group (United Kingdom); Peter Shardlow, Optoelectronics Research Ctr. (United Kingdom) and Univ. of Southampton (United Kingdom) . . . . . [9346-23]

Coffee Break . . . . . Wed 9:50 am to 10:20 am

LASE PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . WED 10:20 AM TO 12:30 PM

Session Chairs: **Guido Hennig**, Daetwyler Graphics AG (Switzerland); **Yongfeng Lu**, Univ. of Nebraska-Lincoln (USA)

10:20 am: **Welcome and Opening Remarks**
Guido Hennig, Daetwyler Graphics AG (Switzerland); **Yongfeng Lu,** Univ. of Nebraska-Lincoln (USA)

10:25 am: **Announcement of the Green Photonics Best Paper Award and the 3D Printing, Fabrication, and Manufacturing Best Paper Award**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA); **Henry Helvajian,** The Aerospace Corp. (USA)

10:30 am: **NASA's Optical Communications Program: 2015 and Beyond**
Donald M. Cornwell Jr., NASA Headquarters, Space Communications and Navigation Program (USA) . . [9354-201]

11:10 am: **Coherent Combination of Ultrafast Laser Pulses: A Route to Joule-Class High Repetition Rate Femtosecond Lasers**
Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9344-202]

11:50 am: **Laser 3D Printing of Metallic Components and its Industrial Applications: Technical Breakthroughs and Opportunities**
Xiaoyan Zeng, Wuhan National Lab. for Optoelectronics (China). . . . . [9353-203]

Lunch/Exhibition Break . . . . . Wed 12:30 pm to 2:00 pm

CONFERENCE 9346
LOCATION: ROOM 272 (MEZZANINE)

SESSION 7
LOCATION: ROOM 272 (MEZZANINE) . . . . . .WED 2:00 PM TO 3:30 PM

Beam Manipulation and Delivery

Session Chair: **Te-Yuan Chung,** National Central Univ. (Taiwan)

2:00 pm: **Beam delivery components for industrial laser systems** *(Invited Paper)*, Magnus Pålsson, Stuart Campbell, Ola I. Blomster, Optoskand AB (Sweden) . . . . . [9346-24]

2:30 pm: **Achromatic phase elements based on a combination of surface and volume diffractive gratings**, Ivan B. Divliansky, Evan R. Hale, Marc SeGall, Daniel Ott, Boris Y. Zeldovich, Bahaa E. A. Saleh, Leonid B. Glebov, The College of Optics and Photonics, Univ. of Central Florida (USA). . . . . [9346-25]

2:50 pm: **Refractive beam shapers for optical systems of lasers**, Alexander V. Laskin, Vadim V. Laskin, AdlOptica Optical Systems GmbH (Germany); Aleksei Ostrun, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9346-26]

3:10 pm: **Monolithic lens arrays as homogenizers for ultra-uniform field illumination**, Thomas Mitra, Manfred Jarczynski, Klaus Bagschik, Janis Sils, LIMO Lissotschenko Mikrooptik GmbH (Germany) . . . . . [9346-27]

Coffee Break . . . . . .Wed 3:30 pm to 4:00 pm

SESSION 8
LOCATION: ROOM 272 (MEZZANINE) . . . . . WED 4:00 PM TO 5:40 PM

High Power/Energy Laser Components

Session Chair: **Thomas Mitra,**
LIMO Lissotschenko Mikrooptik GmbH (Germany)

4:00 pm: **Diamond optical components for high-power and high-energy laser applications**, Eugene Anoikin, Element Six (USA); Alexander Muhr, Element Six Technologies U.S. Corp (USA); Andrew M. Bennett, Element Six Ltd. (United Kingdom); Daniel Twitchen, Element Six Technologies U.S. Corp (USA); Henk G. M. de Wit, Element Six N.V. (Netherlands). . . . . [9346-28]

4:20 pm: **BBO sapphire compound for high-power frequency conversion**, Carolin Rothhardt, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Jan Rothhardt, Arno Klenke, Helmholtz Institute Jena (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Thomas Peschel, Ramona Eberhardt, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) and Helmholtz Institute Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany). . . . . [9346-29]

4:40 pm: **Solid-state laser source of narrowband ultraviolet B light for skin disease care with advanced performance**, Aleksandr A. Tarasov, Hong Chu, Laseroptek (Korea, Republic of); Kristian Buchwald, Ibsen Photonics (Denmark) . . . . . [9346-30]

5:00 pm: **Demonstration of >5kW emissions with good beam quality from two different 7:1 all-glass fiber coupler-types**, Marco Plötner, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Tina Eschrich, Leibniz-Institut für Photonische Technologien e.V. (Germany); Oliver de Vries, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Denny Hoh, Florian Just, Jens Kobelke, Sonja Unger, Matthias Jäger, Leibniz-Institut für Photonische Technologien e.V. (Germany); Thomas Schreiber, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Hartmut Bartelt, Leibniz-Institut für Photonische Technologien e.V. (Germany); Ramona Eberhardt, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Andreas Tünnermann, Fraunhofer-Institut für Photonische Technologien e.V. (Germany) . . . . . [9346-31]

5:20 pm: **Photothermal studies of the radiation effects on weakly absorptive optical thin film coatings induced by high repetitive laser pulses**, Jingtao Dong, Jian Chen, Zhouling Wu, ZC Optoelectronic Technologies, Ltd. (China); Huasong Liu, Yiqin Ji, Tianjin Jinhang Institute of Technology Physics (China) . . . . . [9346-32]

Thursday 12 February

SESSION 9
LOCATION: ROOM 272 (MEZZANINE) . . . . . THU 8:30 AM TO 10:10 AM

Components for Ultra-Short Pulse Lasers

Session Chair: **Christian V. Poulsen,** NKT Photonics Inc. (USA)

8:30 am: **Integrated femtosecond lasers** *(Invited Paper)*, Clemens Hönninger, Martin Delaigue, Florent Guichard, Amélie Letan, Guillaume Machinet, Franck Morin, Julien Pouysegur, Birgit Weichelt, Yoann Zaouter, Eric P. Mottay, Amplitude Systèmes (France) . . . . . [9346-33]

9:00 am: **Kagome-type hollow-core photonic-crystal fibers for beam delivery and pulse compression of high-power ultrafast lasers** *(Invited Paper)*, Clara J. Saraceno, ETH Zürich (Switzerland) and Univ. of Neuchâtel (Switzerland); Florian M. Emaury, ETH Zürich (Switzerland); Benoit Debord, Univ. de Limoges (France); Andreas Diebold, Cinia Schriber, ETH Zürich (Switzerland); Frederic Gérôme, Univ. de Limoges (France); Thomas Südmeyer, Univ. of Neuchâtel (Switzerland); Fetah A. Benabid, Univ. de Limoges (France); Ursula Keller, ETH Zürich (Switzerland). . . . . [9346-34]

9:30 am: **Efficient chirped Bragg gratings for stretching and compression of high power ultra short laser pulses**, Vadim Smirnov, Eugeniu Rotari, Ruslan Vasilyeu, Ion Cohanoschi, Larissa Glebova, Oleg V. Smolski, Alexei L. Glebov, Leonid B. Glebov, OptiGrate Corp. (USA). . . . . [9346-35]

9:50 am: **Adaptive optics for ultra short pulsed lasers in UHV environment**, Laurent Ropert, Sébastien Theis, François Deneuville, Paul Sauvageot, ISP System (France). . . . . [9346-36]

Coffee Break . . . . . Thu 10:10 am to 10:40 am

SESSION 10
LOCATION: ROOM 272 (MEZZANINE) . . . . . .THU 10:40 AM TO 11:50 AM

Beam Combining Techniques

Session Chair: **Alexei L. Glebov,** OptiGrate Corp. (USA)

10:40 am: **Components for beam combination in high power fiber systems** *(Invited Paper)*, Joshua E. Rothenberg, Northrop Grumman Aerospace Systems (USA) . . . . . [9346-37]

11:10 am: **New generation of VBGs for efficient spectral beam combination of high power diode lasers**, Vadim Smirnov, OptiGrate Corp. (USA); Daniel Ott, Ivan B. Divliansky, George B. Venus, The College of Optics and Photonics, Univ. of Central Florida (USA); Olexy Mokhun, Alexei L. Glebov, Leonid B. Glebov, OptiGrate Corp. (USA). . . . . [9346-38]

11:30 am: **Beam combining techniques for high-power high-brightness diode lasers**, Ralf Koch, Haro Fritsche, Bastian Kruschke, Holger Kern, Ulrich Pahl, Thomas Hagen, Andreas Grohe, Wolfgang Gries, DirectPhotonics Industries GmbH (Germany) . . . . . [9346-40]

CONFERENCE 9347

LOCATION: ROOM 122 (EXHIBIT LEVEL) AND ROOM 120

Monday–Thursday 9 –12 February 2015 • Proceedings of SPIE Vol. 9347

Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications XIV

Conference Chair: **Konstantin L. Vodopyanov,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

Conference Co-Chair: **Yehoshua Y. Kalisky,** Nuclear Research Ctr. Negev (Israel)

Program Committee: **Darrell J. Armstrong,** Sandia National Labs. (USA); **Majid Ebrahim-Zadeh,** ICFO - Institut de Ciències Fotòniques (Spain); **Peter Günter,** ETH Zurich (Switzerland); **Baldemar Ibarra-Escamilla,** Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); **Moti Katz,** Soreq Nuclear Research Ctr. (Israel); **Yun-Shik Lee,** Oregon State Univ. (USA); **Rita D. Peterson,** Air Force Research Lab. (USA); **Peter G. Schunemann,** BAE Systems (USA); **Kenneth L. Schepler,** Air Force Research Lab. (USA); **Andrei V. Shchegrov,** KLA-Tencor Corp. (USA); **Wei Shi,** Tianjin Univ. (China); **Michael Vasilyev,** The Univ. of Texas at Arlington (USA)

Monday 9 February

SESSION 1

LOCATION: ROOM 122 (EXHIBIT LEVEL) ..... MON 1:20 PM TO 2:55 PM

Microresonator Combs, THz, and RF Photonics I

Joint Session with Conferences 9343 and 9347

Session Chair: **Andrea M. Armani,** The Univ. of Southern California (USA)

1:20 pm: **Diamond frequency combs** *(Invited Paper)*, Marko Loncar, Harvard Univ. (USA) . . . . . [9343-10]

1:45 pm: **On chip temporal solitons and coherent dispersive waves in SiN optical micro resonators for octave spanning frequency combs** *(Invited Paper)*, Tobias J. Kippenberg, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9343-11]

2:10 pm: **Precision frequency metrology with microresonator combs** *(Invited Paper)*, Scott Diddams, Scott B. Papp, National Institute of Standards and Technology (USA) . . . . . [9343-12]

2:35 pm: **Broadband 2.5-6μm frequency comb source for dual-comb molecular spectroscopy**, Viktor O. Smolski, Konstantin L. Vodopyanov, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9347-1]

Coffee Break . . . . . Mon 2:55 pm to 3:20 pm

SESSION 2

LOCATION: ROOM 122 (EXHIBIT LEVEL) ..... MON 3:20 PM TO 5:50 PM

Microresonator Combs, THz, and RF Photonics II

Joint Session with Conferences 9343 and 9347

Session Chairs: **Konstantin L. Vodopyanov,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Gualtiero Nunzi Conti,** Istituto di Fisica Applicata Nello Carrara (Italy)

3:20 pm: **Terabit/s communications using chip-scale frequency comb sources** *(Invited Paper)*, Christian Koos, Karlsruher Institut für Technologie (Germany); Tobias J. Kippenberg, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Larry R. Dalton, Univ. of Washington (USA); Liam P. Barry, Dublin City Univ. (Ireland); Wolfgang Freude, Karlsruher Institut für Technologie (Germany); Juerg Leuthold, Karlsruher Institut für Technologie (Germany) and ETH Zürich (Switzerland); Joerg Pfeifle, Claudius Weimann, Matthias Lauermann, Stefan Wolf, Karlsruher Institut für Technologie (Germany); Victor Brasch, Tobias Herr, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Delwin L. Elder, Univ. of Washington (USA); Vidak Vujicic, Regan T. Watts, Dublin City Univ. (Ireland) . . . . . [9343-13]

3:45 pm: **Towards efficient octave-spanning comb with micro-structured crystalline resonator** *(Invited Paper)*, Nan Yu, Ivan S. Grudinin, Jet Propulsion Lab. (USA) . . . . . [9343-14]

4:10 pm: **Ultrafast nonlinear Si optics** *(Invited Paper)*, Alexander L. Gaeta, Cornell Univ. (USA) . . . . . [9347-2]

4:35 pm: **Making microwaves visible: Parametric frequency conversion in whispering gallery mode resonators** *(Invited Paper)*, Harald G. L. Schwefel, Max-Planck-Institut für die Physik des Lichts (Germany) . . . . . [9343-15]

5:00 pm: **Advances in Kerr optical frequency comb generation** *(Invited Paper)*, Guoping Lin, Irina V. Balakireva, Khaldoun Saleh, Souleymane Diallo, Romain Martinenghi, Rémi Henriet, Aurelien Coillet, Yanne K. Chembo, FEMTO-ST (France). . . . . [9343-16]

5:25 pm: **Analysis of third order nonlinearity effects in high-Q WGM resonator by cavity ring down** *(Invited Paper)*, Patrice Féron, Vincent Huet, Alphonse L. Rasoloniaina, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France); Maurizio Ferrari, Istituto di Fotonica e Nanotecnologie (Italy); Stéphane Balac, Yannick Dumeige, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France) . . . . . [9343-17]

Tuesday 10 February

SESSION 3

LOCATION: ROOM 120 (EXHIBIT LEVEL) ..... TUE 8:00 AM TO 10:10 AM

NOTE ROOM CHANGE

Visible-UV Generation I

Session Chair: **Andrei V. Shchegrov,** KLA-Tencor Corp. (USA)

8:00 am: **High average power quasi-CW single-mode green and UV fiber lasers,** Alexey Avdokhin, Valentin Gapontsev, Pankaj Kadwani, Andreas Vaupel, Igor Samartsav, IPG Photonics Corp. (USA). . . . . [9347-70]

8:30 am: **CW, single-frequency 229nm laser source for Cd-cooling by harmonic conversion**, Yushi Kaneda, J. Michael Yarborough, Yevgeny A. Merzlyak, College of Optical Sciences, The Univ. of Arizona (USA) and KATORI Innovative Space-Time Project, ERATO (Japan). . . . . [9347-3]

8:50 am: **Second harmonic 266nm generation by PP-LBGO device**, Junji Hirohashi, Oxide Corp. (Japan); Tetsuo Taniuchi, Tohoku Univ. (Japan); Koichi Imai, Masami Hatori, Shunji Takekawa, Mitsuyoshi Sakairi, Makoto Matsukura, Hiroshi Motegi, Satoshi Makio, Oxide Corp. (Japan); Shintaro Miyazawa, Oxide Corp. (Japan) and Waseda Univ. (Japan); Yasunori Furukawa, Oxide Corp. (Japan). . . . . [9347-4]

9:10 am: **High brightness 188nm light source with low temporal jitter**, James J. Jacob, Actinix (USA) . . . . . [9347-5]

9:30 am: **Ten deep blue to cyan emission lines from an intracavity frequency converted Raman laser**, Dimitri Geskus, Ctr. de Lasers e Aplicações (Brazil); Jonas Jakutis Neto, Instituto de Estudos Avançados (Brazil); Helen M. Pask, Macquarie Univ. (Australia); Niklaus U. Wetter, Instituto de Pesquisas Energéticas e Nucleares (Brazil) . . . . . [9347-6]

9:50 am: **Frequency doubling of near-infrared radiation enhanced by a multi-pass cavity for the second-harmonic wave**, Daniel Jedrzejczyk, Reiner Güther, Katrin Paschke, Götz Erbert, Ferdinand-Braun-Institut (Germany) . . . . . [9347-7]

Coffee Break . . . . . Tue 10:10 am to 10:40 am

LASE

CONFERENCE 9347
LOCATION: ROOM 120 (EXHIBIT LEVEL)

SESSION 4
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . .TUE 10:40 AM TO 12:20 PM

Visible-UV Generation II

Session Chair: **Andrei V. Shchegrov,** KLA-Tencor Corp. (USA)

10:40 am: **Whispering gallery resonator from lithium tetraborate**, Josef Fürst, Univ. of Freiburg (Germany); Petra Becker, Ladislav Bohaty, Univ. zu Köln (Germany); Karsten Buse, Univ. of Freiburg (Germany) and Fraunhofer-Institut für Physikalische Messtechnik (Germany); Ingo Breunig, Univ. of Freiburg (Germany) . . . . . [9347-8]

11:00 am: **Fiber-integrated second harmonic generation modules for visible picosecond pulse generation**, Thomas H. Legg, Gooch & Housego Systems Technology Group (United Kingdom); Timothy H. Runcorn, Imperial College London (United Kingdom); Dora J. Hu, Institute for Infocomm Research (Singapore); Robert T. Murray, Edmund J. R. Kelleher, Sergei V. Popov, Imperial College London (United Kingdom); Robert C. Eckardt, Gooch & Housego, Cleveland (USA); Dieter H. Jundt, Gooch & Housego, Palo Alto (USA); Andrew Robertson, Gooch & Housego (Torquay) Ltd. (United Kingdom); James R. Taylor, Imperial College London (United Kingdom) . . . . . [9347-9]

11:20 am: **0.5W CW single frequency blue at 486 nm via SHG with net conversion of 81.5% from the NIR using a 30 mm PPMgO:SLT crystal in a resonant cavity**, Ali Khademian, David Shiner, Univ. of North Texas (USA) . . . . . [9347-10]

11:40 am: **517nm - 538nm tunable second harmonic generation in a diode-pumped PPKTP waveguide crystal**, Ksenia A. Fedorova, Aston Univ. (United Kingdom); Phillip R. Battle, AdvR, Inc. (USA); Daniil A. Livshits, Innolume GmbH (Germany); Edik U. Rafailov, Aston Univ. (United Kingdom) . . . . . [9347-11]

12:00 pm: **A novel collinear $LiNbO_3$ acousto optical tunable filter with the improved range of transmission and spectral resolution**, Adan O. Arellanes, Alexandre S. Shcherbakov, Emanuele Bertone, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) . . . . . [9347-12]

Lunch/Exhibition Break . . . . . Tue 12:20 pm to 1:50 pm

SESSION 5
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . . TUE 1:50 PM TO 3:30 PM

Terahertz Generation

Session Chair: **Konstantin L. Vodopyanov,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

1:50 pm: **Sub-cycle control of multi-THz high-harmonic generation and all-coherent charge transport in bulk semiconductors** *(Invited Paper)*, Christoph Lange, Olaf Schubert, Matthias Hohenleutner, Fabian Langer, Thomas Maag, Sebastian Baierl, Univ. Regensburg (Germany); Ulrich Huttner, Daniel Golde, Philipps-Univ. Marburg (Germany); Torsten Meier, Univ. Paderborn (Germany); Mackillo Kira, Stephan W. Koch, Philipps-Univ. Marburg (Germany); Rupert Huber, Univ. Regensburg (Germany) . . . . . [9347-13]

2:20 pm: **Intense THz sources for condensed matter physics** *(Invited Paper)*, Matthias C. Hoffmann, SLAC National Accelerator Lab. (USA) . . . . . [9347-14]

2:50 pm: **Ultrafast photo-response in superconductive isotropic radiators for microwave generation**, Brian D. Dolasinski, Peter E. Powers, Joseph W. Haus, Univ. of Dayton (USA); Thomas Bullard, Air Force Research Lab. (USA); John Bulmer, Univ. of Cambridge (United Kingdom) . . . . . [9347-15]

3:10 pm: **High efficiency, wide bandwidth THz generation in organic crystals OH1 and DSTMS**, Carolina C. Medrano, Tobias Bach, Mojca Jazbinsek, Rainbow Photonics AG (Switzerland); Peter Gunter, Rainbow Photonics AG (Switzerland) and ETH Zürich (Switzerland) . . . [9347-16]

Coffee Break . . . . . Tue 3:30 pm to 4:00 pm

SESSION 6
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . . TUE 4:00 PM TO 5:50 PM

Optical Parametric Processes I

Session Chairs: **Majid Ebrahim-Zadeh,** ICFO - Institut de Ciències Fotòniques (Spain); **Rita D. Peterson,** Air Force Research Lab. (USA)

4:00 pm: **Optical parametric oscillation in quasi-phase-matched GaP** *(Invited Paper)*, Peter G. Schunemann, Leonard A. Pomeranz, Daniel J. Magarrell, BAE Systems (USA). . . . . [9347-17]

4:30 pm: **1-micron-pumped OPO based on orientation-patterned GaP**, Leonard A. Pomeranz, Peter G. Schunemann, Daniel J. Magarrell, John C. McCarthy, Kevin T. Zawilski, BAE Systems (USA) . . . . . [9347-18]

4:50 pm: **Highly efficient double pass optical parametric generator for ultrashort pulses of tunable NIR radiation**, Heiko Linnenbank, Stefan Linden, Rheinische Friedrich-Wilhelms-Univ. Bonn (Germany) . . . . . [9347-19]

5:10 pm: **Tunable continuous-wave midwave infrared generation using an orientation patterned GaAs crystal with a fan-out grating design**, Jacob O. Barnes, Shekhar Guha, Leonel P. Gonzalez, Air Force Research Lab. (USA); Peter G. Schunemann, BAE Systems (USA) . . . . . [9347-20]

5:30 pm: **Temperature-tuned 90° phase-matched SHG and DFG in $BaGa_4S_7$**, Nobuhiro Umemura, Chitose Institute of Science and Technology (Japan); Valentin P. Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Valery V. Badikov, Kuban State Technological Univ. (Russian Federation); Kiyoshi Kato, Chitose Institute of Science and Technology (Japan) . . . . . [9347-21]

POSTERS-TUESDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . TUE 6:00 TO 8:00 PM

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Tunable two-color soliton pulse generation through soliton self-frequency shift, Ping Qiu, Ke Wang, Shenzhen Univ. (China) . . . . . [9347-53]

Chemical synthesis and crystal growth of $AgGaGeS_4$, a material for mid-IR nonlinear laser applications, Jeremy Rame, Johan Petit, ONERA (France); Bruno Viana, Institut de Recherche de Chimie Paris (France) . . . . . [9347-54]

Nonlinearity improvement in rubidium vapor by means of additional optical pumping, Nikolai A. Korneev, Yaneth M. Torres Garcia, Yadira Ortega Barrera, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico). . . . . [9347-55]

Surface characterization studies of orientation patterned ZnSe doped with Cr^{2+}, Rami R. Bommareddi, Alabama A&M Univ. (USA); Kenneth L. Schepler, Univ. of Central Florida (USA); Elizabeth A. Moore, John Hoelscher, Shiva R. Vangala, Bruce B. Claflin, Air Force Research Lab. (USA); Narsingh B. Singh, Univ. of Maryland, Baltimore County (USA); Jonathan W. Evans, Air Force Research Lab. (USA) . . . . . [9347-56]

Double-pump-pass singly resonant optical parametric oscillator for efficient generation of infrared light at 2300 nm based on PPMgSLT, Bum Ku Rhee, Seungmin Lee, Sogang Univ. (Korea, Republic of). . . . . [9347-57]

Generation of third harmonic picosecond pulses at 355 nm by sum frequency mixing in periodically poled MgSLT crystal, Thomas Schoenau, PicoQuant GmbH (Germany); André Kaltenbach, Günther Tränkle, Ferdinand-Braun-Institut (Germany); Kristian Lauritsen, Rainer Erdmann, PicoQuant GmbH (Germany) . . . . . [9347-58]

Chalcogenide suspended-core fibers for supercontinuum generation in the mid-infrared, Enrico Coscelli, Federica Poli, Univ. degli Studi di Parma (Italy); Jianfeng Li, Univ. of Electronic Science and Technology of China (China) and Aston Univ. (United Kingdom); Annamaria Cucinotta, Stefano Selleri, Univ. degli Studi di Parma (Italy) . . . . . [9347-59]

Characterizing germania concentration and structure in fiber soot using multiphoton microscopy and spectroscopy technology, Minghan Chen, Ming-Jun Li, Anping Liu, Corning Incorporated (USA) . . . . . [9347-60]

Dissipative collinear weakly coupled acousto-optical states, Adan O. Arellanes, Alexandre S. Shcherbakov, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Sergey A. Nemov, Saint-Petersburg State Polytechnical Univ. (Russian Federation). . . . . [9347-61]

Temperature-dependent phase-matching properties with oo-e and oo-o interactions in 5mol% MgO doped congruent $LiNbO_3$, Daisuke Matsuda, Takuma Mizuno, Nobuhiro Umemura, Chitose Institute of Science and Technology (Japan) . . . . . [9347-62]

Temperature-dependent phase-matching properties of 1.3mol% MgO doped stoichiometric $LiNbO_3$, Takuma Mizuno, Daisuke Matsuda, Nobuhiro Umemura, Chitose Institute of Science and Technology (Japan) . . . . . [9347-63]

Polarization tunable spatial and angular Goos-Hänchen shift and Imbert-Fedorov shift using long range surface plasmon, Ardhendu Saha, Nabamita Goswami, National Institute of Technology Agartala (India) . . . . . [9347-64]

Effect of surfactants on the emission properties of ZnO: Mn_3O_4 nanocomposites, Senthilkumar P. Pachamuthu, Rajeswari Ponnusamy, Sivasubramanian Dhanuskodi, Bharathidasan Univ. (India) . . . . . [9347-65]

Self-focusing effect on THG at interfaces of solvent-cuvette, Emerson C. Barbano, Univ. de São Paulo (Brazil); Kerrianne Harrington, Univ. of Bath (United Kingdom); Sérgio C. Zilio, Lino Misoguti, Univ. de São Paulo (Brazil) . . [9347-66]

Supercontinuum from single- and double-scale fiber laser pulses in long extra-cavity P_2O_5-doped silica fiber, Sergey M. Kobtsev, Sergey V. Kukarin, Sergei V. Smirnov, Novosibirsk State Univ. (Russian Federation) . . . . . [9347-67]

Flat mid-infrared supercontinuum generation in tapered fiber with thin coating of highly nonlinear glass, Pantelis Velanas, Christos Riziotis, Georgios Kakarantzas, National Hellenic Research Foundation (Greece) . . . . . [9347-68]

High power narrow linewidth monolithic PM fiber lasers in 1μm region for nonlinear frequency conversion, Wei Shi, Tianjin Univ. (China); Qiang Fang, Jingli Fan, Yuguo Qin, HFB Photonics, Inc. (China) . . . . . [9347-69]

Wednesday 11 February

SESSION 7

LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . . WED 8:30 AM TO 9:50 AM

Optical Parametric Processes II

Session Chairs: **Majid Ebrahim-Zadeh,** ICFO - Institut de Ciències Fotòniques (Spain); **Kenneth L. Schepler,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

8:30 am: **6.5W mid-infrared $ZnGeP_2$ parametric oscillator directly pumped by a Q-switched Tm^{3+}-doped single-oscillator fiber laser**, Christelle Kieleck, Antoine Berrou, Brenda M. Donnellan, Institut Franco-Allemand de Recherches de Saint-Louis (France); Benoit Cadier, Thierry Robin, iXFiber SAS (France); Marc Eichhorn, Institut Franco-Allemand de Recherches de Saint-Louis (France) . . . . . [9347-22]

8:50 am: **Cascaded OPGaAs OPO for increased longwave efficiency**, Ryan K. Feaver, Air Force Research Lab. (USA) and Univ. of Dayton (USA); Rita D. Peterson, Air Force Research Lab. (USA); Peter E. Powers, Joseph W. Haus, Univ. of Dayton (USA) . . . . . [9347-23]

9:10 am: **High average power difference-frequency generation of picosecond mid-IR pulses at 80MHz using an Yb-fiber laser pumped optical parametric oscillator**, Julia Michel, Marcus Beutler, Ingo Rimke, Edlef Büttner, APE GmbH (Germany); Paolo Farinello, Antonio Agnesi, Univ. degli Studi di Pavia (Italy); Valentin P. Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany). . . . . [9347-24]

9:30 am: **Power scaling in a mid-IR OPO, pumped by high power Tm:fiber MOPA system**, Ali Abdulfattah, Lawrence Shah, Alex M. Sincore, Robert Ryan, Martin C. Richardson, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9347-25]

Coffee Break . . . . . .Wed 9:50 am to 10:20 am

LASE PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . WED 10:20 AM TO 12:30 PM

Session Chairs: **Guido Hennig**, Daetwyler Graphics AG (Switzerland); **Yongfeng Lu**, Univ. of Nebraska-Lincoln (USA)

10:20 am: **Welcome and Opening Remarks**
Guido Hennig, Daetwyler Graphics AG (Switzerland); Yongfeng Lu, Univ. of Nebraska-Lincoln (USA)

10:25 am: **Announcement of the Green Photonics Best Paper Award and the 3D Printing, Fabrication, and Manufacturing Best Paper Award**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA); **Henry Helvajian,** The Aerospace Corp. (USA)

10:30 am: **NASA's Optical Communications Program: 2015 and Beyond**
Donald M. Cornwell Jr., NASA Headquarters, Space Communications and Navigation Program (USA) . . [9354-201]

11:10 am: **Coherent Combination of Ultrafast Laser Pulses: A Route to Joule-Class High Repetition Rate Femtosecond Lasers**
Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9344-202]

11:50 am: **Laser 3D Printing of Metallic Components and its Industrial Applications: Technical Breakthroughs and Opportunities**
Xiaoyan Zeng, Wuhan National Lab. for Optoelectronics (China). . . . . [9353-203]

Lunch/Exhibition Break . . . . . .Wed 12:30 pm to 1:30 pm

SESSION 8

LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . . WED 1:30 PM TO 3:30 PM

Novel Concepts of Nonlinear Optics I

Session Chairs: **Michael Vasilyev,** The Univ. of Texas at Arlington (USA); **Darrell J. Armstrong,** Sandia National Labs. (USA)

1:30 pm: **Second harmonic generation from metamaterials strongly coupled to intersubband transitions in quantum wells** *(Invited Paper)*, Salvatore Campione, Omri Wolf, Sandia National Labs. (USA); Arvind P. Ravikumar, Princeton Univ. (USA); Alexander Benz, Sheng Liu, John F. Klem, Michael B. Sinclair, Igal Brener, Sandia National Labs. (USA) . . . . . [9347-26]

2:00 pm: **Adiabatic nonlinear optical processes** *(Invited Paper)*, Gil Porat, Weizmann Institute of Science (Israel) . . . . . [9347-27]

2:30 pm: **Design and results of a dual-gas quasi-phase matching (QPM) foil target**, Arvid Hage, Deutsches Elektronen-Synchrotron (Germany) and Queen's Univ. (United Kingdom); Björn Landgraf, Helmholtz Institute Jena (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Michael Taylor, Queen's Univ. (United Kingdom); Martin Wünsche, Helmholtz Institute Jena (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Mark J. Prandolini, Mark Yeung, Helmholtz Institute Jena (Germany); Hauke Höppner, Michael Schulz, Deutsches Elektronen-Synchrotron (Germany); Robert Riedel, Helmholtz Institute Jena (Germany); Franz Tavella, SLAC National Accelerator Lab. (USA); Brendan H. Dromey, Queen's Univ. Belfast (United Kingdom); Matthew Zepf, Helmholtz Institute Jena (Germany) . . . . . [9347-28]

2:50 pm: **Competition between harmonic generation and multi-photon luminescence in selectively grown coaxial InGaN/GaN quantum wells on GaN pyramids for tunable light emission**, Sween J. Butler, Univ. of North Texas (USA); Mohamed Fikry, Klaus Thonke, Univ. Ulm (Germany); Arup Neogi, Univ. of North Texas (USA) . . . . . [9347-29]

3:10 pm: **Increased distributed sensing sensitivity using higher order stimulated Brillouin scattering**, Victor L. Lambin Iezzi, Ecole Polytechnique de Montréal (Canada). . . . . [9347-30]

Coffee Break . . . . . .Wed 3:30 pm to 4:00 pm

SESSION 9

LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . . WED 4:00 PM TO 6:00 PM

Novel Concepts of Nonlinear Optics II

Session Chairs: **Michael Vasilyev,** The Univ. of Texas at Arlington (USA); **Darrell J. Armstrong,** Sandia National Labs. (USA)

4:00 pm: **Quantum optical arbitrary waveform manipulation and measurement in real time** *(Invited Paper)*, Abijith S. Kowligy, Paritosh Manurkar, Neil V. Corzo Trejo, Vesselin G. Velev, Michael L. Silver, Northwestern Univ. (USA); Ryan P. Scott, S. J. Ben Yoo, Univ. of California, Davis (USA); Prem Kumar, Gregory S. Kanter, Yuping Huang, Northwestern Univ. (USA) . . [9347-31]

4:30 pm: **New nonlinear signal processing schemes based on photonic-phononic emitter-receivers in silicon** *(Invited Paper)*, Heedeuk Shin, Yale Univ. (USA); Jonathan A. Cox, Robert Jarecki, Andrew Starbuck, Sandia National Labs. (USA); Zheng Wang, The Univ. of Texas at Austin (USA); Peter T. Rakich, Yale Univ. (USA) . . . . . [9347-32]

5:00 pm: **Second harmonic generation at oblique angles in photonic bandgap structures**, Han Li, Joseph W. Haus, Partha P. Banerjee, Univ. of Dayton (USA). . . . . [9347-33]

5:20 pm: **Second harmonic generation of a random fiber laser with Raman gain**, Sergey A. Babin, Ekaterina I. Dontsova, Ilya D. Vatnik, Sergey I. Kablukov, Institute of Automation and Electrometry (Russian Federation) . . . . . [9347-34]

5:40 pm: **Mechanisms for forbidden hyper-Rayleigh scattering**, David L. Andrews, Mathew D. Williams, Jack S. Ford, Univ. of East Anglia (United Kingdom). . . . . [9347-35]

CONFERENCE 9347
LOCATION: ROOM 120 (EXHIBIT LEVEL)

Thursday 12 February

SESSION 10
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . . THU 8:40 AM TO 10:10 AM

Supercontinuum Generation
Session Chair: **Yehoshua Y. Kalisky,** Nuclear Research Ctr. Negev (Israel)

8:40 am: **Vacuum-UV to IR supercontinuum generated by impulsive Raman self-scattering in hydrogen-filled photonic crystal fibre** *(Invited Paper)*, Amir Abdolvand, Federico Belli, John C. Travers, Philip Russell, Max-Planck-Institut für die Physik des Lichts (Germany) . . . . . [9347-36]

9:10 am: **Analysis of a low-cost technique for the generation of broadband spectra with adjustable spectral width in optical fibers**, Roberto Rojas-Laguna, Juan C. Hernández-Garcia, Julián Móises M. Estudillo-Ayala, Univ. de Guanajuato (Mexico); Baldemar Ibarra-Escamilla, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Olivier J. M. Pottiez, Ctr. de Investigaciones en Óptica, A.C. (Mexico); Everardo Vargas-Rodríguez, Alejandro Barrientos-Garcia, Univ. de Guanajuato (Mexico). . . . . [9347-37]

9:30 am: **High sensitivity mid-infrared incoherent broadband cavity enhanced absorption spectroscopy with a supercontinuum source**, Caroline Amiot, Tampere Univ. of Technology (Finland) and FEMTO-ST (France); Antti Aalto, Juha Toivonen, Goëry Genty, Tampere Univ. of Technology (Finland). . . . . [9347-38]

9:50 am: **Low noise, phase coherent and efficient generation of femtosecond ~1.3μm pulses from a two zero dispersion wavelength photonic crystal fiber**, Yuhong Yao, Wayne H. Knox, Univ. of Rochester (USA) . . . . . [9347-39]

Coffee Break . . . . . Thu 10:10 am to 10:40 am

SESSION 11
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . THU 10:40 AM TO 12:00 PM

Raman and Brillouin Processes
Session Chair: **Darrell J. Armstrong,** Sandia National Labs. (USA)

10:40 am: **Passive noise suppression in cascaded Raman fiber lasers**, Michael Steinke, Jörg Neumann, Dietmar Kracht, Peter Wessels, Laser Zentrum Hannover e.V. (Germany) and Ctr. for Quantum Engineering and Space-Time Research (Germany) . . . . . [9347-40]

11:00 am: **Femtosecond diamond Raman lasers**, Jipeng Lin, Macquarie Univ. (Australia); Michelle Murtagh, Macquarie Univ. (Australia) and Univ. of Strathclyde (United Kingdom); David J. Spence, Richard P. Mildren, Macquarie Univ. (Australia) . . . . . [9347-41]

11:20 am: **Diode side pumped, quasi-CW Nd:YVO_4 self-Raman laser operating at 1176 nm**, Cristine Calil Kores, Dimitri Geskus, Instituto de Pesquisas Energéticas e Nucleares (Brazil); Helen M. Pask, MQ Photonics (Australia); Niklaus U. Wetter, Instituto de Pesquisas Energéticas e Nucleares (Brazil) . . . . . [9347-42]

11:40 am: **Enhanced stimulated Brillouin scattering in chalcogenide elliptical photonic crystal fibres**, Imen Abidi, Rim Cherif, SUP'COM (Tunisia); Mourad Zghal, Univ. of Carthage (Tunisia) . . . . . [9347-43]

Lunch/Exhibition Break . . . . . Thu 12:00 pm to 1:30 pm

SESSION 12
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . . THU 1:30 PM TO 3:00 PM

New Nonlinear Materials and Characterization
Session Chairs: **Majid Ebrahim-Zadeh,** ICFO - Institut de Ciències Fotòniques (Spain); **Kenneth L. Schepler,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

1:30 pm: **Frequency conversion for infrared generation in monolithic semiconductor waveguides** *(Invited Paper)*, Amr S. Helmy, Payam Abolghasem, Dongpeng Kang, Univ. of Toronto (Canada); Dylan Logan, Univ of Toronto (Canada). . . . . [9347-44]

2:00 pm: **Calorimetric measurement of absorption loss in orientation-patterned GaP and GaAs**, Yelena Isyanova, Q-Peak, Inc. (USA); Peter G. Schunemann, BAE Systems (USA); Peter F. Moulton, Q-Peak, Inc. (USA) . . . . . [9347-45]

2:20 pm: **Lithium niobate: Wavelength and temperature dependence of the thermo-optic coefficient in the visible and near infrared**, Stephan Fieberg, Streit Levin, Jens Kiessling, Fraunhofer-Institut für Physikalische Messtechnik (Germany); Petra Becker, Univ. zu Köln (Germany); Frank Kühnemann, Fraunhofer-Institut für Physikalische Messtechnik (Germany); Karsten Buse, Fraunhofer-Institut für Physikalische Messtechnik (Germany) and Univ. of Freiburg (Germany) . . . . . [9347-46]

2:40 pm: **Highly sensitive absorption measurements in lithium niobate using whispering gallery resonators**, Markus Leidinger, Univ. of Freiburg (Germany); Karsten Buse, Fraunhofer-Institut für Physikalische Messtechnik (Germany); Ingo Breunig, Univ. of Freiburg (Germany) . . . . . [9347-47]

Coffee Break . . . . . Thu 3:00 pm to 3:30 pm

SESSION 13
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . . THU 3:30 PM TO 5:10 PM

Peter Powers Tribute
Session Chairs: **Yehoshua Y. Kalisky,** Nuclear Research Ctr. Negev (Israel); **Kenneth L. Schepler,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

3:30 pm: **Peter Powers' inspirational collaborative style**, Joseph W. Haus, Univ. of Dayton (USA) . . . . . [9347-48]

3:50 pm: **Polarization meets nonlinear optics**, Qiwen Zhan, Univ. of Dayton (USA) . . . . . [9347-49]

4:10 pm: **Peter Powers: A long-lasting impact on nonlinear optics**, Majid Ebrahim-Zadeh, ICFO - Institut de Ciències Fotòniques (Spain) . . . . . [9347-50]

4:30 pm: **Physics works! The teaching style of Professor Peter Powers**, Kenneth L. Schepler, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA). . . . . [9347-51]

4:50 pm: **Peter Powers: His unique contributions to laser physics and nonlinear optics**, Yehoshua Y. Kalisky, Nuclear Research Ctr. Negev (Israel) . . . . . [9347-52]

CONFERENCE 9348
LOCATION: ROOM 309 (ESPLANADE)

Sunday–Tuesday 8–10 February 2015 • Proceedings of SPIE Vol. 9348

High-Power Diode Laser Technology and Applications XIII

Conference Chair: **Mark S. Zediker,** Foro Energy, Inc. (USA)

Program Committee: **Friedrich G. Bachmann,** FriBa LaserNet (Germany); **Stefan W. Heinemann,** TRUMPF Photonics (USA); **Volker Krause,** Laserline GmbH (Germany); **Robert Martinsen,** nLIGHT Corp. (USA); **Kurt J. Linden,** Spire Corp. (USA); **Erik P. Zucker,** JDSU (USA)

Sunday 8 February

SESSION 1

LOCATION: ROOM 309 (ESPLANADE) . . . . . SUN 8:30 AM TO 10:20 AM

High Power Fiber Coupled Laser Sources I

Session Chair: **Erik P. Zucker,** JDSU (USA)

8:30 am: **Scaling brightness and power of diode laser arrays** *(Invited Paper)*, Tso Yee Fan, Antonio Sanchez-Rubio, George W. Turner, Shawn M. Redmond, Kevin J. Creedon, Leo J. Missaggia, Gary M. Smith, Michael K. Connors, Steven J. Augst, Juan C. Montoya, Jan E. Kansky, MIT Lincoln Lab. (USA) . . . . [9348-1]

9:00 am: **A 40kW fiber-coupled diode laser for material processing**, Joerg Malchus, Volker Krause, Arnd Koesters, Laserline GmbH (Germany); David G. Matthews, Laserline Inc. (USA) . . . . . [9348-2]

9:20 am: **High brightness diodes and fiber-coupled modules**, Manoj Kanskar, Ling Bao, Zhigang Chen, David Dawson, Mark DeVito, Weimin Dong, Mike P. Grimshaw, Xingguo Guan, David M. Hemenway, Keith Kennedy, Robert Martinsen, Wolfram Urbanek, Shiguo Zhang, nLIGHT Corp. (USA) . . . . . [9348-3]

9:40 am: **Narrow-line fiber-coupled modules for DPAL pumping**, Tobias P. Koenning, Dan McCormick, David Irvin, Dean Stapleton, Tina Guiney, Steven G. Patterson, DILAS Diode Laser, Inc. (USA) . . . . . [9348-4]

10:00 am: **Low-NA fiber laser pumps powered by high-brightness single emitters**, Dan Yanson, Moshe Levi, Ophir Peleg, Noam Rappaport, Moshe Shamay, Yuri Berk, Nir Dahan, Genady Klumel, Ilya Baskin, SCD SemiConductor Devices (Israel) . . . . . [9348-5]

Coffee Break . . . . . Sun 10:20 am to 10:50 am

SESSION 2

LOCATION: ROOM 309 (ESPLANADE) . . . . . SUN 10:50 AM TO 12:10 PM

High Power Fiber Coupled Laser Sources II

Session Chair: **Volker Krause,** Laserline GmbH (Germany)

10:50 am: **Packaging of high power bars for optical pumping and direct applications**, Stefan W. Heinemann, Haiyan An, Tobias Barnowski, Viorel C. Negoita, Robert Roff, Thilo Vethake, TRUMPF Photonics (USA); Sven-Silvius Schad, Hagen Zimer, TRUMPF Laser GmbH & Co. KG (Germany); Konstantin M. Boucke, Georg Treusch, TRUMPF Photonics (USA) . . . . . [9348-6]

11:10 am: **Power scaling of kW-diode lasers optimized for material processing applications**, Stephan Schneider, Ihab Kardosh, Sebastian Liebl, Michael Voss, LIMO Lissotschenko Mikrooptik GmbH (Germany) . . . . . [9348-7]

11:30 am: **Tailored bar concepts for 10mm-mrad fiber coupled modules scalable to kW-class direct diode lasers**, Andreas Unger, Bernd Köhler, Ross Uthoff, Thomas Brand, Heiko Kissel, Jens Biesenbach, Michael Stoiber, DILAS Diodenlaser GmbH (Germany) . . . . . [9348-8]

11:50 am: **Highly modular high brightness diode laser system design for a wide application range**, Haro Fritsche, DirectPhotonics Industries GmbH (Germany) and Technische Univ. Berlin (Germany); Bastian Kruschke, Ulrich Pahl, Fabio Ferrario, Ralf Koch, Einar Ehm, Holger Kern, Andreas Grohe, Wolfgang Gries, DirectPhotonics Industries GmbH (Germany) . . . . . [9348-9]

Lunch Break . . . . . Sun 12:10 pm to 1:40 pm

SESSION 3

LOCATION: ROOM 309 (ESPLANADE) . . . . . SUN 1:40 PM TO 3:10 PM

High Power Devices I

Session Chair: **Stefan W. Heinemann,** TRUMPF Photonics (USA)

1:40 pm: **Brightness and average power as driver for advancements in diode lasers and their applications** *(Invited Paper)*, Reinhart Poprawe, Hans-Dieter Hoffmann, Fraunhofer-Institut für Lasertechnik (Germany) [9348-10]

2:10 pm: **High reliability demonstrated on high power and high brightness diode lasers**, Ling Bao, Manoj Kanskar, Mark DeVito, David M. Hemenway, Wolfram Urbanek, Mike P. Grimshaw, Weimin Dong, Xingguo Guan, Shiguo Zhang, David Dawson, Rob Martinsen, nLIGHT Corp. (USA). . . [9348-11]

2:30 pm: **Development of high power diode lasers with beam parameter product below 2 mm×mrad within the bridle project**, Paul Crump, Jonathan Decker, Martin Winterfeldt, Jörg Fricke, Andre Maassdorf, Götz Erbert, Guenther Tränkle, Ferdinand-Braun-Institut (Germany) . . . . . [9348-12]

2:50 pm: **Heading to 1kW levels with laser bars of high efficiency and emission wavelength around 880nm and 940nm**, Agnieszka Pietrzak, Ralf Huelsewede, Martin Zorn, Martin Woelz, Olaf Hirsekorn, JENOPTIK Diode Lab GmbH (Germany); Jens Meusel, Alex Kindsvater, Matthias Schroeder, JENOPTIK Laser GmbH (Germany); Jürgen Sebastian, JENOPTIK Diode Lab GmbH (Germany). . . . . [9348-13]

Coffee Break . . . . . Sun 3:10 pm to 3:40 pm

SESSION 4

LOCATION: ROOM 309 (ESPLANADE) . . . . . SUN 3:40 PM TO 5:00 PM

High Power Devices II

Session Chair: **Kurt J. Linden,** N2 Biomedical (USA)

3:40 pm: **915nm high power broad area laser diodes with ultra-small optical confinement based on asymmetric decoupled confinement heterostructure (ADCH)**, Yuji Yamagata, Yumi Yamada, Masanori Muto, Syunta Sato, Ryozaburo Nogawa, OPTOENERGY Inc. (Japan); Akira Sakamoto, Fujikura Ltd. (Japan); Masayuki Yamaguchi, OPTOENERGY Inc. (Japan). . . . . [9348-14]

4:00 pm: **29.5W continuous wave output from 100um wide laser diode**, Abdullah Demir, Matthew Peters, Richard Duesterberg, Victor Rossin, Erik P. Zucker, JDSU (USA). . . . . [9348-15]

4:20 pm: **High power operation of AlGaInP red laser diode for display applications**, Kyosuke Kuramoto, Takehiro Nishida, Shinji Abe, Motoharu Miyashita, Kenzo Mori, Tetsuya Yagi, Mitsubishi Electric Corp. (Japan). . . . . [9348-17]

4:40 pm: **Advancements in high power high brightness laser bars and single emitters for pumping and direct diode application**, Haiyan An, Ching-Long Jiang, Yihan Xiong, Qiang Zhang, Aloysius Inyang, Jason Felder, Alexander Lewin, Robert Roff, Stefan W. Heinemann, TRUMPF Photonics (USA); Berthold Schmidt, TRUMPF Laser Marking Systems AG (Switzerland); Georg Treusch, TRUMPF Photonics (USA). . . . . [9348-18]

CONFERENCE 9348
LOCATION: ROOM 309 (ESPLANADE)

Monday 9 February

SESSION 5
LOCATION: ROOM 309 (ESPLANADE) . . . . . MON 8:00 AM TO 10:00 AM

High Power Device Reliability
Session Chair: **Erik P. Zucker,** JDSU (USA)

8:00 am: **Reliability study of high brightness multiple single emitter diode lasers**, Jing Zhu, Thomas C. Yang, Cuipeng Zhang, Chao Lang, Luyan Zhang, Louisa Chen, Xiaochen Jiang, Rui Liu, Yanyan Gao, BWT Beijing Ltd. (China) . . . . . [9348-19]

8:20 am: **Reliable single emitters and laser bars for efficient CW-operation in the near-infrared emission range**, Martin Zorn, Ralf Huelsewede, Agnieszka Pietrzak, JENOPTIK Diode Lab GmbH (Germany); Jens Meusel, JENOPTIK Laser GmbH (Germany); Martin Woelz, Jürgen Sebastian, JENOPTIK Diode Lab GmbH (Germany). . . . . [9348-20]

8:40 am: **Degradation mechanisms in high power multi-mode InGaAs-AlGaAs strained quantum well lasers for high reliability applications**, Yongkun Sin, Nathan Presser, Erica Delonno, Miles Brodie, Brendan Foran, Steven C. Moss, The Aerospace Corp. (USA). . . . . [9348-21]

9:00 am: **High-power diode lasers under external optical feedback**, Britta Leonhäuser, Heiko Kissel, DILAS Diodenlaser GmbH (Germany); Jens W. Tomm, Martin Hempel, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Andreas Unger, Jens Biesenbach, DILAS Diodenlaser GmbH (Germany) . . . . . [9348-22]

9:20 am: **Analysis of 980nm emitting single-spatial mode diode lasers at high power levels by complementary imaging techniques**, Jens W. Tomm, Martin Hempel, Thomas Elsässer, Forschungsverbund Berlin e.V. (Germany); David Venables, Victor Rossin, Erik P. Zucker, JDSU (USA) . . . . . [9348-23]

9:40 am: **Mechanisms driving the catastrophic optical damage in high power laser diodes**, Juan Jimenez, Jorge Souto, Miguel Rodríguez, Univ. de Valladolid (Spain); Julian Anaya, Univ. of Bristol (United Kingdom); Alfredo Torres, Univ. de Valladolid (Spain) . . . . . [9348-24]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

SESSION 6
LOCATION: ROOM 309 (ESPLANADE) . . . . . MON 10:30 AM TO 11:50 AM

External Cavity Devices
Session Chair: **Robert Martinsen,** nLIGHT Corp. (USA)

10:30 am: **Separate phase-locking and coherent combining of two laser diodes in a Michelson cavity**, Guillaume Schimmel, Ioana Doyen, Sylvie Janicot, Lourdes Patricia R. Ramirez, Marc Hanna, Gaëlle Lucas-Leclin, Patrick Georges, Lab. Charles Fabry (France); Ville Vilokkinen, Petri Melanen, Petteri Uusimaa, Modulight, Inc. (Finland); Jonathan Decker, Paul Crump, Götz Erbert, Ferdinand-Braun-Institut (Germany); Stephen Bull, The Univ. of Nottingham (United Kingdom). . . . . [9348-25]

10:50 am: **Wavelength stabilized multi-kW diode laser systems**, Bernd Köhler, Andreas Unger, Tobias Kindervater, Simon Drovs, Paul Wolf, Ralf Hubrich, Stefan Auch, Holger Müntz, Jens Biesenbach, DILAS Diodenlaser GmbH (Germany). . . . . [9348-26]

11:10 am: **High power external cavity CW red laser diode**, Hong Joo Song, Jun-Ho Lee, Jiyeon Park, Jong-Hwan Park, Gaye Park, Hong Man Na, Korea Electronics Technology Institute (Korea, Republic of); Jung Ho Park, Korea Univ. (Korea, Republic of). . . . . [9348-27]

11:30 am: **High-power laser diodes using a large active core combined with mode control for high beam quality**, David M. Pai, Bright Beam Technologies (USA) . . . . . [9348-28]

Lunch Break . . . . . Mon 11:50 am to 1:20 pm

SESSION 7
LOCATION: ROOM 309 (ESPLANADE) . . . . . MON 1:20 PM TO 3:10 PM

High Power Devices III
Session Chair: **Stefan W. Heinemann,** TRUMPF Photonics (USA)

1:20 pm: **New developments in diode lasers in Europe** *(Invited Paper)*, Günther Tränkle, Ferdinand-Braun-Institut (Germany) . . . . . [9348-29]

1:50 pm: **Progress in high-energy-class diode laser pump sources**, Paul Crump, Carlo F. Frevert, Frank Bugge, Steffen Knigge, Götz Erbert, Guenther Tränkle, Ferdinand-Braun-Institut (Germany); Agnieszka Pietrzak, Ralf Hueslewede, Martin Zorn, Jürgen Sebastian, JENOPTIK Diode Lab GmbH (Germany); Jens Lotz, Wilhelm Fassbender, Joerg Neukum, DILAS Diodenlaser GmbH (Germany); Joerg Körner, Joachim Hein, Thomas Toepfer, Lastronics GmbH (Germany). . . . . [9348-30]

2:10 pm: **High brightness 9xxnm fiber coupled diode lasers**, Rui Liu, Xiaochen Jiang, Thomas C. Yang, Yanyan Gao, Xiaoguang He, Luyan Zhang, Louisa Chen, Tujia Zhang, BWT Beijing Ltd. (China) . . . . . [9348-31]

2:30 pm: **High power VCSEL systems and applications**, Holger Moench, Ralf Conrads, Stephan Gronenborn, Gero Heusler, Johanna S. Kolb, Michael Miller, Pavel Pekarski, Jens Pollmann-Retsch, Armand Pruijmboom, Ulrich Weichmann, Philips GmbH (Germany) . . . . . [9348-32]

2:50 pm: **Watt-level continuous-wave diode lasers at 1180 nm with high spectral brightness**, Katrin Paschke, Gunnar Blume, Olaf Brox, Frank Bugge, David Feise, Jörg Fricke, Julian Hofmann, Hans Wenzel, Götz Erbert, Ferdinand-Braun-Institut (Germany). . . . . [9348-33]

Coffee Break . . . . . Mon 3:10 pm to 3:40 pm

SESSION 8
LOCATION: ROOM 309 (ESPLANADE) . . . . . MON 3:40 PM TO 5:40 PM

Laser Diode Packaging and Components

Joint Session with Conferences 9346 and 9348

Session Chairs: **Paul O. Leisher,** Rose-Hulman Institute of Technology (USA); **Kurt J. Linden,** N2 Biomedical (USA)

3:40 pm: **Copper-based micro-channel cooler reliably operated using solutions of distilled-water and ethanol as a coolant**, Aland Chin, Somerville Laser Technology, LLC (USA); Alan Nelson, Richard H. Chin, Science Research Lab., Inc. (USA); Rick K. Bertaska, New England Analytical, LLC (USA); Jonah H. Jacob, Science Research Lab., Inc. (USA) . . . . . [9348-34]

4:00 pm: **Beam vignetting effect in micro-optic collimation and transmission for high power diode laser arrays**, Martin Forrer, Hansruedi Moser, Dzelal Kura, Hans Forrer, FISBA OPTIK AG (Switzerland) . . . . . [9346-1]

4:20 pm: **Coupling of a high-power tapered diode laser beam into a single-mode-fiber within a compact module**, Daniel Jedrzejczyk, Alexander Sahm, Ferdinand-Braun-Institut (Germany); Christian Carstens, Gerald A. Urban, C2GO inprocess solutions GmbH (Germany); Markus Pulka, FCC FibreCableConnect GmbH (Germany); Bernd Eppich, Ferdinand-Braun-Institut (Germany); Friedemann Scholz, Eagleyard Photonics GmbH (Germany); Katrin Paschke, Ferdinand-Braun-Institut (Germany) . . . . . [9348-35]

4:40 pm: **High-brightness power delivery for fiber laser pumping: Simulation and measurement of low-NA fiber guiding**, Dan Yanson, Moshe Levi, Ophir Peleg, Noam Rappaport, Moshe Shamay, Yuri Berk, Nir Dahan, Genadi Klumel, Ilya Baskin, SCD SemiConductor Devices (Israel) . . . . . [9346-2]

5:00 pm: **Maximizing coupling-efficiency of high-power diode lasers utilizing hybrid assembly technology**, Daniel Zontar, Fraunhofer-Institut für Produktionstechnologie (Germany); Mehmet Dogan, Stephen F. Fulghum, Science Research Lab., Inc. (USA); Tobias Müller, Sebastian Haag, Fraunhofer-Institut für Produktionstechnologie (Germany); Christian Brecher, RWTH Aachen (Germany); Jonah H. Jacob, Science Research Lab., Inc. (USA) . . . . . [9348-36]

5:20 pm: **High power diode laser stack development using gold-tin bonding technology**, Dong Hou, Jingwei Wang, Xi'an Focuslight Technologies Co., Ltd. (China); Pu Zhang, Xi'an Institute of Optics and Precision Mechanics (China); Ye Dai, Yingjie Li, Xingsheng Liu, Xi'an Focuslight Technologies Co., Ltd. (China) . . . . . [9346-3]

Tuesday 10 February

POSTERS-TUESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) ..... TUE 6:00 TO 8:00 PM

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Assessment of high-power kW-class single-diode bars for use in highly efficient pulsed solid-state laser systems, Alina Pranovich, Jan Pilar, Institute of Physics of the ASCR, v.v.i. (Czech Republic) and Czech Technical Univ. in Prague (Czech Republic); Antonio Lucianetti, Martin Divoky, Tomas Mocek, Institute of Physics of the ASCR, v.v.i. (Czech Republic); Klaus G. Ertel, Rutherford Appleton Lab. (United Kingdom); Helena Jelinkova, Czech Technical Univ. in Prague (Czech Republic); Paul Crump, Carlo F. Frevert, Ralf Staske, Götz Erbert, Guenther Tränkle, Ferdinand-Braun-Institut (Germany) . . . [9348-16]

In-volume heating using high-power laser diodes, Valentin Denisenkov, Vadim V. Kiyko, A. M. Prokhorov General Physics Institute (Russian Federation) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Gleb V. Vdovin, Technische Univ. Delft (Netherlands) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation). . . . . [9348-37]

Tapered laser diode with linearly effective-refractive-index variational waveguide, Duchang Heo, Korea Electrotechnology Research Institute (Korea, Republic of); Yun-Seok Kwak, Tae-kyung Kim, QSI Co., Ltd. (Korea, Republic of); Young-Wook Choi, Korea Electrotechnology Research Institute (Korea, Republic of) . . . . . [9348-38]

CONFERENCE 9349
LOCATION: ROOM 238 (MEZZANINE)

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COSPONSOR: COHERENT

Vertical External Cavity Surface Emitting Lasers (VECSELs) V

Conference Chair: **Mircea Guina,** Tampere Univ. of Technology (Finland)

Program Committee: **Juan L. Chilla,** Coherent, Inc. (USA); **Arnaud Garnache,** Univ. Montpellier 2 (France); **Jennifer E. Hastie,** Univ. of Strathclyde (United Kingdom); **Elyahou Kapon,** Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Ursula Keller,** ETH Zürich (Switzerland); **Jerome V. Moloney,** College of Optical Sciences, The Univ. of Arizona (USA); **Anne C. Tropper,** Univ. of Southampton (United Kingdom); **Keith G. Wilcox,** Univ. of Dundee (United Kingdom)

Monday 9 February

SESSION 1

LOCATION: ROOM 238 (MEZZANINE) . . . . . MON 8:00 AM TO 10:20 AM

Fundamental Physics and New Concepts

Session Chair: **Juan L. Chilla,** Coherent, Inc. (USA)

8:00 am: **Ultrafast non-equilibrium carrier dynamics in semiconductor laser mode-locking** *(Invited Paper)*, Jerome V. Moloney, Isak Kilen, Joerg Hader, College of Optical Sciences, The Univ. of Arizona (USA); Stephan W. Koch, Philipps-Univ. Marburg (Germany) . . . . . [9349-1]

8:30 am: **Influence of non-equilibrium carrier dynamics on pulse amplification in semiconductor gain media**, Christoph N. Boettge, Joerg Hader, Isak Kilen, College of Optical Sciences, The Univ. of Arizona (USA); Stephan W. Koch, College of Optical Sciences, The Univ. of Arizona (USA) and Philipps-Univ. Marburg (Germany); Jerome V. Moloney, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9349-2]

8:50 am: **Pumping of VECSELs using high quantum defect and broadband sources** *(Invited Paper)*, Adrian H. Quarterman, Univ. of Dundee (United Kingdom) . . . . . [9349-3]

9:20 am: **DBR-free optically pumped semiconductor disk lasers** *(Invited Paper)*, Zhou Yang, Alexander R. Albrecht, The Univ. of New Mexico (USA); Jeffrey G. Cederberg, Sandia National Labs. (USA); Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) . . . . . [9349-4]

9:50 am: **Recent advances in the field of vertical-external-cavity surface-emitting lasers** *(Invited Paper)*, Arash Rahimi-Iman, Mahmoud Gaafar, Dalia Al Nakdali, Christoph Möller, Fan Zhang, Matthias Wichmann, Mohammad K. Shakfa, Philipps-Univ. Marburg (Germany); Ksenia A. Fedorova, Aston Univ. (United Kingdom); Wolfgang Stolz, Philipps-Univ. Marburg (Germany) and NAsP III/V GmbH (Germany); Edik U. Rafailov, Aston Univ. (United Kingdom); Martin Koch, Philipps-Univ. Marburg (Germany) . . . . . [9349-5]

Coffee Break . . . . . Mon 10:20 am to 10:40 am

SESSION 2

LOCATION: ROOM 238 (MEZZANINE) . . . . . MON 10:40 AM TO 12:30 PM

Power Scaling

Session Chair: **Jerome V. Moloney,**
College of Optical Sciences, The Univ. of Arizona (USA)

10:40 am: **Recent progress in wafer-fused VECSELs emitting in the 1310nm waveband** *(Invited Paper)*, Alexei Sirbu, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Antti J. Rantamaki, Tampere Univ. of Technology (Finland); Vladimir Iakovlev, Alexandru Mereuta, Andrei Caliman, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Jari Lyytikäinen, Oleg G. Okhotnikov, Tampere Univ. of Technology (Finland); Elyahou Kapon, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9349-6]

11:10 am: **Towards high power flip-chip long-wavelength semiconductor disk lasers** *(Invited Paper)*, Antti J. Rantamaki, Jari Lyytikäinen, Esa J. Saarinen, Juha M. Kontio, Juuso Heikkinen, Kimmo Lahtonen, Mika Valden, Oleg G. Okhotnikov, Tampere Univ. of Technology (Finland) . . . . . [9349-7]

11:40 am: **>8W GaInNAs VECSEL emitting at 615 nm**, Tomi Leinonen, Jussi-Pekka Penttinen, Ville-Markus Korpijärvi, Emmi L. Kantola, Mircea Guina, Tampere Univ. of Technology (Finland). . . . . [9349-8]

12:00 pm: **20W continuous wave output power from an GaSb-based VECSEL at 2µm emission wavelength** *(Invited Paper)*, Marcel Rattunde, Peter B. Holl, Sebastian Kaspar, Steffen Adler, Andreas Bächle, Rolf Aidam, Wolfgang Bronner, Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) . . . . . [9349-9]

Lunch Break . . . . . Mon 12:30 pm to 2:00 pm

SESSION 3

LOCATION: ROOM 238 (MEZZANINE) . . . . . MON 2:00 PM TO 3:30 PM

Wavelength Extension

Session Chair: **Anne C. Tropper,**
Univ. of Southampton (United Kingdom)

2:00 pm: **Direct blue laser emission from InGaN-based VECSEL** *(Invited Paper)*, Thomas Wunderer, Palo Alto Research Center, Inc. (USA) . . . . . [9349-10]

2:30 pm: **Degradation studies and pump optimization of optically pumped red emitting AlGaInP-VECSELs**, Hermann Kahle, Maren Jäger, Stefan Baumgärtner, Fabian Sauter, Caroline Weinspach, Roman Bek, Thomas Schwarzbäck, Michael Jetter, Peter Michler, Univ. Stuttgart (Germany) [9349-11]

2:50 pm: **Monolithic GaInNAsSb/GaAs VECSEL emitting at 1550 nm**, Ville-Markus Korpijärvi, Emmi L. Kantola, Tomi Leinonen, Mircea Guina, Tampere Univ. of Technology (Finland) . . . . . [9349-12]

3:10 pm: **Power and wavelength scaling using semiconductor disk laser-bismuth fiber MOPA systems**, Juuso Heikkinen, Regina Gumenyuk, Antti J. Rantamaki, Jari Lyytikäinen, Tomi Leinonen, Tampere Univ. of Technology (Finland); Igor O. Zolotovskii, Ulyanovsk State Univ. (Russian Federation); Mikhail A. Melkumov, Eugeny M. Dianov, Fiber Optics Research Ctr. (Russian Federation); Oleg G. Okhotnikov, Tampere Univ. of Technology (Finland). . . . . [9349-13]

Coffee Break . . . . . Mon 3:30 pm to 4:00 pm

SESSION 4

LOCATION: ROOM 238 (MEZZANINE) . . . . . MON 4:00 PM TO 5:30 PM

Mode-Locking

Session Chair: **Keith G. Wilcox,** Univ. of Dundee (United Kingdom)

4:00 pm: **Carrier-envelope-offset frequency detection of an ultrafast VECSEL** *(Invited Paper)*, Mario Mangold, Christian A. Zaugg, Alexander Klenner, Aline S. Mayer, Sandro M. Link, Florian M. Emaury, Matthias Golling, Emilio Gini, ETH Zürich (Switzerland); Clara J. Saraceno, ETH Zürich (Switzerland) and Univ. de Neuchâtel (Switzerland); Bauke W. Tilma, Ursula Keller, ETH Zürich (Switzerland) . . . . . [9349-14]

4:30 pm: **Quantum dot based mode-locked AlGaInP-VECSEL**, Roman Bek, Grizelda Kersteen, Hermann Kahle, Thomas Schwarzbäck, Michael Jetter, Peter Michler, Univ. Stuttgart (Germany) . . . . . [9349-15]

4:50 pm: **Ultrafast in-situ probing of passively mode-locked VECSEL dynamics**, Maik Scheller, Caleb W. Baker, College of Optical Sciences, The Univ. of Arizona (USA); Stephan W. Koch, Philipps-Univ. Marburg (Germany); R. Jason Jones, Jerome V. Moloney, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9349-16]

5:10 pm: **Spectrally resolved pulse evolution in a mode-locked VECSEL from lasing onset measurements**, Andrew P. Turnbull, Christopher R. Head, Edward A. Shaw, Theo Chen-Sverre, Anne C. Tropper, Univ. of Southampton (United Kingdom). . . . . [9349-17]

Tuesday 10 February

SESSION 5

LOCATION: ROOM 238 (MEZZANINE) . . . . . TUE 8:00 AM TO 10:20 AM

Industry Developments

Session Chair: **Ursula Keller,** ETH Zürich (Switzerland)

8:00 am: **Development of next generation OPS laser products** *(Invited Paper)*, Juan L. Chilla, Coherent, Inc. (USA) . . . . . [9349-18]

8:30 am: **Development and commercialization of mode-locked VECSELs** *(Invited Paper)*, Nils Hempler, Craig J. Hamilton, Gareth T. Maker, Graeme P. A. Malcolm, M Squared Lasers Ltd. (United Kingdom). . . . . [9349-19]

9:00 am: **Latest achievements of NECSEL visible extended cavity surface emitting lasers** *(Invited Paper)*, Gregory T. Niven, Simon J. Field, Michael J. Finander, Necsel (USA) . . . . . [9349-20]

9:30 am: **20.3% wall-plug efficiency green laser based on an electrically pumped VECSEL through intracavity second harmonic generation**, Pu Zhao, Bing Xu, Robert Van Leeuwen, Tong Chen, Laurence S. Watkins, Delai Zhou, Jean-Francois Seurin, Peng Gao, Guoyang Xu, Qing Wang, Chuni Ghosh, Princeton Optronics, Inc. (USA) . . . . . [9349-21]

9:50 am: **Simultaneous power and beam-shape optimization of an OPSL resonator** *(Invited Paper)*, Sebastian Haag, Sebastian Sauer, Fraunhofer-Institut für Produktionstechnologie (Germany); Torsten Garlich, Wolf R. Seelert, Coherent Lubeck GmbH (Germany); Christian Brecher, Tobias Müller, Daniel Zontar, Fraunhofer-Institut für Produktionstechnologie (Germany) . . . . [9349-22]

Coffee Break . . . . . Tue 10:20 am to 10:40 am

SESSION 6

LOCATION: ROOM 238 (MEZZANINE) . . . . . .TUE 10:40 AM TO 12:20 PM

Applications/Multifrequency

Session Chair: **Jennifer E. Hastie,**
Univ. of Strathclyde (United Kingdom)

10:40 am: **Time-gated detection and VECSELs: A grand unison towards the wide dissemination of STED microscopy** *(Invited Paper)*, Ivàn Coto Hernàndez, Marco Castello, Paolo Bianchini, Alberto Diaspro, Giuseppe Vicidomini, Istituto Italiano di Tecnologia (Italy) . . . . . [9349-23]

11:10 am: **Optically pumped semiconductor lasers for atomic and molecular physics** *(Invited Paper)*, Shaun C. Burd, Dietrich Leibfried, Andrew C. Wilson, David J. Wineland, National Institute of Standards and Technology (USA) . . . . . [9349-24]

11:40 am: **Dual-comb MIXSEL**, Sandro M. Link, Christian A. Zaugg, Alexander Klenner, Mario Mangold, Matthias Golling, Bauke W. Tilma, Ursula Keller, ETH Zürich (Switzerland). . . . . [9349-25]

12:00 pm: **Coherent spectral broadening and compression of the output of a mode-locked VECSEL**, Edward A. Shaw, Univ. of Southampton (United Kingdom); Adrian H. Quarterman, Univ. of Dundee (United Kingdom); Lucy E. Hooper, Peter J. Mosley, Univ. of Bath (United Kingdom); Keith G. Wilcox, Univ. of Dundee (United Kingdom). . . . . [9349-26]

BEST STUDENT PRESENTATION AWARD AND CLOSING REMARKS

LOCATION: ROOM 238 (MEZZANINE) . . . . . 12:20 PM TO 12:30 PM

Mircea Guina, Tampere Univ. of Technology (Finland)

POSTERS-TUESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . TUE 6:00 TO 8:00 PM

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Evaluation of the noise properties of a dual-frequency VECSEL for compact Cs atomic clocks, Paul Dumont, Lab. Charles Fabry (France) and LNE-SYRTE, CNRS, Observatoire de Paris (France); Gaëlle Lucas-Leclin, Patrick Georges, Lab. Charles Fabry (France); Jean-Marie Danet, David Holleville, Stéphane Guerandel, LNE-SYRTE, CNRS, Observatoire de Paris (France); Ghaya Baili, Grégoire Pillet, Loïc Morvan, Daniel Dolfi, Thales Research & Technology (France); Iryna Gozhyk, Lab. de Photonique et de Nanostructures (France) and Lab. Charles Fabry (France); Grégoire Beaudoin, Isabelle Sagnes, Lab. de Photonique et de Nanostructures (France) . . . . . [9349-27]

Optimisation of fundamental transverse mode output in electrically pumped vertical external cavity surface emitting lasers, Xiao Jin, Pavlo Ivanov, David T. Childs, Nasser Babazadeh, Jonathan R. Orchard, Ben J. Stevens, Richard A. Hogg, The Univ. of Sheffield (United Kingdom) . . . . . [9349-28]

1180nm VECSEL with 40 W output power, Emmi L. Kantola, Tomi Leinonen, Sanna Ranta, Miki Tavast, Jussi-Pekka Penttinen, Mircea Guina, Tampere Univ. of Technology (Finland) . . . . . [9349-29]

Super resolution photophysics probed by VECSEL and DPSS lasers, Angus J. Bain, Richard J. Marsh, Siân Culley, Univ. College London (United Kingdom); Emmi L. Kantola, Mircea Guina, Tampere Univ. of Technology (Finland) . . . . . [9349-30]

CONFERENCE 9350
LOCATION: ROOM 133 (EXHIBIT LEVEL)

Monday–Thursday 9–12 February 2015 • Proceedings of SPIE Vol. 9350

COSPONSORS:

OKAMOTO optics

Plymouth Grating Laboratory

Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XX

Conference Chairs: **Stephan Roth,** BLZ Bayerisches Laserzentrum GmbH (Germany); **Yoshiki Nakata,** Osaka Univ. (Japan); **Beat Neuenschwander,** Berner Fachhochschule Technik und Informatik (Switzerland); **Xianfan Xu,** Purdue Univ. (USA)

Program Committee: **Craig B. Arnold,** Princeton Univ. (USA); **J. Thomas Dickinson,** Washington State Univ. (USA); **Jan J. Dubowski,** Univ. de Sherbrooke (Canada); **Bo Gu,** Bos Photonics (USA); **Sami T. Hendow,** Adaptive Laser Processing (USA); **Guido Hennig,** Daetwyler Graphics AG (Switzerland); **Henry Helvajian,** The Aerospace Corp. (USA); **Michel Meunier,** Ecole Polytechnique de Montréal (Canada); **Hiroyuki Niino,** National Institute of Advanced Industrial Science and Technology (Japan); **Alberto Piqué,** U.S. Naval Research Lab. (USA); **Gediminas Raciukaitis,** Ctr. for Physical Sciences and Technology (Lithuania); **Andrei V. Rode,** The Australian National Univ. (Australia); **Klaus Sokolowski-Tinten,** Univ. Duisburg-Essen (Germany); **Razvan Stoian,** Lab. Hubert Curien (France); **Koji Sugioka,** RIKEN (Japan)

Monday 9 February

SESSION 1

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . .MON 8:30 AM TO 10:20 AM

Pulsed Laser Deposition and Synthesis of Nano-scale Structures

Joint Session with Conferences 9350 and 9352

Session Chairs: **Andrei V. Kabashin,** Lasers, Plasmas et Procédés Photoniques (France); **Richard F. Haglund Jr.,** Vanderbilt Univ. (USA)

8:30 am: **Pulsed laser deposition of calcium barium niobate thin films for electro-optical devices** *(Invited Paper)*, Mohamed Chaker, Nadir Hossain, Institut National de la Recherche Scientifique (Canada) . . . . . [9352-18]

9:00 am: **Controlled growth of 2D metal chalcogenides from pulsed laser deposited nanoparticles**, Masoud Mahjouri-Samani, Ryan Gresback, Oak Ridge National Lab. (USA); Mengkun Tian, The Univ. of Tennessee (USA); Kai Wang, Abledaziz Boulesbaa, Alexander A. Puretzky, Christopher M. Rouleau, Gyula Eres, Ilia N. Ivanov, Kai Xiao, Michael A. McGuire, Oak Ridge National Lab. (USA); Gerd J. Duscher, The Univ. of Tennessee (USA); David B. Geohegan, Oak Ridge National Lab. (USA). . . . . [9352-19]

9:20 am: **Growth of nanostructures and mesoscale architectures by pulsed laser synthesis, deposition, and integration of ultrasmall nanoparticle "building blocks"**, David B. Geohegan, Masoud Mahjouri-Samani, Kai Wang, Alexander A. Puretzky, Christopher M. Rouleau, Oak Ridge National Lab. (USA); Mengkun Tian, Gerd J. Duscher, The Univ. of Tennessee (USA); Mina Yoon, Gyula Eres, Miaofang Chi, Oak Ridge National Lab. (USA) . . . . . [9352-20]

9:40 am: **Study on generation process of nanofibers from back surface of thin glass substrate using pulsed UV 355nm laser**, Sho Itoh, Nippon Electric Glass Co., Ltd. (Japan); Masaaki Sakakura, Yasuhiko Shimotsuma, Kiyotaka Miura, Kyoto Univ. Graduate School of Engineering (Japan) . . . . . [9352-21]

10:00 am: **Rapid fabrication of graphene on dielectric substrates via solid-phase processes**, Wei Xiong, Yunshen Zhou, Wenjia Hou, Yongfeng Lu, Univ. of Nebraska-Lincoln (USA) . . . . . [9352-22]

Coffee Break . . . . . Mon 10:20 am to 10:50 am

SESSION 2

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . MON 10:50 AM TO 12:10 PM

Laser-induced Surface Nanostructures

Joint Session with Conferences 9350 and 9352

Session Chairs: **Yoshiki Nakata,** Osaka Univ. (Japan); **Xianfan Xu,** Purdue Univ. (USA)

10:50 am: **Fabrication of periodic metal nanowire grating and dotted structures on silica substrate by femtosecond laser irradiation**, Yasutaka Nakajima, Mitsuhiro Terakawa, Keio Univ. (Japan) . . . . . [9350-1]

11:10 am: **Direct laser beam interference patterning technique for fast high aspect ratio surface structuring**, Bogdan Voisiat, Simonas Indrisiunas, Airidas Zukauskas, Gediminas Raciukaitis, Ctr. for Physical Sciences and Technology (Lithuania) . . . . . [9350-2]

11:30 am: **F_2 laser induced micro/nanostructuring and surface modification of iron thin film**, Masayuki Okoshi, National Defense Academy (Japan) and Kanto Gakuin Univ. (Japan). . . . . [9350-3]

11:50 am: **Femtosecond laser induced extraordinary relief surface microstructures on thin Cr films**, Jianxiong Zhou, Institute of Modern Optics (China); Jianjun Yang, Nankai Univ. (China); Bo Zhao, Institute of Modern Optics (China) and Nankai Univ. (China); Xianfan Xu, Purdue Univ. (USA). . . . . [9350-4]

Lunch Break . . . . . .Mon 12:10 pm to 1:40 pm

SESSION 3

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . . MON 1:40 PM TO 3:20 PM

Laser Nanoscale Materials Processing

Session Chair: **Gediminas Račiukaitis,**
Ctr. for Physical Sciences and Technology (Lithuania)

1:40 pm: **Optical vortices pioneer chiral nano-structures** *(Invited Paper)*, Takashige Omatsu, Chiba Univ. (Japan) . . . . . [9350-5]

2:10 pm: **Material properties and applications of blended organic thin films with nanoscale domains deposited by RIR-MAPLE** *(Invited Paper)*, Adrienne Stiff-Roberts, Ryan D. McCormick, Wangyao Ge, Duke Univ. (USA) . . . . . [9350-6]

2:40 pm: **Quantifying forces of levitated graphite particles in air with a diverging hollow Bessel beam**, Niko O. Eckerskorn, Avinash Upadhya, Steve Lee, Andrei V. Rode, The Australian National Univ. (Australia) . . . . [9350-7]

3:00 pm: **Surface modification using shaped laser pulses as optimal control reagents**, Ali O. Er, Western Kentucky Univ. (USA) and Princeton Univ. (USA) . . . . . [9350-8]

Coffee Break . . . . . .Mon 3:20 pm to 3:50 pm

SESSION 4

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . . MON 3:50 PM TO 5:10 PM

Laser Direct Write

Session Chair: **Stephan Roth,**
BLZ Bayerisches Laserzentrum GmbH (Germany)

3:50 pm: **3D micro-printing of optical temperature probes**, Andreas Wickberg, Jonathan B. Mueller, Karlsruher Institut für Technologie (Germany); Yatin J. Mange, Thomas Nann, Univ. of South Australia (Australia); Martin Wegener, Karlsruher Institut für Technologie (Germany) . . . . . [9350-9]

4:10 pm: **Trans-wafer removal of metallization using a nanosecond Tm:fiber laser**, Ilya Mingareev, Sascha Berger, Thomas Tetz, Ali Abdulfattah, Alex M. Sincore, Lawrence Shah, Martin C. Richardson, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9350-10]

4:30 pm: **Bragg grating fabrication in microfiber by femtosecond pulse filamentation induced periodic refractive index modification**, Farid Ahmed, Martin B. G. Jun, Univ. of Victoria (Canada) . . . . . [9350-11]

4:50 pm: **Augmentation of degree of conversion in resins via Thiol-ene chemistry in microstructures fabricated by two-photon polymerization**, Lijia Jiang, Yunshen Zhou, Wei Xiong, Univ. of Nebraska-Lincoln (USA); Tommaso Baldacchini, Newport Corp. (USA); Yongfeng Lu, Univ. of Nebraska-Lincoln (USA) . . . . . [9350-12]

Tuesday 10 February

SESSION 5

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . . TUE 8:00 AM TO 10:00 AM

Laser Micromachining in Bulk and Thin Film Materials

Joint Session with Conferences 9350 and 9355

Session Chair: **Bo Gu,** Bos Photonics (USA)

8:00 am: **Optimization of laser process conditions for cutting of thin metal and polymer sheets with femtosecond laser**, Klaus Stolberg, Susanna Friedel, Nikolas von Freyhold, Markus Röhner, JENOPTIK Laser GmbH (Germany) . . . . . [9355-37]

8:20 am: **Conditions for the formation of individual and periodic holes during Si ablation with ultrashort pulsed lasers**, Matthias Domke, Fachhochschule Vorarlberg (Austria) . . . . . [9355-38]

8:40 am: **Erasure and formation of femtosecond laser-induced nanostructures**, Felix Zimmermann, Friedrich-Schiller-Univ. Jena (Germany); Anton Plech, Karlsruher Institut für Technologie (Germany); Andreas Tünnermann, Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) . . . . . [9355-39]

9:00 am: **Quantized structuring of transparent films with femtosecond laser interference**, Stephen Ho, Kenneth K. C. Lee, Jianzhao Li, Peter R. Herman, Univ. of Toronto (Canada) . . . . . [9350-13]

9:20 am: **Adaptive optics for the laser fabrication of 3D graphitic microwires in diamond**, Patrick S. Salter, Bangshan Sun, Martin J. Booth, Univ. of Oxford (United Kingdom). . . . . [9355-40]

9:40 am: **Transient imaging with gated avalanche photodiodes**, Mauro Buttafava, Alberto Tosi, Politecnico di Milano (Italy); Kevin W. Eliceiri, Andreas Velten, Univ. of Wisconsin-Madison (USA) . . . . . [9355-41]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 6

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . . TUE 10:30 AM TO 12:10 PM

Laser Micromachining of Glass

Joint Session with Conferences 9350 and 9355

Session Chair: **Sami T. Hendow,** Adaptive Laser Processing (USA)

10:30 am: **Ship-in-a-bottle integration by hybrid femtosecond laser technology for fabrication of true 3D biochips**, Felix Sima, Dong Wu, Jian Xu, Katsumi Midorikawa, Koji Sugioka, RIKEN (Japan). . . . . [9350-14]

10:50 am: **Spatial and temporal temperature distribution of ultrashort pulse induced heat accumulation in glass**, Sören Richter, Friedrich-Schiller-Univ. Jena (Germany); Fumiya Hashimoto, Osaka Univ. (Japan); Yasuyuki Ozeki, Osaka Univ. (Japan) and Univ. of Tokyo (Japan); Kazuyoshi Itoh, Osaka Univ. (Japan); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9355-42]

11:10 am: **Formation of nanogratings in a porous glass immersed in water by femtosecond laser irradiation**, Yang Liao, Shanghai Institute of Optics and Fine Mechanics (China); Jielei Ni, SIOM (China); Lingling Qiao, SIOM (China) and SIOM (China); Min Huang, Sun Yat-Sen University (China); Yves Bellouard, Eindhoven University of Technology (Netherlands); Koji Sugioka, RIKEN (Japan); Ya Cheng, Shanghai Institute of Optics and Fine Mechanics (China). . . [9350-15]

11:30 am: **Laser induced structural modifications in fused silica within the microexplosion regime evidenced by Raman spectroscopy**, Nadezda Varkentina, Univ. Bordeaux 1 (France); Arnaud Royon, Univ. of Bordeaux 1 (France); Marc Dussauze, Univ. Bordeaux 1 (France); Yannick Petit, Univ. of Bordeaux 1 (France); Lionel Canioni, Univ. Bordeaux 1 (France) . . . . . [9350-16]

11:50 am: **Adaptable acylindrical optofluidic lenses fabricated by femtosecond laser micromachining**, Petra Paiè, Politecnico di Milano (Italy); Francesca Bragheri, Istituto di Fotonica e Nanotecnologie, CNR (Italy); Theo Claude, Ecole Normale Supérieure de Lyon (France); Roberto Osellame, Istituto di Fotonica e Nanotecnologie, CNR (Italy) . . . . . [9355-43]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 1:10 pm

SESSION 7

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . . TUE 1:30 PM TO 3:30 PM

Processes Compatible for LIFT and Additive Manufacturing I

Joint Session with Conferences 9350 and 9353

Session Chairs: **Stephan Roth,** BLZ Bayerisches Laserzentrum GmbH (Germany); **Henry Helvajian,** The Aerospace Corp. (USA)

1:30 pm: **High-resolution printing of functional microdots by double-pulse laser-induced forward transfer** *(Invited Paper)*, Aiko Narazaki, Ryozo Kurosaki, Tadatake Sato, Hiroyuki Niino, National Institute of Advanced Industrial Science and Technology (Japan) . . . . . [9350-17]

2:00 pm: **2D/3D laser cutting of carbon fiber reinforced plastic (CFRP) by fiber laser irradiation**, Hiroyuki Niino, Yoshihisa Harada, National Institute of Advanced Industrial Science and Technology (Japan) and Advanced Laser and Process Technology Research Association (Japan); Kenji Anzai, Mitsuaki Aoyama, Miyachi Corp. (Japan) and Advanced Laser and Process Technology Research Association (Japan); Masafumi Matsushita, Koichi Furukawa, Shin Nippon Koki Co. Ltd. (Japan) and Advanced Laser and Process Technology Research Association (Japan); Michiteru Nishino, Mitsubishi Chemical Corp. (Japan) and Advanced Laser and Process Technology Research Association (Japan); Akira Fujisaki, Taizo Miyato, Takashi Kayahara, Furukawa Electric Co., Ltd. (Japan) and Advanced Laser and Process Technology Research Association (Japan) . . . . . [9353-1]

2:20 pm: **Advances and future directions in laser-induced forward transfer (LIFT)**, Alberto Piqué, Heungsoo Kim, Nicholas A. Charipar, Raymond C. Y. Auyeung, Kristin M. Charipar, Scott A. Mathews, U.S. Naval Research Lab. (USA) . . . . . [9350-18]

2:40 pm: **Additive manufacturing in production: Challenges and opportunities** *(Invited Paper)*, Michael Schmidt, BLZ Bayerisches Laserzentrum GmbH (Germany). . . . . [9353-2]

3:10 pm: **All-printed reduced graphene oxide gas sensors**, Symeon Papazoglou, Marina Makrygianni, National Technical Univ. of Athens (Greece); Myrto K. Filippidou, Stavros Chatzandroulis, National Ctr. for Scientific Research Demokritos (Greece); Ioanna Zergioti, National Technical Univ. of Athens (Greece). . . . . [9350-19]

Coffee Break . . . . . Tue 3:30 pm to 4:00 pm

LASE

CONFERENCE 9350
LOCATION: ROOM 133 (EXHIBIT LEVEL)

SESSION 8
LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . . TUE 4:00 PM TO 6:00 PM

Processes Compatible for LIFT and Additive Manufacturing II

Joint Session with Conferences 9350 and 9353

Session Chairs: **Beat Neuenschwander,** Berner Fachhochschule Technik und Informatik (Switzerland); **Henry Helvajian,** The Aerospace Corp. (USA)

4:00 pm: **Laser printing of nanoparticles and living cells** *(Invited Paper)*, Boris Chichkov, Laser Zentrum Hannover e.V. (Germany) . . . . . [9353-3]

4:30 pm: **Laser sintering of metal nano-ink tracks embedded into 3D structure**, Abraham Rotnemer, Orbotech Ltd. (Israel); Michael Zenou, Orbotech Ltd. (Israel) and Hebrew Univ. (Israel) and Ricah Institute of Physics (Israel); Jonathan Ankri, Zvi Kotler, Orbotech Ltd. (Israel) . . . . . [9353-4]

4:50 pm: **Laser-assisted conductive silver ink printing with inkjet and laser-induced forward transfer techniques for organic transistor fabrication**, Dimitris Karnakis, Riccardo Geremia, Oxford Lasers Ltd. (United Kingdom); Lee Winchester, Simon Ogier, Ctr. for Process Innovation Ltd. (United Kingdom); Roger Artigas, Sensofar-Tech, S.L. (Spain); C. Florian, F. Caballero-Lucas, Juan Marcos Fernández-Pradas, Pere Serra Coromina, Univ. de Barcelona (Spain) . . . . . [9350-20]

5:10 pm: **Laser-assisted transfer and bonding for MEMS and microelectronics** *(Invited Paper)*, Andrew S. Holmes, Imperial College London (United Kingdom). . . . . [9350-21]

5:40 pm: **Monolithic hybrid optics for broadband focusing and beam shaping**, Ulrike Fuchs, asphericon GmbH (Germany) . . . . . [9353-5]

POSTERS-TUESDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . TUE 6:00 TO 8:00 PM

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Mobile laser lithography station for microscopic two-photon polymerization, Frank Leinenbach, Hans G. Breunig, Karsten König, Univ. des Saarlandes (Germany). . . . . [9350-43]

Effect of different properties of $Cu(in1-_xGa_x)Se_2$ thin films synthesized by femtosecond and nanosecond pulsed laser deposition, Mu-Gong Tsai, Chia-Chuan Chen, You-jyun Chen, In-Gann Chen, Xiaoding Qi, Jung-Chun C. A. Huang, National Cheng Kung Univ. (Taiwan); Cen-Ying Lin, Chung-Wei Cheng, Industrial Technology Research Institute (Taiwan) . . . . . [9350-46]

The effect of femtosecond laser processing conditions on the properties of a polarization imaging filter inside a silica glass, Yuya Yamada, Hitachi Zosen Corp. (Japan); Takafumi Ohfuchi, Naoaki Fukuda, Masaaki Sakakura, Yasuhiko Shimotsuma, Kiyotaka Miura, Kyoto Univ. (Japan); Toshio Takiya, Hitachi Zosen Corp. (Japan) . . . . . [9350-47]

Laser micromachining of transparent glass and quartz dielectrics using nano short pulsed Nd:YVO_4 laser harmonics, Shiva P. Gadag, Southern Methodist Univ. (USA). . . . . [9350-48]

Experimental and calculative estimation of femtosecond laser induced-impulsive force in culture medium solution with motion analysis of polymer micro-beads, Takeshi Yamakawa, Akihiro Maruyama, Hirohisa Uedan, Takanori Iino, Yoichiroh Hosokawa, Nara Institute of Science and Technology (Japan). . . . . [9350-49]

High speed laser transfer (LIFT), thin-film patterning and selective sintering of printed Ag nanoparticle inks for electronic device integration on flexible substrates, Filimon Zacharatos, National Technical Univ. of Athens (Greece); Stéphanie Leyder, Riccardo Geremia, Oxford Lasers Ltd. (United Kingdom); Daniel Puerto, E. Biver, Ludovic Rapp, Philippe Delaporte, Anne Patricia B. Alloncle, Lasers, Plasmas et Procédés Photoniques (France); Dimitris Karnakis, Oxford Lasers Ltd. (United Kingdom); Ioanna Zergioti, National Technical Univ. of Athens (Greece). . . . . [9350-50]

Glass drilling by longitudinally excited CO_2 laser with short laser pulse, Kazuyuki Uno, Takuya Yamamoto, Tetsuya Akitsu, Univ. of Yamanashi (Japan); Takahisa Jitsuno, Osaka Univ. (Japan) . . . . . [9350-51]

On the transmission of sub-wavelength annular apertures based on periodic structure, Kuan-Ming Chen, Chun-Hung Weng, Ming-Han Chung, Chih-Kung Lee, National Taiwan Univ. (Taiwan) . . . . . [9350-52]

Modelling and analysis of image degradation due to birefringence created by UV laser on optical specimen, Achyut Adhikari, Nanyang Technological Univ. (Singapore) . . . . . [9350-53]

Experimental study on early stage of LIPSS formation on SiC by using double pulses of femtosecond laser, Taira Enami, Shuhei Yada, Yasutaka Nakajima, Mitsuhiro Terakawa, Keio Univ. (Japan) . . . . . [9350-54]

Molybdenum thin film ablation on glass substrate by ultra-short laser, Pinaki Das Gupta, Gerard M. O'Connor, National Univ. of Ireland, Galway (Ireland) . . . . . [9350-55]

Controlling depth and periodicity of the hole formation at the bottom of laser-scribed trenches in silicon using fs-pulses, Matthias Domke, Bernadette Egle, Giovanni Piredda, FH Vorarlberg (Austria). . . . . [9350-56]

Fabrication of 4, 5, or 6-fold symmetric 3D photonic structures using single beam and single reflective optical element based holographic lithography, David George, Jeffrey R. Lutkenhaus, David Lowell, Usha Philipose, Hualiang Zhang, Univ. of North Texas (USA); Zsolt L. Poole, Kevin P. Chen, Univ. of Pittsburgh (USA); Yuankun Lin, Univ. of North Texas (USA). . . . . [9350-57]

Synthesis of Sb-doped ZnO microspheres by pulsed laser ablation and their photoluminescence properties, Toshinobu Tanaka, Tetsuya Shimogaki, Mitsuhiro Higashihata, Daisuke Nakamura, Tatsuo Okada, Kyushu Univ. (Japan). . . . . [9350-58]

Wednesday 11 February

LASE PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . WED 10:20 AM TO 12:30 PM

Session Chairs: **Guido Hennig**, Daetwyler Graphics AG (Switzerland); **Yongfeng Lu**, Univ. of Nebraska-Lincoln (USA)

10:20 am: **Welcome and Opening Remarks**
Guido Hennig, Daetwyler Graphics AG (Switzerland); **Yongfeng Lu,** Univ. of Nebraska-Lincoln (USA)

10:25 am: **Announcement of the Green Photonics Best Paper Award and the 3D Printing, Fabrication, and Manufacturing Best Paper Award**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA); **Henry Helvajian,** The Aerospace Corp. (USA)

10:30 am: **NASA's Optical Communications Program: 2015 and Beyond**
Donald M. Cornwell Jr., NASA Headquarters, Space Communications and Navigation Program (USA) . . [9354-201]

11:10 am: **Coherent Combination of Ultrafast Laser Pulses: A Route to Joule-Class High Repetition Rate Femtosecond Lasers**
Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9344-202]

11:50 am: **Laser 3D Printing of Metallic Components and its Industrial Applications: Technical Breakthroughs and Opportunities**
Xiaoyan Zeng, Wuhan National Lab. for Optoelectronics (China). . . . . [9353-203]

Lunch/Exhibition Break . . . . . .Wed 12:30 pm to 2:00 pm

SESSION 9

LOCATION: ROOM 133 (EXHIBIT LEVEL) .....WED 2:00 PM TO 3:30 PM

20 Years of LAMOM: Anniversary Session

Session Chairs: **Jan J. Dubowski,** Univ. de Sherbrooke (Canada); **Stephan Roth,** BLZ Bayerisches Laserzentrum GmbH (Germany)

2:00 pm: **Laser-driven surface and interface nanotechnology** *(Invited Paper)*, Jan J. Dubowski, Univ. de Sherbrooke (Canada) . . . . . [9350-22]

2:30 pm: **Advances in ultrafast laser processing in the last two decades and the future** *(Invited Paper)*, Koji Sugioka, RIKEN (Japan) . . . . . [9350-23]

3:00 pm: **Adjusting material properties locally via phase change using controlled laser processing schemes** *(Invited Paper)*, Henry Helvajian, The Aerospace Corp. (USA) . . . . . [9350-24]

Coffee Break . . . . . .Wed 3:30 pm to 4:00 pm

SESSION 10

LOCATION: ROOM 133 (EXHIBIT LEVEL) ..... WED 4:00 PM TO 5:00 PM

Processing of Photovoltaics

Session Chair: **Yoshiki Nakata,** Osaka Univ. (Japan)

4:00 pm: **Laser patterning for reel-to-reel production of organic photovoltaic (OPV) devices**, Colin J. Moorhouse, Dimitris Karnakis, Oxford Lasers Ltd. (United Kingdom); Christos Kapnopoulos, Argiris Laskarakis, S. Logothetidis, Aristotle Univ. of Thessaloniki (Greece); G. Antonopoulos, Christos Koidis, Organic Electronic Technologies (Greece) . . . . . [9350-25]

4:20 pm: **Laser "lift-off" observation of zinc oxide and copper-indium-diselenide thin-films on molybdenum initiated by sub-ns-laser pulses**, Regina Moser, Maximilian Grimm, Daniel Sailer, Heinz P. Huber, Hochschule für Angewandte Wissenschaften München (Germany) . . . . . [9350-26]

4:40 pm: **Evaluation of electrical shunt resistance in laser scribed thin-films for CIGS solar cells on flexible substrates**, Etgaras Markauskas, Paulius Gecys, Gediminas Raciukaitis, Ctr. for Physical Sciences and Technology (Lithuania) . . . . . [9350-27]

Thursday 12 February

SESSION 11

LOCATION: ROOM 133 (EXHIBIT LEVEL) ..... THU 8:10 AM TO 10:00 AM

Dynamics of Laser Ablation

Session Chair: **Gediminas Račiukaitis,** Ctr. for Physical Sciences and Technology (Lithuania)

8:10 am: **Towards an understanding of laser ablation efficiency: Comparison of pico- and femtosecond pulse durations** *(Invited Paper)*, Juergen Sotrop, Jan Winter, Heinz P. Huber, Hochschule für Angewandte Wissenschaften München (Germany) . . . . . [9350-28]

8:40 am: **Burst mode with ps- and fs-pulses: Influence on the removal rate, surface quality, and heat accumulation**, Beat Neuenschwander, Beat Jäggi, Thorsten Kramer, Berner Fachhochschule Technik und Informatik (Switzerland) . . . . . [9350-29]

9:00 am: **Experimental investigation of CFRP cutting with nano second laser under air and Ar gas ambience**, Yuji Sato, Masahiro Tsukamoto, Fumihiro Matsuoka, Shinichiro Masuno, Kenjiro Takahashi, Osaka Univ. (Japan) . . . . . [9350-30]

9:20 am: **Ultrafast pump-probe studies of the complex refractive index in metals**, Stephan Rapp, Maximilian Bung, Albert Althammer, Heinz P. Huber, Laserzentrum der Hochschule für angewandte Wissenschaften München (Germany) . . . . . [9350-31]

9:40 am: **Dynamics of ZnO nanoparticles formed in the high-pressure phase during growth of ZnO nanocrystals**, Daisuke Nakamura, Tetsuya Shimogaki, Shuhei Takao, Shihomi Nakao, Kosuke Harada, Mitsuhiro Higashihata, Tatsuo Okada, Kyushu Univ. (Japan) . . . . . [9350-32]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 12

LOCATION: ROOM 133 (EXHIBIT LEVEL) .... THU 10:30 AM TO 12:00 PM

Thin-film Processing

Session Chair: **Andrei V. Rode,** The Australian National Univ. (Australia)

10:30 am: **Femtoseconds to microseconds: Multi-scalar response during liquid spallation of metal films** *(Invited Paper)*, Steven M. Yalisove, Keegan J. Schrider, Michael J. Abere, Ben R. Torralva, Univ. of Michigan (USA) . . [9350-33]

11:00 am: **Ablation depth control on ITO thin film using a beam shaped femtosecond laser**, Hoon-Young Kim, Ji-Wook Yoon, Won-Suk Choi, Sung-Hak Cho, Korea Institute of Machinery & Materials (Korea, Republic of) and Univ. of Science & Technology (Korea, Republic of). . . . . [9350-34]

11:20 am: **The role of under-dense liquids in the ultrafast laser ablation dynamics of thin Ni films on glass: A theoretical study**, Ben R. Torralva, Keegan J. Schrider, Steven M. Yalisove, Univ. of Michigan (USA) . . . . . [9350-35]

11:40 am: **Ultrafast laser irradiation of thin films as a route to the formation of very small nanoparticles with controllable size distributions**, Keegan J. Schrider, Ben R. Torralva, Steven M. Yalisove, Univ. of Michigan (USA) . . . . . [9350-36]

Lunch/Exhibition Break . . . . . Thu 12:00 pm to 1:50 pm

SESSION 13

LOCATION: ROOM 133 (EXHIBIT LEVEL) .....THU 1:50 PM TO 3:00 PM

Ultrafast Laser Micromachining

Session Chair: **Beat Neuenschwander,** Berner Fachhochschule Technik und Informatik (Switzerland)

1:50 pm: **Efficient processing of CFRP with a picosecond laser with up to 1.4 kW average power** *(Invited Paper)*, Volkher Onuseit, Margit Wiedenmann, Christian Freitag, Jan-Philipp Negel, André Löscher, Marwan Abdou Ahmed, Rudolf Weber, Thomas Graf, Univ. Stuttgart (Germany). . . . . [9350-37]

2:20 pm: **Modification of flow of glass melt and elemental distributions by parallel irradiation with femtosecond laser pulses**, Masaaki Sakakura, Torataro Kurita, Kouhei Yoshimura, Naoaki Fukuda, Yasuhiko Shimotsuma, Kiyotaka Miura, Kyoto Univ. (Japan) . . . . . [9350-38]

2:40 pm: **Material processing with ultra-short pulse lasers working in 2µm wavelength range**, Bogdan Voisiat, Ctr. for Physical Sciences and Technology (Lithuania); Dmitry A. Gaponov, NOVAE (France); Paulius Gecys, Ctr. for Physical Sciences and Technology (Lithuania); Laure Lavoute, Manuel Silva, Nicolas Ducros, NOVAE (France); Gediminas Raciukaitis, Ctr. for Physical Sciences and Technology (Lithuania) . . . . . [9350-39]

Coffee Break . . . . . Thu 3:00 pm to 3:30 pm

SESSION 14

LOCATION: ROOM 133 (EXHIBIT LEVEL) ..... THU 3:30 PM TO 4:40 PM

Systems for High-Precision Manufacturing

Session Chair: **Stephan Roth,** BLZ Bayerisches Laserzentrum GmbH (Germany)

3:30 pm: **Machine technology for 3D microprocessing of complex curved surfaces** *(Invited Paper)*, Max Groenendijk, Lightmotif B.V. (Netherlands) . . . . . [9350-41]

4:00 pm: **Improvements in ultra-high precision surface structuring using synchronized galvo scanner a laser system in MOPA arrangement**, Markus Zimmermann, Beat Jäggi, Beat Neuenschwander, Berner Fachhochschule Technik und Informatik (Switzerland) . . . . . [9350-42]

4:20 pm: **Efficient processing of brittle industrial materials by hybrid-fiber UV laser**, James M. Bovatsek, Rajesh S. Patel, Ashwini Tamhankar, Spectra-Physics, a Newport Corp. Brand (USA). . . . . [9350-44]

STUDENT AWARD

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . . 4:40 PM TO 4:50 PM

CONFERENCE 9351
LOCATION: ROOM 125 (EXHIBIT LEVEL)

Tuesday–Thursday 10–12 February 2015 • Proceedings of SPIE Vol. 9351

Laser-based Micro- and Nanoprocessing IX

Conference Chair: **Udo Klotzbach,** Fraunhofer IWS Dresden (Germany)

Conference Co-Chairs: **Kunihiko Washio,** Paradigm Laser Research Ltd. (Japan); **Craig B. Arnold,** Princeton Univ. (USA)

Program Committee: **José A. Alvarez-Chávez,** Ctr. de Investigación e Innovación Tecnológica (Mexico); **Antonio Ancona,** CNR-Istituto di Fotonica e Nanotecnologie (Italy); **Roberto Osellame,** Politecnico di Milano (Italy); **Friedrich G. Bachmann,** FriBa LaserNet (Germany); **Francois Courvoisier,** Univ. de Franche-Comté (France); **Haiyan Zhao,** Tsinghua Univ. (China); **Duncan P. Hand,** Heriot-Watt Univ. (United Kingdom); **Miguel Holgado Bolaños,** Univ. Politécnica de Madrid (Spain); **Minghui Hong,** National Univ. of Singapore (Singapore); **Sonja M. Kittel,** Robert Bosch GmbH (Germany); **Rainer Kling,** ALPhANOV (France); **Andres F. Lasagni,** Technische Univ. Dresden (Germany); **Jyrki Latokartano,** Tampere Univ. of Technology (Finland); **Yongfeng Lu,** Univ. of Nebraska-Lincoln (USA); **Andreas E. H. Oehler,** Time-Bandwidth Products AG (Switzerland); **Yasu Osako,** Electro Scientific Industries, Inc. (USA); **Andreas Ostendorf,** Ruhr-Univ. Bochum (Germany); **Wilhelm Pfleging,** Karlsruhe Institute of Technology (Germany); **Alberto Piqué,** U.S. Naval Research Lab. (USA); **Martin Sharp,** Liverpool John Moores Univ. (United Kingdom); **Razvan Stoian,** Lab. Hubert Curien (France); **Koji Sugioka,** RIKEN (Japan); **Akira Watanabe,** Tohoku Univ. (Japan); **Michael J. Withford,** Macquarie Univ. (Australia); **Xianfan Xu,** Purdue Univ. (USA); **Haibin Zhang,** Electro Scientific Industries, Inc. (USA)

Tuesday 10 February

SESSION 1

LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . . TUE 8:10 AM TO 10:00 AM

Laser Micro-Structuring and Processing I

Session Chair: **Udo Klotzbach,** Fraunhofer IWS Dresden (Germany)

8:10 am: **Smart laser micro-welding of difficult-to-weld materials for electronic industry** *(Invited Paper)*, Yasuhiro Okamoto, Okayama Univ. (Japan); Norio Nishi, Shin-ichi Nakashiba, Tomokazu Sakagawa, KATAOKA Corp. (Japan); Akira Okada, Okayama Univ. (Japan) . . . . . [9351-1]

8:40 am: **Picosecond laser fabrication of micro cutting tool geometries on polycrystalline diamond composites using a high-numerical aperture micro scanning system**, Gregory Eberle, ETH Zürich (Switzerland); Claus A. Dold, EWAG (Switzerland); Konrad Wegener, ETH Zürich (Switzerland) . . . . . [9351-2]

9:00 am: **Experimental and modelling investigations into the laser ablation of Si, PCD, Cu, steel and WC using picosecond pulses at second harmonics**, Paul Börner, ETH Zürich (Switzerland); Germana Zandonadi, ETH Zürich (Switzerland) and Univ. Federal de Santa Catarina (Brazil); Gregory Eberle, Konrad Wegener, ETH Zürich (Switzerland) . . . . . [9351-3]

9:20 am: **Generating embedded 3D optical functions in ultrafast laser processed bulk chalcogenide glasses for photonic applications in the mid-IR domain**, Ciro D'Amico, Lab. Hubert Curien (France); Guanghua Cheng, Xi'an Institute of Optics and Precision Mechanics (China); Cyril Mauclair, Lab. Hubert Curien (France); Johann Trolès, Laurent Calvez, Virginie Nazabal, Céline Caillaud, Univ. de Rennes 1 (France); Guillermo Martin, Brahim Arezki, Etienne P. Le Coarer, Pierre Kern, Institut de Planétologie et d'Astrophysique de Grenoble (France); Stefano Minardi, Friedrich-Schiller-Univ. Jena (Germany); Razvan Stoian, Lab. Hubert Curien (France) . . . . . [9351-4]

9:40 am: **Femtosecond fiber laser welding of PMMA**, Annalisa Volpe, Francesca Di Niso, Caterina Gaudiuso, Univ. degli Studi di Bari Aldo Moro (Italy) and Istituto di Fotonica e Nanotecnologie, CNR (Italy); Antonio Ancona, Istituto di Fotonica e Nanotecnologie, CNR (Italy); Pietro Mario Lugarà, Univ. degli Studi di Bari Aldo Moro (Italy) and Istituto di Fotonica e Nanotecnologie, CNR (Italy); Rebeca Martìnez Vàzquez, Roberto Osellame, Andrea De Rosa, Istituto di Fotonica e Nanotecnologie, CNR (Italy) . . . . . [9351-5]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 2

LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . .TUE 10:30 AM TO 12:00 PM

Laser Nano-Structuring and Processing

Session Chair: **Kunihiko Washio,**
Paradigm Laser Research Ltd. (Japan)

10:30 am: **Laser processing of carbon based nanomaterials** *(Invited Paper)*, William O'Neill, Univ. of Cambridge (United Kingdom) . . . . . [9351-7]

11:00 am: **Laser direct written silicon nanowires for field effect transistors and p-n junction diodes**, Woongsik Nam, James I. Mitchell, Xianfan Xu, Purdue Univ. (USA) . . . . . [9351-8]

11:20 am: **Two-color double-pulse experiments studying the dynamics of femtosecond laser-induced periodic surface structures (LIPSS) on metals, semiconductors, and dielectrics**, Sandra Höhm, Marcel Herzlieb, Arkadi Rosenfeld, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Jörg Krüger, Jörn Bonse, Bundesanstalt für Materialforschung und -prüfung (Germany) . . . . . [9351-9]

11:40 am: **A point defect injection and diffusion mechanism for the origin of high spatial frequency laser induced periodic surface structures**, Michael J. Abere, Ben R. Torralva, Steven M. Yalisove, Univ. of Michigan (USA) . . [9351-10]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:20 pm

SESSION 3

LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . . TUE 1:20 PM TO 3:00 PM

Laser Micro-Structuring and Processing II

Session Chair: **Michael J. Withford,** Macquarie Univ. (Australia)

1:20 pm: **High volume transfer of high viscosity silver pastes using laser direct-write processing for screen printing of c-Si cells**, Miguel Morales, Yu Chen, David Munoz-Martin, Sara Lauzurica, Carlos Molpeceres, Univ. Politécnica de Madrid (Spain) . . . . . [9351-11]

1:40 pm: **Multilayer based lab-on-chip-systems for substance testing**, Frank Sonntag, Udo Klotzbach, Volker Franke, Florian Schmieder, Stefan Grünzner, Fraunhofer IWS Dresden (Germany) . . . . . [9351-12]

2:00 pm: **Enhancing vapor generation at a liquid-solid interface using micro/nanoscale surface structures fabricated by femtosecond laser surface processing**, Troy P. Anderson, Chris Wilson, Craig A. Zuhlke, Dennis R. Alexander, Univ. of Nebraska-Lincoln (USA) . . . . . [9351-13]

2:20 pm: **Fundamental investigations of ps-laser burst-mode on common metals for an enhanced ablation process**, Nicolai Hänel, Mareike Stolze, Thomas Herrmann, Johannes A. L´huillier, Photonik-Zentrum Kaiserslautern e.V. (Germany) . . . . . [9351-14]

2:40 pm: **Vibration assisted femtosecond laser hole drilling on fine metal mask for AMOLED application**, Won-Suk Choi, Korea Institute of Machinery & Materials (Korea, Republic of) and Korea Univ. of Science and Technology (Korea, Republic of); Ji-Wook Yoon, Korea Institute of Machinery & Materials (Korea, Republic of) and Univ. of Science & Technology (Korea, Republic of); Hoon-Young Kim, Sung-Hak Cho, Korea Institute of Machinery & Materials (Korea, Republic of) and Univ. of Science & Technology (Korea, Republic of) . . . . . [9351-15]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 4

LOCATION: ROOM 125 (EXHIBIT LEVEL) ..... TUE 3:30 PM TO 6:00 PM

Direct Write Processing, Ablation, and Surface Modification I

Session Chair: **Wilhelm Pfleging,**
Karlsruher Institut für Technologie (Germany)

3:30 pm: **fs-Laser based production of 3D micro- and nano-devices in transparent substrate displays with fs lasers** *(Invited Paper)*, Yves Bellouard, Ecole Polytechnique Fédérale de Lausanne (Netherlands). . . . . [9351-16]

4:00 pm: **Dynamics of optically excited tungsten, stainless steel and bulk metallic glass for ripples formation**, Hao Zhang, Lab. Hubert Curien (France); Chen Li, Lab. Hubert Curien (France) and Xi'an Institute of Optics and Precision Mechanics (China); Jean-Philippe Colombier, Univ. Jean Monnet Saint-Etienne (France); Guanghua Cheng, Xi'an Institute of Optics and Precision Mechanics (China); Razvan Stoian, Lab. Hubert Curien (France) . . . . . [9351-17]

4:20 pm: **Process and parameter optimisation for micro structuring of 3D freeform metallic surfaces: A comparative study of shortpulse (ns) and ultrafast laser (ps, fs) ablation**, Steffen G. Scholz, Melanie Mangang, Wilhelm Pfleging, Karlsruher Institut für Technologie (Germany) . . . . . [9351-18]

4:40 pm: **Superhydrophobic metallic surfaces functionalized via femtosecond laser surface processing for long term air film retention when submerged in liquid**, Craig A. Zuhlke, Troy P. Anderson, Pengbo Li, Michael Lucis, Nick Roth, Jeffrey E. Shield, Benjamin Terry, Dennis R. Alexander, Univ. of Nebraska-Lincoln (USA) . . . . . [9351-19]

5:00 pm: **Influence of pulsed Nd^{3+}: YAG laser beam profile and wavelength on micro-scribing of copper and aluminum thin films**, Srinagalakshmi Nammi, Nilesh J. Vasa, Indian Institute of Technology Madras (India); Sanjay Gupta, Anil C. Mathur, Indian Space Research Organisation (India) . . . [9351-20]

5:20 pm: **Effects of burst mode on transparent materials processing**, Clémentine Javaux, John Lopez, ALPhANOV (France); Clemens Hönninger, Eric P. Mottay, Amplitude Systèmes (France); Rainer Kling, ALPhANOV (France) . . . . . [9351-21]

5:40 pm: **Laser processing of glass fiber reinforced thermoplastics with different wavelengths and pulse durations**, Niels Schilling, Udo Klotzbach, Fraunhofer IWS Dresden (Germany) . . . . . [9351-22]

POSTERS-TUESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) ..... TUE 6:00 TO 8:00 PM

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Extreme ultraviolet surface modification of biomaterials: A novel technique for biocompatibility control, Inam Ul Ahad, Military Univ. of Technology (Poland) and Dublin City Univ. (Ireland); Beata Butruk, Warsaw Univ. of Technology (Poland); Andrzej S. Bartnik, Henryk Fiedorowicz, Military Univ. of Technology (Poland); Dermot Brabazon, Dublin City Univ. (Ireland). . . . [9351-57]

Research on femtosecond laser processing by using patterned vector optical fields, Yongnan Li, Nankai Univ. (China) . . . . . [9351-58]

Laser micro-engineering of functionalised cyclic olefin polymers for microfluidic applications, Ronan McCann, Komal Bagga, Apryll Stalcup, Mercedes Vázquez, Dermot Brabazon, Dublin City Univ. (Ireland). . . . . [9351-59]

Generation of laser-induced periodic surfaces structures in indium-tin-oxide thin films and two-photon lithography of ma-N photoresist by sub-15 femtosecond laser microscopy for liquid crystal cell application, Madlen Klötzer, Karsten König, Martin H. Straub, Univ. des Saarlandes (Germany) . . . . . [9351-60]

Tribological performance of near- and sub-wavelength femtosecond laser-induced periodic surface structures on titanium, Jörn Bonse, Robert Koter, Manfred Hartelt, Dirk Spaltmann, Simone Pentzien, Bundesanstalt für Materialforschung und -prüfung (Germany); Sandra Höhm, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Arkadi Rosenfeld, Jörg Krüger, Bundesanstalt für Materialforschung und -prüfung (Germany) . . . . . [9351-61]

Investigation of double-pulse femtosecond laser induced breakdown spectroscopy of polymethyl methacrylate (PMMA), Mengmeng Wang, Sumei Wang, Zhitao Cao, Peng Wang, Beijing Institute of Technology (China); Cong Wang, Central South Univ. (China) . . . . . [9351-62]

High performance light trapping structures for Si-based photoelectronics fabricated by hybrid picosecond laser irradiation and chemical corrosion, Lingfei Ji, Xiaozhan Lv, Yan Wu, Zhenyuan Lin, Yijian Jiang, Beijing Univ. of Technology (China) . . . . . [9351-63]

Laser-induced controlled crystallization of heavy metal oxide glass, Juliana M. P. Almeida, Paulo Henrique D. Ferreira, Antonio C. Hernandes, Cleber R. Mendonça, Univ. de São Paulo (Brazil). . . . . [9351-64]

Electrochemical and kinetic studies of ultrafast laser structured $LiFePO_4$ electrodes, Melanie Mangang, Petronela Gotcu-Freis, Hans J. Seifert, Wilhelm Pfleging, Karlsruher Institut für Technologie (Germany) . . . . . [9351-65]

Nanosecond laser-induced nanostructuring of thin metal layers and dielectric surfaces, Pierre Lorenz, Leibniz-Institut für Oberflächenmodifizierung e.V. (Germany); Michael Klöppel, Technische Univ. Dresden (Germany); Martin Ehrhardt, Klaus-Peter Zimmer, Leibniz-Institut für Oberflächenmodifizierung e.V. (Germany); Patrick Schwaller, Berner Fachhochschule Technik und Informatik (Switzerland). . . . . [9351-66]

Structural dependence and mechanisms of LIPSS formation at a step edge due to single-pulsed femtosecond laser irradiation, Rico S. Cahyadi, Univ. of Michigan (USA); Ryan D. Murphy, Sandia National Labs. (USA); Ben R. Torralva, Univ. of Michigan (USA); David P. Adams, Sandia National Labs. (USA); Steven M. Yalisove, Univ. of Michigan (USA) . . . . . [9351-67]

Laser based microstructuring of polymer optical fibers for sensors optimization, Loukas Athanasekos, National Hellenic Research Foundation (Greece); Miltiadis Vasileiadis, Univ. of Patras (Greece); Alexandros El Sachat, National Hellenic Research Foundation (Greece) and Catalan Institute of Nanoscience and Nanotechnology (Spain); Nikolaos A. Vainos, Univ. of Patras (Greece); Christos Riziotis, National Hellenic Research Foundation (Greece) . . . . . [9351-68]

The development of enhanced flexible PET substrate using picosecond laser scribing, Min Gi Kang, Seung Sik Ham, Tae Dong Kim, Sung Yeol Kim, Yong Joong Lee, Ho Lee, Kyungpook National Univ. (Korea, Republic of) . . . . . [9351-70]

LASE

Wednesday 11 February

SESSION 5

LOCATION: ROOM 125 (EXHIBIT LEVEL) .... WED 8:00 AM TO 10:00 AM

Laser Micro-Structuring and Processing III

Session Chair: **Rainer Kling,** ALPhANOV (France)

8:00 am: **Ultrafast laser processing for mobile display** *(Invited Paper)*, Eric P. Mottay, Amplitude Systèmes (France); Jiyeon Choi, Korea Institute of Machinery & Materials (Korea, Republic of); Rainer Kling, ALPhANOV (France) . . . . . [9351-23]

8:30 am: **Dynamic optics in laser fabrication** *(Invited Paper)*, Patrick S. Salter, Martin J. Booth, Univ. of Oxford (United Kingdom) . . . . . [9351-24]

9:00 am: **Metal deep engraving with high average power femtosecond lasers**, Rainer Kling, Marc Faucon, Girolamo Mincuzzi, ALPhANOV (France); Franck Morin, Clemens Hönninger, Eric P. Mottay, Amplitude Systèmes (France) . . . . . [9351-25]

9:20 am: **Bessel filamentation in glass**, Chen Xie, FEMTO-ST (France); Vytautas Jukna, Ctr. National de la Recherche Scientifique (France) and Lab. Hubert Curien (France); Ismail Ouadghiri, FEMTO-ST (France); Carles Milián Enrique, Ctr. National de la Recherche Scientifique (France); Remo Giust, Luca Furfaro, Pierre-Ambroise Lacourt, Maxime Jacquot, Luc Froehly, FEMTO-ST (France); Razvan Stoian, Tatiana E. Itina, Lab. Hubert Curien (France); John M. Dudley, FEMTO-ST (France); Arnaud Couairon, Ctr. National de la Recherche Scientifique (France); Francois Courvoisier, FEMTO-ST (France). . . . . [9351-26]

9:40 am: **Metal mirrors with metal-dielectric HR-coating for ultrashort lasers pulses applied in scanner applications**, Mark Schuermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Christian Franke, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Sandra Müller, Stefan Risse, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Helena Kaemmer, Felix Dreisow, Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany); Ramona Eberhardt, Norbert Kaiser, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) . . . . . [9351-27]

Coffee Break . . . . . Wed 10:00 am to 10:20 am

CONFERENCE 9351
LOCATION: ROOM 125 (EXHIBIT LEVEL)

LASE PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . WED 10:20 AM TO 12:30 PM

Session Chairs: **Guido Hennig**, Daetwyler Graphics AG (Switzerland); **Yongfeng Lu**, Univ. of Nebraska-Lincoln (USA)

10:20 am: **Welcome and Opening Remarks**
Guido Hennig, Daetwyler Graphics AG (Switzerland); Yongfeng Lu, Univ. of Nebraska-Lincoln (USA)

10:25 am: **Announcement of the Green Photonics Best Paper Award and the 3D Printing, Fabrication, and Manufacturing Best Paper Award**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA); **Henry Helvajian,** The Aerospace Corp. (USA)

10:30 am: **NASA's Optical Communications Program: 2015 and Beyond**
Donald M. Cornwell Jr., NASA Headquarters, Space Communications and Navigation Program (USA) . . [9354-201]

11:10 am: **Coherent Combination of Ultrafast Laser Pulses: A Route to Joule-Class High Repetition Rate Femtosecond Lasers**
Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9344-202]

11:50 am: **Laser 3D Printing of Metallic Components and its Industrial Applications: Technical Breakthroughs and Opportunities**
Xiaoyan Zeng, Wuhan National Lab. for Optoelectronics (China). . . . . [9353-203]

Lunch/Exhibition Break . . . . . .Wed 12:30 pm to 2:00 pm

SESSION 6
LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . . WED 2:00 PM TO 3:10 PM

Direct Write Processing, Ablation, and Surface Modification II

Session Chair: **Craig B. Arnold,** Princeton Univ. (USA)

2:00 pm: **Ultrashort pulse laser processing of glass: From cutting to welding** *(Invited Paper)*, Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer Institute for Applied Optics and Precision Engineering (Germany) . . . . . [9351-28]

2:30 pm: **Design and fabrication of sub-wavelength annular apertures for femtosecond laser machining**, Kuan Yu Hsu, Yen Chun Tung, Ming-Han Chung, Chih-Kung Lee, National Taiwan Univ. (Taiwan). . . . . [9351-29]

2:50 pm: **Enhancing direct laser patterning of Si wafers by polystyrene films**, Haeyeon Yang, Anahita Haghi Zadeh, Jon J. Kellar, Jacob B. Peterson, South Dakota School of Mines and Technology (USA). . . . . [9351-30]

Coffee Break . . . . . .Wed 3:10 pm to 3:40 pm

SESSION 7
LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . . WED 3:40 PM TO 6:00 PM

Advanced 1D to 3D Additive Processes

Session Chair: **Antonio Ancona,** CNR-Istituto di Fotonica e Nanotecnologie (Italy)

3:40 pm: **Present status and future outlook of selective metallization for electronics industry by laser irradiation to metal nanoparticles** *(Invited Paper)*, Akira Watanabe, Tohoku Univ. (Japan). . . . . [9351-31]

4:10 pm: **Laser nanofabrication for functional devices** *(Invited Paper)*, Hong-Bo Sun, Jilin Univ. (China). . . . . [9351-32]

4:40 pm: **Laser forward transfer of solder paste for microelectronics fabrication**, Scott A. Mathews, Heungsoo Kim, Nicholas A. Charipar, Alberto Piqué, U.S. Naval Research Lab. (USA) . . . . . [9351-33]

5:00 pm: **Local nitrogen doping in 4H-SiC by laser irradiation in atmospheric-pressure plasma**, Ryota Kojima, Hiroshi Ikenoue, Yousuke Watanabe, Akihiro Ikeda, Daisuke Nakamura, Tanemasa Asano, Tatsuo Okada, Kyushu Univ. (Japan) . . . . . [9351-34]

5:20 pm: **Diffractive beam shaping for enhanced laser polymer welding**, Jens Rauschenberger, Daniel Vogler, Christoph Raab, Ulrich Gubler, Leister Technologies AG (Switzerland) . . . . . [9351-35]

5:40 pm: **Laser sintering of silver nano-particle inks printed on paper substrates**, Enkeleda Balliu, Henrik Andersson, Magnus Engholm, Mid Sweden Univ. (Sweden) . . . . . [9351-36]

Thursday 12 February

SESSION 8
LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . . THU 8:00 AM TO 10:20 AM

Large Area Micro/Nano Structuring, Laser Interference Patterning

Session Chair: **Andres F. Lasagni,** Fraunhofer IWS Dresden (Germany)

8:00 am: **Surface structuring of metals and non-metals for printing tools and embossing dies with an ultrafast ps-laser machining system** *(Invited Paper)*, Stephan Brüning, Schepers GmbH (Germany); Guido Hennig, Daetwyler Graphics AG (Switzerland) . . . . . [9351-37]

8:30 am: **Towards 3D laser nano patterning in polymer optical materials** *(Invited Paper)*, Patricia J. Scully, The Univ. of Manchester (United Kingdom); Walter Perrie, Univ. of Liverpool (United Kingdom). . . . . [9351-38]

9:00 am: **Direct laser interference patterning (DLIP) technique applied to the development of optical biosensors based on biophotonic sensing cells (bicells)**, Francisco J. Sanza, Univ. Politécnica de Madrid (Spain) and Bio Optical Detection (Spain); Denise Langheinrich, Jana Berger, Fraunhofer IWS Dresden (Germany); Ana L. Hernández, Univ. Politécnica de Madrid (Spain); Ines Dani, Fraunhofer IWS Dresden (Germany); Rafael Casquel del Campo, Álvaro Lavin, Univ. Politécnica de Madrid (Spain); Álvaro Otón, Univ. Politécnica de Madrid (Spain) and Bio Optical Detection (Spain); Betxu Santamaría, María-Fe Laguna, Miguel Holgado Bolaños, Univ. Politécnica de Madrid (Spain); Andres F. Lasagni, Fraunhofer IWS Dresden (Germany) . . . . . [9351-39]

9:20 am: **To use or not to use (direct laser interference patterning), that is the question**, Andres F. Lasagni, Fraunhofer IWS Dresden (Germany) and Technische Univ. Dresden (Germany). . . . . [9351-40]

9:40 am: **Fabrication of highly efficient transparent metal thin film electrodes using direct laser interference patterning**, Sebastian Eckhardt, Andres F. Lasagni, Fraunhofer IWS Dresden (Germany) and Technische Univ. Dresden (Germany) . . . . . [9351-41]

10:00 am: **Role of the surface plasma density on the formation of laser induced periodic surface structures (LIPSS) on Ti upon double fs pulse irradiation**, Laura Gemini, HiLASE Ctr. (Czech Republic); Masaki Hashida, Yasuhiro Miyasaka, Shunsuke Inoue, Kyoto Univ. (Japan); Jiri Limpouch, Czech Technical Univ. in Prague (Czech Republic); Tomas Mocek, HiLASE Ctr. (Czech Republic); Shuji Sakabe, Kyoto Univ. (Japan). . . . . [9351-42]

Coffee Break . . . . . Thu 10:20 am to 10:50 am

SESSION 9

LOCATION: ROOM 125 (EXHIBIT LEVEL) .... THU 10:50 AM TO 12:00 PM

High-Speed Laser Beam Engineering Systems for High-Power Ultra-Short Pulsed Laser

Session Chair: **Akira Watanabe,** Tohoku Univ. (Japan)

10:50 am: **Ultrafast laser processing and metrology for consumer applications** *(Invited Paper)*, Keiji Nomaru, Naoki Murazawa, DISCO Corp. (Japan). . . . . [9351-43]

11:20 am: **Nanosecond laser-induced ablation and laser-induced shockwave structuring of polymer foils down to sub-µm patterns**, Pierre Lorenz, Lukas Bayer, Martin Ehrhardt, Klaus-Peter Zimmer, Leibniz-Institut für Oberflächenmodifizierung e.V. (Germany); Lutz Engisch, Hochschule für Technik, Wirtschaft und Kultur Leipzig (Germany). . . . . [9351-44]

11:40 am: **Laser direct patterning of graphene on SiC(0001) surfaces by KrF excimer laser irradiation**, Masakazu Hattori, Kyushu Univ. (Japan); Kazuaki Furukawa, Makoto Takamura, Hiroki Hibino, NTT Basic Research Labs. (Japan); Hiroshi Ikenoue, Kyushu Univ. (Japan) . . . . . [9351-45]

Lunch/Exhibition Break . . . . . Thu 12:00 pm to 1:30 pm

SESSION 10

LOCATION: ROOM 125 (EXHIBIT LEVEL) ..... THU 1:30 PM TO 3:30 PM

Advanced Laser Structuring for Energy Storage and Conversion

Session Chair: **Yongfeng Lu,** Univ. of Nebraska-Lincoln (USA)

1:30 pm: **Laser-printed lithium-sulphur micro-electrodes for Li/S batteries** *(Invited Paper)*, Andreas Hintennach, Sarah Rosenberg, CGS (Germany) . . . . . [9351-47]

2:00 pm: **Analytical model of the laser ablation mechanism of lithium-Ion battery electrode coatings** *(Invited Paper)*, Benjamin Schmieder, Manz AG (Germany) . . . . . [9351-48]

2:30 pm: **Laser-induced breakdown spectroscopy for chemical characterization of laser structured Li(NiMnCo)O_2 electrodes for lithium-ion batteries**, Peter Smyrek, Johannes Pröll, Hans J. Seifert, Karlsruher Institut für Technologie (Germany); Wilhelm Pfleging, Karlsruher Institut für Technologie (Germany) and Karlsruhe Nano Micro Facility (Germany) . . . . . [9351-49]

2:50 pm: **Surface micro-structuring of intercalation cathode materials for lithium-ion batteries: A study of laser-assisted cone formation**, Wilhelm Pfleging, Johannes Pröll, Peter Smyrek, Thomas Bergfeldt, Robert Kohler, Karlsruher Institut für Technologie (Germany). . . . . [9351-50]

3:10 pm: **Femtosecond laser patterning of lithium-ion battery separator materials: Impact on liquid electrolyte wetting and cell performance**, Johannes Pröll, Karlsruher Institut für Technologie (Germany); Bertram Schmitz, Treofan Germany GmbH & Co. KG (Germany); Axel Niemoeller, Bernd Robertz, Manfred Schäfer, Sihl GmbH (Germany); Maika Torge, Peter Smyrek, Hans J. Seifert, Karlsruher Institut für Technologie (Germany); Wilhelm Pfleging, Karlsruher Institut für Technologie (Germany) and Karlsruhe Nano Micro Facility (Germany) . . . . . [9351-51]

Coffee Break . . . . . Thu 3:30 pm to 4:00 pm

SESSION 11

LOCATION: ROOM 125 (EXHIBIT LEVEL) ..... THU 4:00 PM TO 5:40 PM

Laser Micro-Structuring and Processing IV

Session Chair: **Andreas E. H. Oehler,** JDSU Ultrafast Lasers AG (Switzerland)

4:00 pm: **Magnetic field-assisted laser micro machining**, Hamid Farrokhi, Nanyang Technological Univ. (Singapore) and SysteMED Pte Ltd. (Singapore); Wei Zhou, Nanyang Technological Univ. (Singapore); HongYu Zheng, Singapore Institute of Manufacturing Technology (Singapore) . . . . . [9351-52]

4:20 pm: **Nano-pulsed-CO_2-laser drilling for glass and its absorption change during laser processing**, Yosuke Watanabe, Hiroshi Ikenoue, Kota Yamasaki, Daisuke Nakamura, Tatsuo Okada, Kyushu Univ. (Japan). . . . . [9351-53]

4:40 pm: **Investigation on the effect of ambient and beam profile in annealing and texturing of amorphous silicon thin films by pulsed Nd^{3+}:YAG laser**, Esther Blesso Vidhya Yesudasan, Nilesh J. Vasa, Sriram R., Indian Institute of Technology Madras (India) . . . . . [9351-54]

5:00 pm: **Reflectivity enhancement underwater caused by super hydrophobic polytetrafluoroethylene surface**, Yijian Jiang, Wenshen Cao, Yan Zhao, Lingfei Ji, Beijing Univ. of Technology (China). . . . . [9351-55]

5:20 pm: **Comparison of laser structuring of thin dielectrics using multiple laser sources**, Adam R. Collins, Gerard M. O'Connor, National Univ. of Ireland, Galway (Ireland). . . . . [9351-56]

CONFERENCE 9352

LOCATION: ROOM 302 (ESPLANADE) AND ROOM 133 (EXHIBIT LEVEL)

Sunday–Tuesday 8–10 February 2015 • Proceedings of SPIE Vol. 9352

Synthesis and Photonics of Nanoscale Materials XII

Conference Chairs: **Jan J. Dubowski,** Univ. de Sherbrooke (Canada); **David B. Geohegan,** Oak Ridge National Lab. (USA); **Andrei V. Kabashin,** Aix-Marseille Univ. (France)

Program Committee: **Jason D. Fowlkes,** Oak Ridge National Lab. (USA); **Reuven Gordon,** Univ. of Victoria (Canada); **Costas P. Grigoropoulos,** Univ. of California, Berkeley (USA); **Richard F. Haglund Jr.,** Vanderbilt Univ. (USA); **Henry Helvajian,** The Aerospace Corp. (USA); **Hiroshi Kumagai,** Kitasato Univ. (Japan); **Thomas K. Lippert,** Paul Scherrer Institut (Switzerland); **Yongfeng Lu,** Univ. of Nebraska-Lincoln (USA); **Rajesh Menon,** The Univ. of Utah (USA); **Rahul Rao,** Honda Research Institute USA, Inc. (USA); **Federico Rosei,** Univ. du Québec (Canada); **James P. Schuck,** The Molecular Foundry (USA); **Oleksandr Voznyy,** Univ. of Toronto (Canada); **Xianfan Xu,** Purdue Univ. (USA)

Sunday 8 February

SESSION 1

LOCATION: ROOM 302 (ESPLANADE) . . . . . SUN 8:20 AM TO 10:00 AM

Nanoparticles for Energy and Bio-applications

Session Chairs: **Jan J. Dubowski,** Univ. de Sherbrooke (Canada); **Xianfan Xu,** Purdue Univ. (USA)

8:20 am: **Laser-based synthesis of nanomaterials for heterogeneous catalysis and energy research** *(Invited Paper)*, Philipp Wagener, Galina Marzun, Stephan Barcikowski, Univ. Duisburg-Essen (Germany) . . . . . [9352-1]

8:50 am: **Laser-activated nanoparticles for biomedical applications** *(Invited Paper)*, Roberto Pini, Fulvio Ratto, Francesca Rossi, Paolo Matteini, Francesca Tatini, Marella de Angelis, Lucia Cavigli, Sonia Centi, Istituto di Fisica Applicata Nello Carrara (Italy) . . . . . [9352-2]

9:20 am: **Catalytic Rh-based alloy nanoparticles by femtosecond laser irradiation of aqueous solution**, Takahiro Nakamura, Tohoku Univ. (Japan); Md. Samiul I. Sarker, Univ. of Rajshahi (Bangladesh); Shunichi Sato, Tohoku Univ. (Japan) . . . . . [9352-3]

9:40 am: **Laser-ablative synthesis of functional nanomaterials for biomedical applications**, Andrei V. Kabashin, Aix-Marseille Univ. (France) . . . . . [9352-4]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 2

LOCATION: ROOM 302 (ESPLANADE) . . . . . SUN 10:30 AM TO 12:00 PM

Nanostructure-Enhanced Diagnostics and Devices I

Session Chairs: **Andrei V. Kabashin,** Lasers, Plasmas et Procédés Photoniques (France); **Rajesh Menon,** The Univ. of Utah (USA)

10:30 am: **Nondestructive analysis of nanomaterials using optofluidic assisted Raman spectroscopy** *(Invited Paper)*, Amr S. Helmy, Siu Wai Mak, Univ. of Toronto (Canada); Steven A Rutledge, Univ of Toronto (Canada); Janahan Ramanan, Univ. of Toronto (Canada) . . . . . [9352-5]

11:00 am: **Persistent all-optical memory effect in a nanostructured metamaterial**, Kannatassen Appavoo, Vanderbilt Univ. (USA); Dangyuan Lei, The Hong Kong Polytechnic Univ. (China); Filip Ligmajer, Yannick Sonnefraud, Imperial College London (United Kingdom); Richard F. Haglund Jr., Vanderbilt Univ. (USA); Stefan A. Maier, Imperial College London (United Kingdom) [9352-6]

11:20 am: **Nanoplasmonics of particles over thin films: Quantum and magnetic effects**, Reuven Gordon, Ghazal Hajisalem, Reza N. Sanadgol, Haitian Xu, Byoung-Chul Choi, Univ. of Victoria (Canada) . . . . . [9352-7]

11:40 am: **Low frequency shear and breathing modes in few-layer $MoSe_2$ with different stacking**, Alexander A. Puretzky, Bobby G. Sumpter, Oak Ridge National Lab. (USA); Liangbo Liang, Vincent Meunier, Rensselaer Polytechnic Institute (USA); Kai Wang, Masoud Mahjouri-Samani, Xufan Li, Kai Xiao, Juan Idrobo, David B. Geohegan, Oak Ridge National Lab. (USA) . . . . . [9352-8]

Lunch/BiOS Exhibition Break . . . . . Sun 12:00 pm to 1:30 pm

SESSION 3

LOCATION: ROOM 302 (ESPLANADE) . . . . . SUN 1:30 PM TO 3:10 PM

Nanostructure-Enhanced Diagnostics and Devices II

Session Chairs: **David B. Geohegan,** Oak Ridge National Lab. (USA); **Reuven Gordon,** Univ. of Victoria (Canada)

1:30 pm: **Hot electron photodetectors based on metamaterial perfect absorbers** *(Invited Paper)*, Jason G. Valentine, Wei Li, Vanderbilt Univ. (USA) . . . . . [9352-9]

2:00 pm: **Surface plasmon amplification and active nonreciprocal gratings** *(Invited Paper)*, Elham Karami Keshmarzi, R. Niall Tait, Carleton Univ. (Canada); Pierre Berini, Univ. of Ottawa (Canada). . . . . [9352-10]

2:30 pm: **3D terahertz metamaterials with asymmetric transmission**, Aggelos Xomalis, George Kenanakis, Alexandros Selimis, Maria Vamvakaki, Maria Kafesaki, Maria Farsari, Foundation for Research and Technology-Hellas (Greece) . . . . . [9352-11]

2:50 pm: **Response of zinc-oxide core-shell nanowires to gamma irradiation**, Richard F. Haglund Jr., Daniel C. Mayo, Claire Marvinney, Vanderbilt Univ. (USA); Richard Mu, Fisk Univ. (USA). . . . . [9352-12]

Coffee Break . . . . . Sun 3:10 pm to 3:40 pm

SESSION 4

LOCATION: ROOM 302 (ESPLANADE) . . . . . SUN 3:40 PM TO 5:50 PM

Nanophotonic Designs for PV and Bio-applications

Session Chairs: **Andrei V. Kabashin,** Lasers, Plasmas et Procédés Photoniques (France); **Jason D. Fowlkes,** Oak Ridge National Lab. (USA)

3:40 pm: **Nanophotonic designs for photovoltaics** *(Invited Paper)*, Vivian Ferry, Univ. of Minnesota, Twin Cities (USA) . . . . . [9352-13]

4:10 pm: **Photo-refractive polymers for ophthalmic applications** *(Invited Paper)*, Norbert A. Hampp, Philipps-Univ. Marburg (Germany) . [9352-14]

4:40 pm: **Laser synthesis of group IV semiconductors nanoparticles for bio-labelling applications**, Marina Rodio, Alberto Diaspro, Romuald Intartaglia, Istituto Italiano di Tecnologia (Italy). . . . . [9352-15]

5:00 pm: **Metallic nanoholes and nanogaps for plasmonic biosensing and spectroscopy** *(Invited Paper)*, Sang-Hyun Oh, Univ. of Minnesota, Twin Cities (USA) . . . . . [9352-16]

5:30 pm: **Photocorrosion metrology of photoluminescence emitting nano-heterostructures**, Srivatsa Aithal, Jan J. Dubowski, Univ. de Sherbrooke (Canada) . . . . . [9352-17]

Monday 9 February

SESSION 5

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . .MON 8:30 AM TO 10:20 AM

NOTE ROOM CHANGE

Pulsed Laser Deposition and Synthesis of Nano-scale Structures

Joint Session with Conferences 9350 and 9352

Session Chairs: **Andrei V. Kabashin,** Lasers, Plasmas et Procédés Photoniques (France); **Richard F. Haglund Jr.,** Vanderbilt Univ. (USA)

8:30 am: **Pulsed laser deposition of calcium barium niobate thin films for electro-optical devices** *(Invited Paper)*, Mohamed Chaker, Nadir Hossain, Institut National de la Recherche Scientifique (Canada) . . . . . [9352-18]

9:00 am: **Controlled growth of 2D metal chalcogenides from pulsed laser deposited nanoparticles**, Masoud Mahjouri-Samani, Ryan Gresback, Oak Ridge National Lab. (USA); Mengkun Tian, The Univ. of Tennessee (USA); Kai Wang, Abledaziz Boulesbaa, Alexander A. Puretzky, Christopher M. Rouleau, Gyula Eres, Ilia N. Ivanov, Kai Xiao, Michael A. McGuire, Oak Ridge National Lab. (USA); Gerd J. Duscher, The Univ. of Tennessee (USA); David B. Geohegan, Oak Ridge National Lab. (USA) . . . . . [9352-19]

9:20 am: **Growth of nanostructures and mesoscale architectures by pulsed laser synthesis, deposition, and integration of ultrasmall nanoparticle "building blocks"**, David B. Geohegan, Masoud Mahjouri-Samani, Kai Wang, Alexander A. Puretzky, Christopher M. Rouleau, Oak Ridge National Lab. (USA); Mengkun Tian, Gerd J. Duscher, The Univ. of Tennessee (USA); Mina Yoon, Gyula Eres, Miaofang Chi, Oak Ridge National Lab. (USA) . . . . . [9352-20]

9:40 am: **Study on generation process of nanofibers from back surface of thin glass substrate using pulsed UV 355nm laser**, Sho Itoh, Nippon Electric Glass Co., Ltd. (Japan); Masaaki Sakakura, Yasuhiko Shimotsuma, Kiyotaka Miura, Kyoto Univ. Graduate School of Engineering (Japan) . . . . . [9352-21]

10:00 am: **Rapid fabrication of graphene on dielectric substrates via solid-phase processes**, Wei Xiong, Yunshen Zhou, Wenjia Hou, Yongfeng Lu, Univ. of Nebraska-Lincoln (USA) . . . . . [9352-22]

Coffee Break . . . . . Mon 10:20 am to 10:50 am

SESSION 6

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . MON 10:50 AM TO 12:10 PM

Laser-induced Surface Nanostructures

Joint Session with Conferences 9350 and 9352

Session Chairs: **Yoshiki Nakata,** Osaka Univ. (Japan); **Xianfan Xu,** Purdue Univ. (USA)

10:50 am: **Fabrication of periodic metal nanowire grating and dotted structures on silica substrate by femtosecond laser irradiation**, Yasutaka Nakajima, Mitsuhiro Terakawa, Keio Univ. (Japan) . . . . . [9350-1]

11:10 am: **Direct laser beam interference patterning technique for fast high aspect ratio surface structuring**, Bogdan Voisiat, Simonas Indrisiunas, Airidas Zukauskas, Gediminas Raciukaitis, Ctr. for Physical Sciences and Technology (Lithuania) . . . . . [9350-2]

11:30 am: **F_2 laser induced micro/nanostructuring and surface modification of iron thin film**, Masayuki Okoshi, National Defense Academy (Japan) and Kanto Gakuin Univ. (Japan) . . . . . [9350-3]

11:50 am: **Femtosecond laser induced extraordinary relief surface microstructures on thin Cr films**, Jianxiong Zhou, Institute of Modern Optics (China); Jianjun Yang, Nankai Univ. (China); Bo Zhao, Institute of Modern Optics (China) and Nankai Univ. (China); Xianfan Xu, Purdue Univ. (USA) . . . . . [9350-4]

Tuesday 10 February

POSTERS-TUESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . TUE 6:00 TO 8:00 PM

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Vertical silver nanorod growth as a surface-enhanced Raman scattering, NoSoung Myoung, Jung Su Park, Yong-Suk Shin, Sang-Youp Yim, Advanced Photonics Research Institute (Korea, Republic of) . . . . . [9352-23]

Direct laser fabrication of GaAs nanostructures on GaAs(001) in MBE reactor in-situ, Haeyeon Yang, Anahita Haghi Zadeh, South Dakota School of Mines and Technology (USA) . . . . . [9352-24]

Comparison of the critical dimensions of one dimensional diffraction gratings extracted from the different scatterometric measurements, Kyongseok Kim, Chang Hyun Park, Daeyeon Kim, Seung-Han Park, Yonsei Univ. (Korea, Republic of) . . . . . [9352-25]

CONFERENCE 9353

LOCATION: ROOM 132 AND ROOM 133 (EXHIBIT LEVEL)

Tuesday–Thursday 10–12 February 2015 • Proceedings of SPIE Vol. 9353

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PolarOnyx

Laser 3D Manufacturing II

Conference Chairs: **Henry Helvajian,** The Aerospace Corp. (USA); **Alberto Piqué,** U.S. Naval Research Lab. (USA); **Martin Wegener,** Karlsruhe Institute of Technology (Germany); **Bo Gu,** Bos Photonics (USA)

Program Committee: **John T. Fourkas,** Univ. of Maryland, College Park (USA); **Youping Gao,** Aerojet Rocketdyne (USA); **Weidong Huang,** Northwestern Polytechnical Univ. (China); **Jian Liu,** PolarOnyx, Inc. (USA); **Paul S. Unwin,** Stanmore Implants (United Kingdom); **Augustine M. Urbas,** Air Force Research Lab. (USA)

Tuesday 10 February

SESSION 1

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . . TUE 1:30 PM TO 3:30 PM

NOTE ROOM CHANGE

Processes Compatible for LIFT and Additive Manufacturing I

Joint Session with Conferences 9350 and 9353

Session Chairs: **Stephan Roth,** BLZ Bayerisches Laserzentrum GmbH (Germany); **Henry Helvajian,** The Aerospace Corp. (USA)

1:30 pm: **High-resolution printing of functional microdots by double-pulse laser-induced forward transfer** *(Invited Paper)*, Aiko Narazaki, Ryozo Kurosaki, Tadatake Sato, Hiroyuki Niino, National Institute of Advanced Industrial Science and Technology (Japan) . . . . . [9350-17]

2:00 pm: **2D/3D laser cutting of carbon fiber reinforced plastic (CFRP) by fiber laser irradiation**, Hiroyuki Niino, Yoshihisa Harada, National Institute of Advanced Industrial Science and Technology (Japan) and Advanced Laser and Process Technology Research Association (Japan); Kenji Anzai, Mitsuaki Aoyama, Miyachi Corp. (Japan) and Advanced Laser and Process Technology Research Association (Japan); Masafumi Matsushita, Koichi Furukawa, Shin Nippon Koki Co. Ltd. (Japan) and Advanced Laser and Process Technology Research Association (Japan); Michiteru Nishino, Mitsubishi Chemical Corp. (Japan) and Advanced Laser and Process Technology Research Association (Japan); Akira Fujisaki, Taizo Miyato, Takashi Kayahara, Furukawa Electric Co., Ltd. (Japan) and Advanced Laser and Process Technology Research Association (Japan) . . . . . [9353-1]

2:20 pm: **Advances and future directions in laser-induced forward transfer (LIFT)**, Alberto Piqué, Heungsoo Kim, Nicholas A. Charipar, Raymond C. Y. Auyeung, Kristin M. Charipar, Scott A. Mathews, U.S. Naval Research Lab. (USA) . . . . . [9350-18]

2:40 pm: **Additive manufacturing in production: Challenges and opportunities** *(Invited Paper)*, Michael Schmidt, BLZ Bayerisches Laserzentrum GmbH (Germany). . . . . [9353-2]

3:10 pm: **All-printed reduced graphene oxide gas sensors**, Symeon Papazoglou, Marina Makrygianni, National Technical Univ. of Athens (Greece); Myrto K. Filippidou, Stavros Chatzandroulis, National Ctr. for Scientific Research Demokritos (Greece); Ioanna Zergioti, National Technical Univ. of Athens (Greece). . . . . [9350-19]

Coffee Break . . . . . Tue 3:30 pm to 4:00 pm

SESSION 2

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . . TUE 4:00 PM TO 6:00 PM

Processes Compatible for LIFT and Additive Manufacturing II

Joint Session with Conferences 9350 and 9353

Session Chairs: **Beat Neuenschwander,** Berner Fachhochschule Technik und Informatik (Switzerland); **Henry Helvajian,** The Aerospace Corp. (USA)

4:00 pm: **Laser printing of nanoparticles and living cells** *(Invited Paper)*, Boris Chichkov, Laser Zentrum Hannover e.V. (Germany) . . . . . [9353-3]

4:30 pm: **Laser sintering of metal nano-ink tracks embedded into 3D structure**, Abraham Rotnemer, Orbotech Ltd. (Israel); Michael Zenou, Orbotech Ltd. (Israel) and Hebrew Univ. (Israel) and Ricah Institute of Physics (Israel); Jonathan Ankri, Zvi Kotler, Orbotech Ltd. (Israel) . . . . . [9353-4]

4:50 pm: **Laser-assisted conductive silver ink printing with inkjet and laser-induced forward transfer techniques for organic transistor fabrication**, Dimitris Karnakis, Riccardo Geremia, Oxford Lasers Ltd. (United Kingdom); Lee Winchester, Simon Ogier, Ctr. for Process Innovation Ltd. (United Kingdom); Roger Artigas, Sensofar-Tech, S.L. (Spain); C. Florian, F. Caballero-Lucas, Juan Marcos Fernández-Pradas, Pere Serra Coromina, Univ. de Barcelona (Spain) . . . . . [9350-20]

5:10 pm: **Laser-assisted transfer and bonding for MEMS and microelectronics** *(Invited Paper)*, Andrew S. Holmes, Imperial College London (United Kingdom). . . . . [9350-21]

5:40 pm: **Monolithic hybrid optics for broadband focusing and beam shaping**, Ulrike Fuchs, asphericon GmbH (Germany) . . . . . [9353-5]

POSTERS-TUESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . TUE 6:00 TO 8:00 PM

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Two-photon microfabrication using azo dyes as polymerization initiator, Adriano J. G. Otuka, Vinicius Tribuzi, Univ. de São Paulo (Brazil); Daniel S. Correa, Embrapa Instrumentação Agropecuária (Brazil); Leonardo De Boni, Cleber R. Mendonca, Univ. de São Paulo (Brazil). . . . . [9353-40]

Evaluation of laser ultrasonic testing for inspection of metal additive manufacturing, Sarah K. Everton, The Univ. of Nottingham (United Kingdom) and The Manufacturing Technology Ctr. (United Kingdom) . . . . . [9353-41]

Two photon polymerization (2PP) technique optimization study using a green femtosecond oscillator, Areti Mourka, Amplitude Systèmes (France); Vasileia Melissinaki, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece); Maria Farsari, Foundation for Research and Technology-Hellas (Greece); Antoine Courjaud, Eric P. Mottay, Amplitude Systèmes (France). . . . . [9353-42]

Contributions for the next generation of 3D metal printing machines, Milton Pereira, Instituto Federal de Santa Catarina (Brazil); Ulrich Thombansen, Fraunhofer-Institut für Lasertechnik (Germany) . . . . . [9353-43]

Fabrication of perfluoropolyether atomic force microscopy tips with two-photon polymerization, Tommaso Zandrini, Raffaella Suriano, Carmela De Marco, Politecnico di Milano (Italy); Roberto Osellame, Istituto di Fotonica e Nanotecnologie (Italy) and Politecnico di Milano (Italy); Stefano Turri, Politecnico di Milano (Italy); Francesca Bragheri, Istituto di Fotonica e Nanotecnologie (Italy) . . . . . [9353-44]

Wednesday 11 February

SESSION 3

LOCATION: ROOM 132 (EXHIBIT LEVEL) . . . . WED 8:00 AM TO 10:00 AM

NOTE ROOM CHANGE

3D Manufacturing Metal Structures

Session Chair: **Henry Helvajian,** The Aerospace Corp. (USA)

8:00 am: **Selective laser melting process fundamental and 3D printing of rocket engine** *(Invited Paper)*, Youping Gao, John S. Malinzak, Aerojet (USA) . . . . . [9353-7]

8:30 am: **Effect of heat treatment on properties of inconel 718 superalloy manufactured by 3D metal printing**, Joung Soo Kim, Korea Atomic Energy Research Institute (Korea, Republic of) and Hoseo Univ. (Korea, Republic of); Chang-Kyu Rhee, Korea Atomic Energy Research Institute (Korea, Republic of); Jeong-Hun Suh, InssTek Co., Ltd. (Korea, Republic of) . . . . . [9353-8]

8:50 am: **Femtosecond fiber laser welding and additive manufacturing for 3D manufacturing** *(Invited Paper)*, Huan Huang, Bai Nie, Peng Wan, PolarOnyx, Inc. (USA); Lih-Mei Yang, PolarOnyx Laser Inc. (USA); Shuang Bai, PolarOnyx, Inc. (USA). . . . . [9353-9]

9:20 am: **Microstructural evolution and mechanical behavior of nickel-based superalloy 625 made by selective laser melting**, David B. Witkin, Paul M. Adams, Thomas V. Albright, The Aerospace Corp. (USA) . . . . . [9353-10]

9:40 am: **Composition analysis using laser induced plasma for metal additive manufacturing**, Lijun Song, Wenkang Huang, Ting Tan, Hunan Univ. (China) . . . . . [9353-11]

Coffee Break . . . . . .Wed 10:00 am to 10:20 am

LASE PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . WED 10:20 AM TO 12:30 PM

Session Chairs: **Guido Hennig**, Daetwyler Graphics AG (Switzerland); **Yongfeng Lu**, Univ. of Nebraska-Lincoln (USA)

10:20 am: **Welcome and Opening Remarks**
Guido Hennig, Daetwyler Graphics AG (Switzerland); Yongfeng Lu, Univ. of Nebraska-Lincoln (USA)

10:25 am: **Announcement of the Green Photonics Best Paper Award and the 3D Printing, Fabrication, and Manufacturing Best Paper Award**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA); **Henry Helvajian,** The Aerospace Corp. (USA)

10:30 am: **NASA's Optical Communications Program: 2015 and Beyond**
Donald M. Cornwell Jr., NASA Headquarters, Space Communications and Navigation Program (USA) . . [9354-201]

11:10 am: **Coherent Combination of Ultrafast Laser Pulses: A Route to Joule-Class High Repetition Rate Femtosecond Lasers**
Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9344-202]

11:50 am: **Laser 3D Printing of Metallic Components and its Industrial Applications: Technical Breakthroughs and Opportunities**
Xiaoyan Zeng, Wuhan National Lab. for Optoelectronics (China). . . . . [9353-203]

Lunch/Exhibition Break . . . . . .Wed 12:30 pm to 1:30 pm

SESSION 4

LOCATION: ROOM 132 (EXHIBIT LEVEL) . . . . . WED 1:30 PM TO 3:00 PM

Mechanical Metamaterials I

Session Chair: **Martin Wegener,** Karlsruher Institut für Technologie (Germany)

1:30 pm: **Development of high-strength and light-weight hierarchical materials based on 3D direct laser writing** *(Invited Paper)*, Jens Bauer, Almut Schroer, Ruth Schwaiger, Oliver Kraft, Karlsruher Institut für Technologie (Germany) . . . . . [9353-12]

2:00 pm: **On the influence of atmospheric oxygen on 2D and 3D direct laser writing**, Michael Adams, Jonathan B. Mueller, Joachim Fischer, Martin Wegener, Karlsruher Institut für Technologie (Germany) . . . . . [9353-13]

2:20 pm: **Advantages and drawbacks of Thiol-ene based resins for 3D-printing**, Holger Leonards, Andreas Hoffmann, Sascha Engelhardt, Martin M. Wehner, Arnold Gillner, Fraunhofer-Institut für Lasertechnik (Germany) . . . . . [9353-14]

2:40 pm: **Direct laser writing of 3D nanostructures using a 405nm laser diode**, Patrick Mueller, Karlsruher Institut für Technologie (Germany) and Nanoscribe GmbH (Germany); Michael Thiel, Nanoscribe GmbH (Germany); Martin Wegener, Karlsruher Institut für Technologie (Germany) . . . . . [9353-15]

Coffee Break . . . . . .Wed 3:00 pm to 3:30 pm

SESSION 5

LOCATION: ROOM 132 (EXHIBIT LEVEL) . . . . . WED 3:30 PM TO 6:10 PM

Mechanical Metamaterials and Devices

Session Chair: **Martin Wegener,** Karlsruher Institut für Technologie (Germany)

3:30 pm: **Polymer microframes by interference lithography and 3D direct write** *(Invited Paper)*, Edwin L. Thomas, Rice Univ. (USA) . . . . . [9353-16]

4:00 pm: **Tailored multiphoton polymerization with abruptly autofocusing beams**, Maria Manousidaki, Foundation for Research and Technology-Hellas (Greece); Dimitrios G. Papazoglou, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece); Maria Farsari, Foundation for Research and Technology-Hellas (Greece); Stelios Tzortzakis, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece) [9353-17]

4:20 pm: **Hierarchical 3D nano-architectures for photonics, biomimetics, and lightweight structural materials** *(Invited Paper)*, Julia R. Greer, Lauren Montemayor, Lucas Meza, Victoria Chernow, California Institute of Technology (USA); Nigel A. Clarke, Univ. of Waterloo (Canada); Xun W. Gu, California Institute of Technology (USA) . . . . . [9353-18]

4:50 pm: **Two-photon polymerization of hybrid polymers for applications in micro-optics**, Sönke Steenhusen, Fraunhofer-Institut für Silicatforschung (Germany); Frank Burmeister, Hans-Christoph Eckstein, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Ruth Houbertz, Fraunhofer-Institut für Silicatforschung (Germany) and Multiphoton Optics GmbH (Germany) . . . . . [9353-19]

5:10 pm: **Parallel optical micro/nanofabrication using desktop digital projection micro-stereolithography** *(Invited Paper)*, Nicholas X. Fang, Massachusetts Institute of Technology (USA) . . . . . [9353-20]

5:40 pm: **Three-dimensional two-photon laser fabrication for metals, polymers, and magneto-optical materials** *(Invited Paper)*, Takuo Tanaka, RIKEN (Japan); Atsushi Ishikawa, Okayama Univ. (Japan); Tomohiro Amemiya, Tokyo Institute of Technology (Japan) . . . . . [9353-21]

CONFERENCE 9353
LOCATION: ROOM 132 (EXHIBIT LEVEL)

Thursday 12 February

SESSION 6
LOCATION: ROOM 132 (EXHIBIT LEVEL) ..... THU 8:00 AM TO 10:10 AM

Materials and Device Fabrication
Session Chair: **Bo Gu,** Bos Photonics (USA)

8:00 am: **Additive manufacturing of optical elements from inorganic materials** *(Invited Paper)*, Augustine M. Urbas, Jonathan T. Goldstein, Christopher E. Tabor, Air Force Research Lab. (USA); Ed C. Kinzel, Missouri Univ. of Science and Technology (USA) . . . . . [9353-22]

8:30 am: **Pulsed laser ultrasonic excitation and heterodyne detection for in situ process control in additive metal manufacturing**, Anthony J. Manzo, Henry Helvajian, The Aerospace Corp. (USA) . . . . . [9353-45]

8:50 am: **High resolution laser micro sintering/melting with brilliant laser radiation** *(Invited Paper)*, Horst Exner, Andrè Streek, Robby Ebert, Hochschule Mittweida (Germany) . . . . . [9353-24]

9:20 am: **Mechanisms of 3D nanoparticles formation using direct laser writing and thermal annealing in a phosphate glass**, Nicolas Marquestaut, Lab. Ondes et Matière d'Aquitaine (France); Yannick G. Petit, Institut de Chimie de la Matière Condensée de Bordeaux (France); Patrick Mounaix, Lab. Ondes et Matière d'Aquitaine (France); Thierry Cardinal, Institut de Chimie de la Matière Condensée de Bordeaux (France); Lionel Canioni, Lab. Ondes et Matière d'Aquitaine (France) . . . . . [9353-25]

9:40 am: **Mesoscale pentamode metamaterial elasto-mechanical cloak by 3D galvo-scanner dip-in direct laser writing** *(Invited Paper)*, Tiemo K. Bückmann, Karlsruhe Institute of Technology (Germany); Michael Thiel, Karlsruhe Institute of Technology (Germany) and Nanoscribe GmbH (Germany); Muamer Kadic, Robert Schittny, Karlsruhe Institute of Technology (Germany); Martin Wegener, Karlsruhe Institute of Technology (Germany) and Nanoscribe GmbH (Germany) . . . . . [9353-26]

Coffee Break . . . . . Thu 10:10 am to 10:40 am

SESSION 7
LOCATION: ROOM 132 (EXHIBIT LEVEL) .... THU 10:40 AM TO 12:20 PM

Process Design and Certification
Session Chair: **Bo Gu,** Bos Photonics (USA)

10:40 am: **Insights into cellular contact guidance through 3D nanofabrication** *(Invited Paper)*, Wolfgang Losert, Univ. of Maryland, College Park (USA) . . . . . [9353-27]

11:10 am: **Additive laser-based techniques for surface structuring of 3D micro-replication tools**, Nerea O. Otero, Pablo M. Romero, Ivette Coto, Cristina Leira, AIMEN - Asociación de Investigación Metalúrgica del Noroeste (Spain) . . . . . [9353-28]

11:30 am: **Cellular scanning strategy for selective laser melting: Generating reliable, optimized scanning paths, and processing parameters**, Sankhya Mohanty, Jesper H. Hattel, Technical Univ. of Denmark (Denmark) . . . . . [9353-29]

11:50 am: **Certify as you build: A challenge for additive manufacturing** *(Invited Paper)*, Jyoti Mazumder, Univ. of Michigan (USA) . . . . . [9353-30]

Lunch/Exhibition Break . . . . . Thu 12:20 pm to 1:40 pm

SESSION 8
LOCATION: ROOM 132 (EXHIBIT LEVEL) .....THU 1:40 PM TO 3:20 PM

Micro Engineering and Process Control
Session Chair: **Alberto Piqué,** U.S. Naval Research Lab. (USA)

1:40 pm: **Microfabrication of three-dimensional filters for liposome extrusion** *(Invited Paper)*, Tommaso Baldacchini, Newport Corp. (USA); Vicente Nunez, Univ. of California, Riverside (USA); Ruben Zadoyan, Newport Corp. (USA). . . . . [9353-31]

2:10 pm: **High power laser beam melting of Ti_6Al_4V on deformed sheet metal to achieve hybrid structures**, Bhrigu Ahuja, Lehrstuhl für Photonische Technologien (Germany); Adam Schaub, Lehrstuhl für Fertigungstechnologie (Germany); Michael Karg, Lehrstuhl für Photonische Technologien (Germany); Marion Merklein, Lehrstuhl für Fertigungstechnologie (Germany); Michael Schmidt, Lehrstuhl für Photonische Technologien (Germany) . [9353-32]

2:30 pm: **In situ process monitoring of selective laser melting at 200 kHz**, Jordan A. Kanko, Christopher M. Galbraith, Queen's Univ. (Canada); Paul J. Webster, Laser Depth Dynamics Inc. (Canada); James M. Fraser, Queen's Univ. (Canada). . . . . [9353-33]

2:50 pm: **Process monitoring in additive manufacturing of metal parts** *(Invited Paper)*, Corey M. Dunsky, Aeos Consulting, Inc. (USA) . . . . . [9353-34]

Coffee Break . . . . . Thu 3:20 pm to 3:50 pm

SESSION 9
LOCATION: ROOM 132 (EXHIBIT LEVEL) ..... THU 3:50 PM TO 6:00 PM

Process Monitoring
Session Chair: **Alberto Piqué,** U.S. Naval Research Lab. (USA)

3:50 pm: **Image-inspired 3D multiphoton excited fabrication of extracellular matrix structures by modulated raster scanning for cancer biology studies** *(Invited Paper)*, Paul J. Campagnola, Visar Ajeti, Kevin W. Eliceiri, Manish Patankar, Univ. of Wisconsin-Madison (USA). . . . . [9353-35]

4:20 pm: **Preliminary investigation of keyhole formation during single track fabrication in laser additive manufacturing of stainless steel** *(Invited Paper)*, Ville-Pekka Matilainen, Heidi Piili, Lappeenranta Univ. of Technology (Finland); Antti S. Salminen, Lappeenranta Univ. of Technology (Finland) and Machine Technology Ctr. Turku Ltd. (Finland); Olli Nyrhilä, Electro Optical Systems Finland Oy (Finland). . . . . [9353-36]

4:50 pm: **Resolution enhancement through three color photolithography**, Zuleykhan Tomova, John T. Fourkas, Univ. of Maryland, College Park (USA) . . . . . [9353-37]

5:10 pm: **A novel multi-scale simulation architecture for laser-based manufacturing technologies** *(Invited Paper)*, Brent Stucker, Univ. of Louisville (USA) and 3DSIM, LLC (USA) . . . . . [9353-38]

5:40 pm: **Laser 3D printing with CAD solid models and adaptive slicing direction improve fabrication accuracy**, Tien-Tung Chung, Ya-Hsun Hsueh, Wan-Jou Li, Sheng-Yuan Chen, National Taiwan Univ. (Taiwan); Patrice L. Baldeck, Univ. Joseph Fourier (France) . . . . . [9353-39]

CONFERENCE 9354
LOCATION: ROOM 120 (EXHIBIT LEVEL)

Sunday–Monday 8–9 February 2015 • Proceedings of SPIE Vol. 9354

Free-Space Laser Communication and Atmospheric Propagation XXVII

Conference Chairs: **Hamid Hemmati,** Facebook Inc. (USA); **Don M. Boroson,** MIT Lincoln Lab. (USA)

Program Committee: **Vincent W. S. Chan,** Massachusetts Institute of Technology (USA); **Renny A. Fields,** The Aerospace Corp. (USA); **G. Charmaine Gilbreath,** U.S. Naval Research Lab. (USA); **Frank F. Heine,** Tesat-Spacecom GmbH & Co. KG (Germany); **Olga Korotkova,** Univ. of Miami (USA); **Michael A. Krainak,** NASA Goddard Space Flight Ctr. (USA); **Ronald L. Phillips,** Florida Space Institute (USA); **Zoran Sodnik,** European Space Research and Technology Ctr. (Netherlands); **Morio Toyoshima,** National Institute of Information and Communications Technology (Japan); **Jian Wang,** Wuhan National Lab. for Optoelectronics, Huazhong Univ. of Science and Technology (China); **Alan E. Willner,** The Univ. of Southern California (USA); **Shiro Yamakawa,** Japan Aerospace Exploration Agency (Japan)

Sunday 8 February

SESSION 1
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . . SUN 1:30 PM TO 3:10 PM

Atmospheric Propagation
Session Chair: **Hamid Hemmati,** Facebook Inc. (USA)

1:30 pm: **Back-scattering in rain on bidirectional free-space optical links**, Wen-hua Song, Jian-cheng Lai, Wei Yan, Chun-yong Wang, Zhen-hua Li, Nanjing Univ. of Science and Technology (China) . . . . . [9354-1]

1:50 pm: **Power-spectrum requirements in ultraviolet optical wireless networks**, Nikos Raptis, Eugenia Roditi, Dimitris Syvridis, National and Kapodistrian Univ. of Athens (Greece) . . . . . [9354-2]

2:10 pm: **Scintillations of a partially coherent beam in a laboratory turbulence: Experiment and comparison to theory**, Anatoly Efimov, Los Alamos National Lab. (USA) . . . . . [9354-3]

2:30 pm: **Optical channel impact over the PSD of UWB over FSO links**, Arturo Arvizu, Salvador Villarreal-Reyes, Aldo E. Perez-Ramos, Joel Santos, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico); Muriel Muller, Ghalid I. Abib, Catherine Lepers, Institut Mines-Télécom (France) and Télécom SudParis (France) . . . . . [9354-4]

2:50 pm: **A microwave radiometric method to obtain the average path profile of atmospheric temperature and humidity structure parameters and its application to optical propagation system assessment**, Robert M. Manning, Brian Vyhnalek, NASA Glenn Research Ctr. (USA) . [9354-5]

Coffee Break . . . . . Sun 3:10 pm to 3:40 pm

SESSION 2
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . . SUN 3:40 PM TO 5:00 PM

Receiver/Ground Terminal
Session Chair: **Bryan S. Robinson,** MIT Lincoln Lab. (USA)

3:40 pm: **Array receivers in downlink coherent lasercom**, Aniceto Belmonte, Univ. Politècnica de Catalunya (Spain); Joseph M. Kahn, Stanford Univ. (USA) . . . . . [9354-6]

4:00 pm: **Achieving operational two-way laser acquisition for OPALS payload on the International Space Station**, Matthew Abrahamson, Bogdan V. Oaida, Oleg V. Sindiy, Abhijit Biswas, Jet Propulsion Lab. (USA) . . . . . [9354-31]

4:20 pm: **Single-polarization, optical low-noise pre-amplified receiver for heavily-coded optical communications links**, Jeffrey M. Roth, MIT Lincoln Lab. (USA); Amrita V. Masurkar, MIT Lincoln Lab. (USA) and Columbia Univ. (USA); Vincent Scalesse, Jeffrey R. Minch, Todd G. Ulmer, Frederick G. Walther, Shelby J. Savage, MIT Lincoln Lab. (USA) . . . . . [9354-8]

4:40 pm: **Upwelling radiance at 976 nm measured from space using a CCD camera**, Abhijit Biswas, Joseph M. Kovalik, Bogdan V. Oaida, Matthew Abrahamson, Malcolm W. Wright, Jet Propulsion Lab. (USA) . . [9354-9]

SESSION 3
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . . SUN 5:00 PM TO 5:40 PM

Modulation/Coding
Session Chair: **Abhijit Biswas,** Jet Propulsion Lab. (USA)

5:00 pm: **Free space optical communication link using a silicon photonic optical phased array**, William S. Rabinovich, Peter G. Goetz, Doewon Park, Marcel W. Pruessner, Michael J. DePrenger, Rita Mahon, Mike S. Ferraro, James L. Murphy, U.S. Naval Research Lab. (USA) . . . . . [9354-10]

5:20 pm: **Energy efficient rateless codes for high speed data transfer over free space optical channels**, Geetha Prakash, PES Institute of Technology (India); Sripati U. Acharya, Muralidhar Kulkarni, National Institute of Technology, Karnataka (India) . . . . . [9354-11]

Monday 9 February

SESSION 4
LOCATION: ROOM 120 (EXHIBIT LEVEL) . . . . MON 8:40 AM TO 10:00 AM

Demonstrations I
Session Chair: **Hamid Hemmati,** Facebook Inc. (USA)

8:40 am: **NASA's Optical Communications Program for 2015 and Beyond** *(Invited Paper)*, Donald M. Cornwell Jr., NASA Headquarters, Space Communications and Navigation Program (USA) . . . . . [9354-12]

9:10 am: **Optical payload for lasercom science (OPALS) link demonstration from the International Space Station (ISS)** *(Invited Paper)*, Abhijit Biswas, Bogdan V. Oaida, Kenneth S. Andrews, Joseph M. Kovalik, Matthew Abrahamson, Malcolm W. Wright, Jet Propulsion Lab. (USA) . . . . . [9354-13]

9:40 am: **LCT for the European data relay system: In orbit commissioning of the Alphasat and Sentinel 1A LCTs**, Herwig Zech, Frank F. Heine, Stefan Seel, Daniel Tröndle, Matthias Motzigemba, Tesat-Spacecom GmbH & Co. KG (Germany); Rolf Meyer, Sabine Philipp-May, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [9354-15]

Coffee Break . . . . . Mon 10:00 am to 10:30 am

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CONFERENCE 9354
LOCATION: ROOM 120 (EXHIBIT LEVEL)

SESSION 5
LOCATION: ROOM 120 (EXHIBIT LEVEL) .... MON 10:30 AM TO 12:10 PM

Demonstrations II

Session Chair: **Don M. Boroson,** MIT Lincoln Lab. (USA)

10:30 am: **TALON: A free space optical communication system for the U.S. Navy and Marine Corps** *(Invited Paper)*, William S. Rabinovich, Christopher I. Moore, Linda M. Thomas, Nathan Smith, Harris R. Burris, Michael J. Vilcheck, Reed Smith, Dave Baker, Rita Mahon, James L. Murphy, Naomi Walker, Lindsey Willstatter, U.S. Naval Research Lab. (USA); Andrew B. Kowalik, John P. Janis, Dillen Li, Michael Ahn, Exelis Inc. (USA); James DeBruin, Marty Wand, Gunnar Ristroph, IJK Controls, LLC (USA); Stanley H. Uecke, Selwyn M. Yee, NovaSol (USA); David J. Harrison, LGS (USA); Alex Orgren, LGS Innovations Inc. (USA) . . . . . [9354-16]

11:00 am: **LEO to ground optical communications from a small satellite platform** *(Invited Paper)*, Todd S. Rose, Renny A. Fields, Siegfried W. Janson, Darren W. Rowen, David A. Hinkley, Richard P. Welle, The Aerospace Corp. (USA) . . . . . [9354-17]

11:30 am: **The meter-class carbon fiber reinforced polymer mirror and segmented mirror telescope at the Naval Postgraduate School**, Christopher C. Wilcox, U.S. Naval Research Lab. (USA); Bautista R. Fernandez, John Bagnasco, Naval Postgraduate School (USA); Ty Martinez, U.S. Naval Research Lab. (USA); Robert C. Romeo, Composite Mirror Applications, Inc. (USA); Brij N. Agrawal, Naval Postgraduate School (USA) . . . . . [9354-18]

11:50 am: **Compact optical gimbal as a conformal beam director for large field-of-regard lasercom applications**, Jessica E. Kesner, Keith M. Hinrichs, Lawrence E. Narkewich, Timothy Stephens, MIT Lincoln Lab. (USA). . . [9354-19]

Lunch Break . . . . . .Mon 12:10 pm to 1:40 pm

SESSION 6
LOCATION: ROOM 120 (EXHIBIT LEVEL) ..... MON 1:40 PM TO 2:20 PM

Demonstrations III

Session Chair: **Don M. Boroson,** MIT Lincoln Lab. (USA)

1:40 pm: **Continuous beam divergence control via wedge-pair for laser communication applications**, Keith M. Hinrichs, Alan E. DeCew, Lawrence E. Narkewich, Timothy H. Williams, MIT Lincoln Lab. (USA). . . . . [9354-20]

2:00 pm: **Situational awareness for robot communication using beacon localization**, Thomas Shen, Univ. of Maryland, College Park (USA); Robert J. Drost, U.S. Army Research Lab. (USA); John Rzasa, Univ. of Maryland, College Park (USA); Brian M. Sadler, U.S. Army Research Lab. (USA); Christopher C. Davis, Univ. of Maryland, College Park (USA) . . . [9354-21]

SESSION 7
LOCATION: ROOM 120 (EXHIBIT LEVEL) ..... MON 2:20 PM TO 3:20 PM

Pointing, Acquisition, and Tracking

Session Chair: **Abhijit Biswas,** Jet Propulsion Lab. (USA)

2:20 pm: **Evaluation of developing inertial stabilization unit**, Masaki Haruna, Kazuhide Kodeki, Seiichi Shimizu, Kazuhiko Fukushima, Osamu Takahara, Toshiyuki Ando, Jiro Suzuki, Eisuke Haraguchi, Mitsubishi Electric Corp. (Japan). . . . . [9354-22]

2:40 pm: **Development of a pointing, acquisition, and tracking system for a CubeSat optical communication module**, Tam N. T. Nguyen, Ryan W. Kingsbury, Kathleen Riesing, Kerri L. Cahoy, Massachusetts Institute of Technology (USA) . . . . . [9354-23]

3:00 pm: **Variable acquisition/communication split ratio for lasercom terminals**, Todd G. Ulmer, Frederick G. Walther, MIT Lincoln Lab. (USA) . . . . . [9354-24]

Coffee Break . . . . . .Mon 3:20 pm to 3:50 pm

SESSION 8
LOCATION: ROOM 120 (EXHIBIT LEVEL) ..... MON 3:50 PM TO 5:50 PM

Laser Transmitters

Session Chair: **Bryan S. Robinson,** MIT Lincoln Lab. (USA)

3:50 pm: **AlGaInN laser diode technology for free-space telecom applications**, Stephen P. Najda, Piotr Perlin, TopGaN Ltd. (Poland); Tadek Suski, Institute of High Pressure Physics (Poland); Lucja Marona, Michal Bockowski, Mike Leszczynski, Przemek Wisniewski, Robert Czernecki, TopGaN Ltd. (Poland); Robert Kucharski, Ammono Sp. z o.o. (Poland); Grzegorz Targowski, TopGaN Ltd. (Poland); Scott Watson, Anthony E. Kelly, Univ. of Glasgow (United Kingdom); Malcolm A. Watson, Paul M. Blanchard, Henry J. White, BAE Systems (United Kingdom) . . . . . [9354-25]

4:10 pm: **Compact dual channel optical fibre amplifier for space communication applications**, Gary Stevens, Liam Henwood-Moroney, Paul Hosking, Efstratios Kehayas, Leontios Stampoulidis, Andrew Robertson, Gooch & Housego Systems Technology Group (United Kingdom) . . . . [9354-26]

4:30 pm: **Compact optical transmitters for CubeSat free-space optical communications**, Ryan W. Kingsbury, Massachusetts Institute of Technology (USA); David O. Caplan, MIT Lincoln Lab. (USA); Kerri L. Cahoy, Massachusetts Institute of Technology (USA) . . . . . [9354-27]

4:50 pm: **Frequency stabilization of laser diodes in an aggressive thermal environment**, Jeffrey R. Minch, Frederick G. Walther, Shelby J. Savage, Al Plante, Vincent Scalesse, MIT Lincoln Lab. (USA) . . . . . [9354-28]

5:10 pm: **High energy uplink transmitters based on monolithic microstructured gain fibers**, Donald Sipes Jr., Jason D. Tafoya, Optical Engines, Inc. (USA) . . . . . [9354-29]

5:30 pm: **Object recognition through turbulence with a modified plenoptic camera**, Chensheng Wu, Christopher C. Davis, Univ. of Maryland, College Park (USA) . . . . . [9354-30]

CONFERENCE 9355
LOCATION: ROOM 133 (EXHIBIT LEVEL)

Sunday–Tuesday 8–10 February 2015 • Proceedings of SPIE Vol. 9355

COSPONSORS:

Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications XV

Conference Chairs: **Alexander Heisterkamp,** Leibniz Univ. Hannover (Germany); **Peter R. Herman,** Univ. of Toronto (Canada); **Michel Meunier,** Ecole Polytechnique de Montréal (Canada); **Stefan Nolte,** Friedrich-Schiller-Univ. Jena (Germany)

Program Committee: **Craig B. Arnold,** Princeton Univ. (USA); **James E. Carey III,** SiOnyx Inc. (USA); **Xun Gu,** ABB Corporate Research (Switzerland); **Denise M. Krol,** Univ. of California, Davis (USA); **Eric Mazur,** Harvard Univ. (USA); **Michael M. Mielke,** Raydiance, Inc. (USA); **Eric P. Mottay,** Amplitude Systèmes (France); **Christopher B. Schaffer,** Cornell Univ. (USA); **Alexander Szameit,** Friedrich-Schiller-Univ. Jena (Germany); **Alfred Vogel,** Univ. zu Lübeck (Germany); **Wataru Watanabe,** Ritsumeikan Univ. (Japan); **Sascha Weiler,** TRUMPF Inc. (USA)

Sunday 8 February

SESSION 1

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . . SUN 8:30 AM TO 10:10 AM

fs Laser Surgery and Bio-Micromachining

Session Chair: **Michel Meunier,**
Ecole Polytechnique de Montréal (Canada)

8:30 am: **Micromachining of bio-absorbable stents with ultra-short pulse lasers**, Victor V. Matylitsky, Frank Hendricks, Spectra-Physics, a Newport Corp. Brand (Austria); Rajesh S. Patel, Spectra-Physics, a Newport Corp. Brand (USA) . . . . . [9355-1]

8:50 am: **Optical and thermal properties in ultrafast laser surface nanostructuring on biodegradable polymer**, Shuhei Yada, Mitsuhiro Terakawa, Keio Univ. (Japan) . . . . . [9355-2]

9:10 am: **High speed deep tissue ablation with nonlinear imaging using an ultrafast fiber laser at 1045 nm**, Murat Yildirim, Kaushik G. Subramanian, Adela Ben-Yakar, The Univ. of Texas at Austin (USA) . . . . . [9355-3]

9:30 am: **A Kagome fiber based, high energy delivery laser scalpel system for laser microsurgery**, Kaushik G. Subramanian, The Univ. of Texas at Austin (USA); Michal E. Pawlowski, Rice Univ. (USA); Tomasz S. Tkaczyk, Rice Univ. (United Arab Emirates); Adela Ben-Yakar, The Univ. of Texas at Austin (USA) . . . . . [9355-4]

9:50 am: **In situ imaging of reacting single-particle zeolites by non-linear optical microscopy**, Paul Wrzesinski, Mikhail Slipchenko, Spectral Energies, LLC (USA); Taslima A. Zaman, Robert M. Rioux, The Pennsylvania State Univ. (USA); James R. Gord, Air Force Research Lab. (USA); Sukesh Roy, Spectral Energies, LLC (USA) . . . . . [9355-5]

Coffee Break . . . . . Sun 10:10 am to 10:40 am

SESSION 2

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . .SUN 10:40 AM TO 12:10 PM

Ultrashort Laser Microsurgery

Joint Session with Conferences 9321 and 9355

Session Chair: **Alexander Heisterkamp,**
Leibniz Univ. Hannover (Germany)

10:40 am: **Ultrafast laser surgery of transparent ocular tissues** *(Invited Paper)*, Daniel V. Palanker, Stanford Univ. (USA) . . . . . [9355-6]

11:10 am: **Ultrashort pulse laser interactions with cortical bone tissue for applications in orthopaedic surgery**, Simon A. Ashforth, Miriam C. Simpson, The Univ. of Auckland (New Zealand) . . . . . [9355-7]

11:30 am: **Laser-induced formation of micro-pores in the tissues for cartilage repair and treatment of glaucoma**, Emil N. Sobol, Olga I. Baum, Institute on Laser and Information Technologies (Russian Federation); Alexander Shnirelman, Concordia Univ. (Canada); Valerii Vinokour, Argonne National Lab. (USA) . . . . . [9321-1]

11:50 am: **Femtosecond laser collagen cross-linking without traditional photosensitizers**, Nicola G. Celi, Michael D. Yu, Sinisa Vukelic, Columbia Univ. (USA) . . . . . [9321-2]

Lunch/BiOS Exhibition Break . . . . . Sun 12:10 pm to 1:40 pm

SESSION 3

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . . .SUN 1:40 PM TO 3:30 PM

Optical Perforation and Manipulation of Cells I

Joint Session with Conferences 9321 and 9355

Session Chair: **Alexander Heisterkamp,**
Leibniz Univ. Hannover (Germany)

1:40 pm: **Perspectives in nano-structure assisted laser manipulation of mammalian cells** *(Invited Paper)*, Dag Heinemann, Laser Zentrum Hannover e.V. (Germany) . . . . . [9355-8]

2:10 pm: **Selective optoporation of cells targeted with functionalized gold nanoparticles enhancing ultrafast laser pulse irradiation**, Eric Bergeron, Alexandre Torres, Rosalie Martel, Camille Rodriguez, Christos Boutopoulos, Ecole Polytechnique de Montréal (Canada); Jukka Niskanen, Univ. de Montréal (Canada); Jean-Jacques Lebrun, Royal Victoria Hospital (Canada) and McGill Univ. Health Ctr. (Canada); Françoise M. Winnik, Univ. de Montréal (Canada); Michel Meunier, Ecole Polytechnique de Montréal (Canada) . . . . . [9355-9]

2:30 pm: **Mechanical response of single nerve cells estimated by femtosecond laser-induced impulsive force**, Takanori Iino, Nara Institute of Science and Technology (Japan); Tadahide Furuno, Aichi Gakuin Univ. (Japan); Man Hagiyama, Akihiko Ito, Kinki Univ. (Japan); Yoichiroh Hosokawa, Nara Institute of Science and Technology (Japan) . . . . . [9355-10]

2:50 pm: **Femtosecond-pulse plasmonic ionization kills cancer cells**, Limor Minai, Adel Zeidan, Daniella Yeheskely-Hayon, Dvir Yelin, Technion-Israel Institute of Technology (Israel) . . . . . [9355-11]

3:10 pm: **Evaluation of different laser systems for decolonization of bacteria under transparent nanocrystalline yttria-stabilized-zirconia cranial implants**, Yasaman Damestani, Yasuhiro Kodera, Javier E. Garay, Guillermo Aguilar, Univ. of California, Riverside (USA) . . . . . [9321-3]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 4

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . . .SUN 4:00 PM TO 6:00 PM

Optical Perforation and Manipulation of Cells II

Joint Session with Conferences 9321 and 9355

Session Chair: **Michel Meunier,**
Ecole Polytechnique de Montréal (Canada)

4:00 pm: **Effect of nanoparticle size on plasmonic enhanced off-resonance femtosecond laser nanocavitation**, Christos Boutopoulos, Ecole Polytechnique de Montréal (Canada) and Univ. of St Andrews (United Kingdom); Ali Hatef, Matthieu Fortin-Deschênes, David Rioux, Rémi Lachaine, Michel Meunier, Ecole Polytechnique de Montréal (Canada) . . . . . [9355-12]

4:20 pm: **Laser transfection with gold nanoparticles: Current state and new particle structures as a perspective**, Stefan Kalies, Lara Gentemann, Georgios C. Antonopoulos, Mirko Rakoski, Dag Heinemann, Markus Schomaker, Tammo Ripken, Laser Zentrum Hannover e.V. (Germany); Heiko Meyer, Laser Zentrum Hannover e.V. (Germany) and Hannover Medical School (Germany) . . . [9355-13]

LASE

4:40 pm: **Plasmonic cell transfection using micropyramid arrays**, Nabiha Saklayen, Daryl I. Vulis, Marinus Huber, Harvard Univ. (USA); Lauren E. Milling, Univ. of Illinois at Urbana-Champaign (USA); Sebastien Courvoisier, Univ. de Genève (Switzerland); Valeria Nuzzo, ECE PARIS Ecole d'Ingenieurs (France); Eric Mazur, Harvard Univ. (USA) . . . . . [9355-14]

5:00 pm: **Hemifusion of cells using femtosecond laser pulses**, Nir Katchinskiy, Roseline Godbout, Helly R. Goez, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) . . . . . [9321-4]

5:20 pm: **Sorting on the basis of deformability of single cells in a femtosecond laser fabricated optofluidic device**, Francesca Bragheri, Istituto di Fotonica e Nanotecnologie, CNR (Italy); Petra Paiè, Politecnico di Milano (Italy); Tie Yang, Giovanni Nava, Univ. degli Studi di Pavia (Italy); Rebeca Martìnez Vàzquez, Politecnico di Milano (Italy); Maira Di Tano, Manuela Veglione, Istituto di Genetica Molecolare, CNR (Italy); Paolo Minzioni, Univ. degli Studi di Pavia (Italy); Chiara Mondello, Istituto di Genetica Molecolare, CNR (Italy); Ilaria Cristiani, Univ. degli Studi di Pavia (Italy); Roberto Osellame, Istituto di Fotonica e Nanotecnologie, CNR (Italy) . . . . . [9355-15]

5:40 pm: **Design, simulation, and fabrication of plasmonic pyramid substrate for cell transfection**, Marinus Huber, Harvard Univ. (USA); Daryl I. Vulis, Harvard School of Engineering and Applied Sciences (USA); Nabiha Saklayen, Harvard Univ. (USA); Sébastien Courvoisier, Jean-Pierre Wolf, Univ. de Genève (Switzerland); Eric Mazur, Harvard School of Engineering and Applied Sciences (USA). . . . . [9355-16]

Monday 9 February

SESSION 5

LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . . MON 8:30 AM TO 10:10 AM

NOTE ROOM CHANGE

Emerging Ultrafast Laser Technologies I

Session Chair: **Peter R. Herman,** Univ. of Toronto (Canada)

8:30 am: **Nonlinear compression of industrial ultrafast lasers in hypocycloid-core Kagome hollow-core fiber**, Achut Giree, Amplitude Technologies (France); Florent Guichard, Guillaume Machinet, Yoann Zaouter, Yvon Hagen, Amplitude Systèmes (France); Benoit Debord, GPMM Group (France); Pascal Dupriez, ALPhANOV (France); Frédéric Gérôme, GPMM Group (France); Marc Hanna, Lab. Charles Fabry (France); Fetah A. Benabid, GPMM Group (France); Clemens Hönninger, Amplitude Systèmes (France); Patrick Georges, Lab. Charles Fabry (France); Eric P. Mottay, Amplitude Systèmes (France). . [9355-17]

8:50 am: **Simple single-shot complete spatiotemporal characterization of the intensity and phase of a complex ultrashort pulse**, Zhe Guang, Michelle Rhodes, Rick Trebino, Georgia Institute of Technology (USA) . . . . . [9355-18]

9:10 am: **Broadband midinfrared frequency comb with tooth scanning**, Kevin F. Lee, IMRA America, Inc. (USA); Piotr Maslowski, Nicolaus Copernicus Univ. (Poland); Andrew Mills, Christian Mohr, Jie Jiang, IMRA America, Inc. (USA); Peter G. Schunemann, BAE Systems (USA); Martin E. Fermann, IMRA America, Inc. (USA) . . . . . [9355-19]

9:30 am: **High-throughput on-chip analysis of single ion tracks created by laser-driven plasma accelerators**, Wei Luo, Faizan Shabbir, Chaokun Gong, Cagatay Gulec, Jeremy Pigeon, Jessica Shaw, Alon Greenbaum, Ting-wei Su, Ahmet F. Coskun, Sergei Y. Tochitsky, Chandrashekhar J. Joshi, Aydogan Ozcan, Univ. of California, Los Angeles (USA) . . . . . [9355-20]

9:50 am: **Pulse splitter to produce ultrafast bursts**, Antoine Courjaud, Vincent Clet, Areti Mourka, Amplitude Systèmes (France); Aghasi Lorsabyan, Candle Synchrtron Research Institute Foundation (Armenia); Eric P. Mottay, Amplitude Systèmes (France). . . . . [9355-21]

Coffee Break . . . . . Mon 10:10 am to 10:40 am

SESSION 6

LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . MON 10:40 AM TO 12:00 PM

Emerging Ultrafast Laser Technologies II

Session Chair: **Stefan Nolte,** Friedrich-Schiller-Univ. Jena (Germany)

10:40 am: **Low-noise supercontinuum: Development, characterization, and programmable biomedical imaging**, Haohua Tu, Yuan Liu, Sixian You, Stephen A. Boppart, Univ. of Illinois at Urbana-Champaign (USA) . . . . [9355-22]

11:00 am: **Yb:CaF_2 femtosecond laser in versatile burst mode: A powerful tool to optimize laser interaction**, Antoine Courjaud, Amplitude Systèmes (France); Jean-Gabriel Brisset, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Eric P. Mottay, Amplitude Systèmes (France) . . . . . [9355-23]

11:20 am: **Compressive ultrahigh-speed continuous imaging using spectrally-structured ultrafast laser pulses**, Bryan Bosworth, Jasper Stroud, Dung N. Tran, Sang Chin, Trac D. Tran, Mark Foster, Johns Hopkins Univ. (USA) . . . . . [9355-24]

11:40 am: **Compact fixed wavelength femtosecond oscillators for multi-photon applications**, Tommi Hakulinen, Spectra-Physics (Austria); Heinz P. Huber, Hochschule für Angewandte Wissenschaften München (Germany); Tilman Franke, FEI Munich GmbH (Germany); Ruben Zadoyan, Tommaso Baldacchini, Newport Corp. (USA). . . . . [9355-25]

Lunch Break . . . . . Mon 12:00 pm to 1:50 pm

SESSION 7

LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . . MON 1:50 PM TO 2:50 PM

Emerging Ultrafast Laser Technologies III

Session Chair: **Eric P. Mottay,** Amplitude Systèmes (France)

1:50 pm: **Efficient generation of continuum spectrum above 2 micron using microstructured fiber**, Stefano Taccheo, Swansea Univ. (United Kingdom); Silvia Soria Huguet, Istituto di Fisica Applicata Nello Carrara (Italy); Cosimo D'Andrea, Politecnico di Milano (Italy); Kay Schuster, Leibniz-Institut für Photonische Technologien e.V. (Germany) . . . . . [9355-26]

2:10 pm: **Low-phase-jitter CEP few-cycle laser system locked by high bandwidth direct modulation of a 'Finesse CEP' pump laser**, Thomas Binhammer, Stefan Rausch, Jan Ahrens, VENTEON Laser Technologies GmbH (Germany); Albrecht Bartels, Laser Quantum GmbH (Germany); Alan Cox, Laser Quantum UK (United Kingdom) . . . . . [9355-27]

2:30 pm: **Femtosecond pulse laser notch shaping via fiber Bragg grating for the excitation source on the coherent anti-stokes Raman spectroscopy**, Seung Ryeol Oh, Won Sik Kwon, Jin Hwan Kim, Soohyun Kim, Kyung-Soo Kim, KAIST (Korea, Republic of) . . . . . [9355-29]

Coffee Break . . . . . Mon 2:50 pm to 3:20 pm

SESSION 8

LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . . MON 3:20 PM TO 5:20 PM

Ultrafast Laser Micromachining

Session Chair: **Peter R. Herman,** Univ. of Toronto (Canada)

3:20 pm: **Plasma dynamics during fs-laser fabrication of waveguides inside zinc phosphate glass**, Javier Hernandez Rueda, Vladimir A. Semenov, Neil W. Troy, Univ. of California, Davis (USA); Charmayne E. Smith, Richard K. Brow, Missouri Univ. of Science and Technology (USA); Denise M. Krol, Univ. of California, Davis (USA) . . . . . [9355-30]

3:40 pm: **Increasing performance of mobile devices: fs laser assisted high quality photonic devices in display glass screens**, Jerome Lapointe, Mathieu Gagné, Raman Kashyap, Ecole Polytechnique de Montréal (Canada) . . . . . [9355-32]

4:00 pm: **Highly functional fiber cladding photonics: Real-time monitoring to control femtosecond laser writing of optical taps and filters**, Jason R. Grenier, Univ. of Toronto (Canada); Luis André Fernandes, OZ Optics Ltd. (Canada); Peter R. Herman, Univ. of Toronto (Canada) . . . . . [9355-33]

4:20 pm: **Catheter shape sensing with 3D fiber-cladding photonics based on femtosecond laser direct-written Bragg grating waveguides**, Kenneth K. C. Lee, Kyle H. Y. Cheng, Univ. of Toronto (Canada); Victor X. D. Yang, Ryerson Univ. (Canada); Peter R. Herman, Univ. of Toronto (Canada). . . . . [9355-34]

4:40 pm: **Ultrafast laser filamentation for scribing transparent optical glasses**, Jianzhao Li, Sijia Li, Erden Ertorer, Maryam Farahani, Peter R. Herman, Univ. of Toronto (Canada) . . . . . [9355-35]

5:00 pm: **Femtosecond laser waveguide writing inside zinc phosphate glasses: Role of composition on permanent photo-induced changes**, Vladimir A. Semenov, Denise M. Krol, Javier Hernandez Rueda, Neil W. Troy, Univ. of California, Davis (USA); Jeffrey D. Smith, Richard K. Brow, Missouri Univ. of Science and Technology (USA) . . . . . [9355-36]

Tuesday 10 February

SESSION 9

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . .TUE 8:00 AM TO 10:00 AM

NOTE ROOM CHANGE

Laser Micromachining in Bulk and Thin Film Materials

Joint Session with Conferences 9350 and 9355

Session Chair: **Bo Gu,** Bos Photonics (USA)

8:00 am: **Optimization of laser process conditions for cutting of thin metal and polymer sheets with femtosecond laser**, Klaus Stolberg, Susanna Friedel, Nikolas von Freyhold, Markus Röhner, JENOPTIK Laser GmbH (Germany) . . . . . [9355-37]

8:20 am: **Conditions for the formation of individual and periodic holes during Si ablation with ultrashort pulsed lasers**, Matthias Domke, Fachhochschule Vorarlberg (Austria) . . . . . [9355-38]

8:40 am: **Erasure and formation of femtosecond laser-induced nanostructures**, Felix Zimmermann, Friedrich-Schiller-Univ. Jena (Germany); Anton Plech, Karlsruher Institut für Technologie (Germany); Andreas Tünnermann, Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) . . . . . [9355-39]

9:00 am: **Quantized structuring of transparent films with femtosecond laser interference**, Stephen Ho, Kenneth K. C. Lee, Jianzhao Li, Peter R. Herman, Univ. of Toronto (Canada) . . . . . [9350-13]

9:20 am: **Adaptive optics for the laser fabrication of 3D graphitic microwires in diamond**, Patrick S. Salter, Bangshan Sun, Martin J. Booth, Univ. of Oxford (United Kingdom). . . . . [9355-40]

9:40 am: **Transient imaging with gated avalanche photodiodes**, Mauro Buttafava, Alberto Tosi, Politecnico di Milano (Italy); Kevin W. Eliceiri, Andreas Velten, Univ. of Wisconsin-Madison (USA) . . . . . [9355-41]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 10

LOCATION: ROOM 133 (EXHIBIT LEVEL) . . . . . TUE 10:30 AM TO 12:10 PM

Laser Micromachining of Glass

Joint Session with Conferences 9350 and 9355

Session Chair: **Sami T. Hendow,** Adaptive Laser Processing (USA)

10:30 am: **Ship-in-a-bottle integration by hybrid femtosecond laser technology for fabrication of true 3D biochips**, Felix Sima, Dong Wu, Jian Xu, Katsumi Midorikawa, Koji Sugioka, RIKEN (Japan) . . . . . [9350-14]

10:50 am: **Spatial and temporal temperature distribution of ultrashort pulse induced heat accumulation in glass**, Sören Richter, Friedrich-Schiller-Univ. Jena (Germany); Fumiya Hashimoto, Osaka Univ. (Japan); Yasuyuki Ozeki, Osaka Univ. (Japan) and Univ. of Tokyo (Japan); Kazuyoshi Itoh, Osaka Univ. (Japan); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Stefan Nolte, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9355-42]

11:10 am: **Formation of nanogratings in a porous glass immersed in water by femtosecond laser irradiation**, Yang Liao, Shanghai Institute of Optics and Fine Mechanics (China); Jielei Ni, SIOM (China); Lingling Qiao, SIOM (China) and SIOM (China); Min Huang, Sun Yat-Sen University (China); Yves Bellouard, Eindhoven University of Technology (Netherlands); Koji Sugioka, RIKEN (Japan); Ya Cheng, Shanghai Institute of Optics and Fine Mechanics (China). . . [9350-15]

11:30 am: **Laser induced structural modifications in fused silica within the microexplosion regime evidenced by Raman spectroscopy**, Nadezda Varkentina, Univ. Bordeaux 1 (France); Arnaud Royon, Univ. of Bordeaux 1 (France); Marc Dussauze, Univ. Bordeaux 1 (France); Yannick Petit, Univ. of Bordeaux 1 (France); Lionel Canioni, Univ. Bordeaux 1 (France) . . . . . [9350-16]

11:50 am: **Adaptable acylindrical optofluidic lenses fabricated by femtosecond laser micromachining**, Petra Paiè, Politecnico di Milano (Italy); Francesca Bragheri, Istituto di Fotonica e Nanotecnologie, CNR (Italy); Theo Claude, Ecole Normale Supérieure de Lyon (France); Roberto Osellame, Istituto di Fotonica e Nanotecnologie, CNR (Italy) . . . . . [9355-43]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 2:00 pm

BEST STUDENT PAPER COMPETITION AND AWARDS CEREMONY

LOCATION: ROOM 258 (MEZZANINE) . . . . . 2:00 PM TO 4:20 PM

NOTE ROOM CHANGE

Competition . . . . . 2:00 pm to 3:30 pm

Judging . . . . . 3:30 pm to 4:00 pm

Award Ceremony . . . . . 4:00 pm to 4:20 pm

We are pleased to announce that a cash prize will be awarded to the best student presentation in this conference (both poster and oral papers considered).

Papers submitted and presented by graduate and undergraduate students are eligible. In order to ensure a fair evaluation, the conference chairs and the program committee will judge the students during a special student competition session held during the conference. Here the students present a brief 5-minute summary of their original talk or poster presented at the conference.

Following the student competition, the judges will meet and decide on the winner. The winner and runner-up will be announced during the award ceremony and awarded a cash prize. In order to claim your cash prize, a manuscript must be submitted to the conference proceedings.

POSTERS-TUESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . TUE 6:00 TO 8:00 PM

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Time-resolved fluorescence polarization spectroscopy of visible and near infrared dyes in picosecond dynamics, Yang Pu, Robert R. Alfano, The City College of New York (USA) . . . . . [9355-44]

All-optical characterization of fs-laser induce refractive index changes in bulk and at the surface of zinc phosphate glasses, Javier Hernandez Rueda, Vladimir A. Semenov, Neil W. Troy, Univ. of California, Davis (USA); Charmayne E. Smith, Richard K. Brow, Missouri Univ. of Science and Technology (USA); Denise M. Krol, Univ. of California, Davis (USA) . . . . . [9355-45]

High speed fabrication of amorphization-induced periodic surface structures in crystalline silicon upon irradiation with a high repetition rate fs-laser, Javier Hernandez Rueda, Jan Siegel, Consejo Superior de Investigaciones Científicas (Spain); Ruth Lahoz, German F. de la Fuente, Univ. de Zaragoza (Spain) and Instituto de Ciencia de Materiales de Aragon (Spain); Francisco Javier Solís Céspedes, Consejo Superior de Investigaciones Científicas (Spain) . . . . . [9355-46]

Ultrafast electron dynamics of N2 under femtosecond and XUV attosecond laser pulse train irradiation, Cong Wang, Ji-an Duan, Central South Univ. (China); Lan Jiang, Beijing Institute of Technology (China); Xiaoyan Sun, Central South Univ. (China); Mengmeng Wang, Beijing Institute of Technology (China) and Univ. of Nebraska-Lincoln (USA) . . . . . [9355-47]

Plasmonic substrates for cell transfection, Marinna Madrid, Harvard School of Engineering and Applied Sciences (USA); Marinus Huber, Harvard Univ. (USA); Nicolas Vogel, Harvard School of Engineering and Applied Sciences (USA); Weilu Shen, Rensselaer Polytechnic Institute (USA); Nabiha Saklayen, Harvard Univ. (USA); Alexander Heisterkamp, Leibniz Univ. Hannover (Germany); Eric Mazur, Harvard School of Engineering and Applied Sciences (USA) . . . . . [9355-48]

Ultrashort pulsed laser tools for testing of semiconductor device hardness to local radiation effects caused by cosmic heavy ions, Oleg B. Mavritskii, Andrey N. Egorov, Alexandra V. Gordienko, Alexander A. Pechenkin, Dmitriy V. Savchenkov, National Research Nuclear Univ. MEPhI (Russian Federation) . . . . . [9355-49]

CONFERENCE 9356

LOCATION: ROOM 122 (EXHIBIT LEVEL) AND ROOM 276 (MEZZANINE)

Tuesday–Thursday 10–12 February 2015 • Proceedings of SPIE Vol. 9356

High-Power Laser Materials Processing: Lasers, Beam Delivery, Diagnostics, and Applications IV

Conference Chair: **Friedhelm Dorsch,** TRUMPF Laser- und Systemtechnik GmbH (Germany)

Program Committee: **Bo Gu,** Bos Photonics (USA); **Stefan Kaierle,** Laser Zentrum Hannover e.V. (Germany); **Ingomar Kelbassa,** Fraunhofer-Institut für Lasertechnik (Germany); **Annett Klotzbach,** Fraunhofer IWS Dresden (Germany); **Wolfgang Knapp,** Cooperation Laser Franco-Allemande (France); **Lin Li,** The Univ. of Manchester (United Kingdom); **Silke Pflueger,** DirectPhotonics, Inc. (USA); **Stephan Roth,** BLZ Bayerisches Laserzentrum GmbH (Germany); **Leonardo D. Scintilla,** Politecnico di Bari (Italy); **Kunihiko Washio,** Paradigm Laser Research Ltd. (Japan)

Tuesday 10 February

SESSION 1

LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . . TUE 1:35 PM TO 3:15 PM

NOTE ROOM CHANGE

Beam Delivery and Shaping

Joint Session with Conferences 9343 and 9356

Session Chair: **Friedhelm Dorsch,**
TRUMPF Laser- und Systemtechnik GmbH (Germany)

1:35 pm: **Hollow core fiber delivery of sub-ps pulses from a TruMicro 5000 Femto edition thin disk amplifier**, Sebastian Pricking, Raphael Gebs, Robert Fleischhaker, Jochen D. Kleinbauer, Dirk H. Sutter, Alexander Killi, TRUMPF Laser GmbH & Co. KG (Germany); Benoît Beaudou, GLOphotonics SAS (France); Benoit Debord, XLIM Institut de Recherche (France); Frédéric Gérôme, Fetah A. Benabid, GLOphotonics SAS (France) and XLIM Institut de Recherche (France); Sascha Weiler, TRUMPF Inc. (USA) . . . . . [9356-1]

1:55 pm: **Industrial beam delivery system for ultra-short pulsed laser**, Max C. Funck, Björn Wedel, Ilya Kayander, Jörg Niemeyer, PT Photonic Tools (Germany) . . . . . [9356-2]

2:15 pm: **Wavefront-sensor-induced beam size error: Physical mechanism, sensitivity analysis, and correction-method**, Wouter D. Koek, TNO Science and Industry (Netherlands); Erwin J. van Zwet, TNO (Netherlands) . . . . . [9356-3]

2:35 pm: **Wavelength- and magnification adaptive beam expansion with one set of components**, Ulrike Fuchs, asphericon GmbH (Germany) . . . . . [9356-4]

2:55 pm: **Effect of large deflection angle on the laser intensity profile produced by AOD scanners in high precision manufacturing**, Tiansi Wang, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Chong Zhang, Aleksandar Aleksov, Islam A. Salama, Intel Corp. (USA); Aravinda Kar, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9356-32]

Coffee Break . . . . . Tue 3:15 pm to 3:45 pm

SESSION 2

LOCATION: ROOM 122 (EXHIBIT LEVEL) . . . . . TUE 3:45 PM TO 5:25 PM

Beam Shaping

Joint Session with Conferences 9343 and 9356

Session Chair: **Lutz Aschke,**
LIMO Lissotschenko Mikrooptik GmbH (Germany)

3:45 pm: **Analysis and demonstration of a wavefront sensor based on binary pixellated transmission filters**, Jie Qiao, Lauren Taylor, Rochester Institute of Technology (USA); Gaozan Ding, Wheaton College (USA) and Rochester Institute of Technology (USA); Danny Dang, Rochester Institute of Technology (USA); Christophe Dorrer, Aktiwave LLC (USA). . . . . [9356-6]

4:05 pm: **Generation of doughnut spot for high-power laser technologies using refractive beam shaping**, Alexander V. Laskin, Vadim V. Laskin, AdlOptica Optical Systems GmbH (Germany); Aleksei Ostrun, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9356-7]

4:25 pm: **Optical alignment influenced aberrations in laser beam delivery systems and their correction**, Michael J. Scaggs, Gilbert J. Haas, Haas Laser Technologies, Inc. (USA) . . . . . [9343-28]

4:45 pm: **Beam uniformity of flat top lasers**, Chao Chang, Larry Cramer, Don Danielson, James Norby, Continuum (USA) . . . . . [9343-29]

5:05 pm: **Ultra-narrow UV laser lines for surface processing**, Mikhail M. Ivanenko, Vyacheslav Grimm, Lisa Kleinschmidt, Aliaksei Krasnaberski, Markus Wiesner, LIMO Lissotschenko Mikrooptik GmbH (Germany) . . . . . [9343-30]

POSTERS-TUESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . TUE 6:00 TO 8:00 PM

Conference attendees are invited to attend the LASE poster session on Tuesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Bioceramic coating of hydroxyapatite fabricated on $Ti_{-6}Al_{-4}V$ with Nd-YAG laser, Monnamme T. Tlotleng, CSIR National Laser Ctr. (South Africa); Esther Akinlabi, Univ. of Johannesburg (South Africa); Mukul Shukla, Motilal Nehru National Institute of Technology (India); Sisa Pityana, CSIR National Laser Ctr. (South Africa) . . . . . [9356-29]

Laser transmission welding of absorber-free thermoplastics using dynamic beam superposition, Viktor Mamuschkin, Fraunhofer-Institut für Lasertechnik (Germany) . . . . . [9356-30]

2500W monolithic CW near diffraction-limited fiber laser for industry applications, Wei Shi, Tianjin Univ. (China) and Tianjin Institute of Modern Laser & Optics Technology (China); Qiang Fang, Yuguo Qin, Xiangjie Meng, HFB Photonics Co., Ltd. (China) . . . . . [9356-31]

Wednesday 11 February

LASE PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . WED 10:20 AM TO 12:30 PM

Session Chairs: **Guido Hennig**, Daetwyler Graphics AG (Switzerland); **Yongfeng Lu**, Univ. of Nebraska-Lincoln (USA)

10:20 am: **Welcome and Opening Remarks**
Guido Hennig, Daetwyler Graphics AG (Switzerland); Yongfeng Lu, Univ. of Nebraska-Lincoln (USA)

10:25 am: **Announcement of the Green Photonics Best Paper Award and the 3D Printing, Fabrication, and Manufacturing Best Paper Award**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA); **Henry Helvajian,** The Aerospace Corp. (USA)

10:30 am: **NASA's Optical Communications Program: 2015 and Beyond**
Donald M. Cornwell Jr., NASA Headquarters, Space Communications and Navigation Program (USA) . . [9354-201]

11:10 am: **Coherent Combination of Ultrafast Laser Pulses: A Route to Joule-Class High Repetition Rate Femtosecond Lasers**
Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9344-202]

11:50 am: **Laser 3D Printing of Metallic Components and its Industrial Applications: Technical Breakthroughs and Opportunities**
Xiaoyan Zeng, Wuhan National Lab. for Optoelectronics (China). . . . . [9353-203]

Lunch/Exhibition Break . . . . . .Wed 12:30 pm to 2:00 pm

SESSION 3

LOCATION: ROOM 276 (MEZZANINE) . . . . . .WED 2:00 PM TO 3:30 PM

NOTE ROOM CHANGE

Laser Joining I

Session Chair: **Wolfgang Knapp,** Cooperation Laser Franco-Allemande (France)

2:00 pm: **Advantages and challenges of dissimilar materials in automotive lightweight construction** *(Invited Paper)*, Jan-Philipp Weberpals, Philipp A. Schmidt, Steffen Müller, AUDI AG (Germany). . . . . [9356-8]

2:30 pm: **Laser hybrid joining of plastic and metal components for lightweight components**, Jens Rauschenberger, Jan Keseberg, Asier Cenigaonaindia, Daniel Vogler, Ulrich Gubler, Leister Technologies AG (Switzerland) . . . . . [9356-9]

2:50 pm: **Microstructure and mechanical performance of carbon steel and stainless steel dissimilar laser welding**, Mohammadreza Nekouie Esfahani, Sundar Marimuthu, Jeremy M. Coupland, Loughborough Univ. (United Kingdom) . . . . . [9356-10]

3:10 pm: **Application of laser beam welding for joining ultra-high strength and supra-ductile steels**, Martin Dahmen, Fraunhofer-Institut für Lasertechnik (Germany) . . . . . [9356-11]

Coffee Break . . . . . .Wed 3:30 pm to 4:00 pm

SESSION 4

LOCATION: ROOM 276 (MEZZANINE) . . . . . WED 4:00 PM TO 5:50 PM

Laser Joining II

Session Chair: **Silke Pflueger,** DirectPhotonics, Inc. (USA)

4:00 pm: **Photonic processes and tools to produce light weight structures and components enabling energy and resource savings** *(Invited Paper)*, Uwe Stute, 4JET Technologies GmbH (Germany) . . . . . [9356-12]

4:30 pm: **Laser based metal and plastics joining for lightweight design**, Ulf Quentin, Marc Kirchhoff, Rüdiger Brockmann, Klaus Löffler, TRUMPF Laser- und Systemtechnik GmbH (Germany); David L. Havrilla, TRUMPF Inc. (USA) . . . . . [9356-13]

4:50 pm: **Enabling lightweight designs by a new laser based approach for joining aluminum to steel**, David L. Havrilla, TRUMPF Inc. (USA); Oliver Müllerschön, Antonio Candel-Ruiz, Rüdiger Brockmann, TRUMPF Laser- und Systemtechnik GmbH (Germany) . . . . . [9356-14]

5:10 pm: **Laser transmission welding of long glass fiber reinforced thermoplastics**, Kira van der Straeten, Christoph Engelmann, Alexander Olowinsky, Arnold Gillner, Fraunhofer-Institut für Lasertechnik (Germany) . . . . . [9356-15]

5:30 pm: **Direct diode lasers and their advantages for materials processing and other applications**, Haro Fritsche, Technische Univ. Berlin (Germany) and DirectPhotonics Industries GmbH (Germany); Fabio Ferrario, Ralf Koch, Bastian Kruschke, Ulrich Pahl, DirectPhotonics Industries GmbH (Germany); Silke Pflueger, DirectPhotonics, Inc. (USA); Andreas Grohe, Wolfgang Gries, DirectPhotonics Industries GmbH (Germany) . . . . . [9356-16]

Thursday 12 February

SESSION 5

LOCATION: ROOM 276 (MEZZANINE) . . . . . THU 8:30 AM TO 10:00 AM

Novel Applications

Session Chair: **Stefan Kaierle,** Laser Zentrum Hannover e.V. (Germany)

8:30 am: **Fatigue life enhancement of high reliability metallic components by laser shock processing** *(Invited Paper)*, José Luis Ocaña, Univ. Politécnica de Madrid (Spain) . . . . . [9356-17]

9:00 am: **Laser chemical vapor doping of platinum in MP35N micro lead wires of pacemaker implants for MRI compatible bio-medical applications**, Shiva P. Gadag, Southern Methodist Univ. (USA) . . . . . [9356-18]

9:20 am: **High power laser sources in industrial applications: A comparative perspective**, Jianwu Ding, Imtiaz Majid, Musse Awale, Ken Smith, Convergent Photonics (USA); Mohammed Naeem, Prima Power Laserdyne LLC (USA) . . . . . [9356-19]

9:40 am: **Development of a low cost, 3-DOF desktop laser cutter using 3D printer hardware**, Jamil Jivraj, Ronnie Wong, Yize Huang, Yi Lu, Barry Vuong, Joel Ramjist, Xijia Gu, Victor Yang, Ryerson Univ. (Canada) . . . . . [9356-20]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 6

LOCATION: ROOM 276 (MEZZANINE) . . . . . .THU 10:30 AM TO 11:50 AM

Process Monitoring and Sensors

Session Chair: **Stephan Roth,** BLZ Bayerisches Laserzentrum GmbH (Germany)

10:30 am: **Latest progress in laser process monitoring and control**, Stefan Kaierle, Laser Zentrum Hannover e.V. (Germany) . . . . . [9356-21]

10:50 am: **Real-time analysis of laser beams by simultaneous imaging on a single camera chip**, Stefan Piehler, Meiko Boley, Marwan Abdou Ahmed, Thomas Graf, Univ. Stuttgart (Germany). . . . . [9356-22]

11:10 am: **Process observation in selective laser melting (SLM)**, Ulrich Thombansen, Peter Abels, Fraunhofer-Institut für Lasertechnik (Germany) . . . . . [9356-23]

11:30 am: **Wide spectral band beam analysis**, Oren Aharon, Duma Optronics Ltd. (Israel) . . . . . [9356-24]

Lunch/Exhibition Break . . . . . Thu 11:50 am to 1:20 pm

SESSION 7

LOCATION: ROOM 276 (MEZZANINE) . . . . . .THU 1:20 PM TO 2:40 PM

Surface Treatment

Session Chair: **Friedhelm Dorsch,** TRUMPF Laser- und Systemtechnik GmbH (Germany)

1:20 pm: **A new pulsed Q-switched CO_2-laser as a tool for surface pre-treatment of CFRP for adhesive bonding**, Fabian Fischer, Stefan Kreling, Malte Cohrs, Klaus Dilger, Technische Univ. Braunschweig (Germany). [9356-25]

1:40 pm: **Active optical system for advanced 3D surface structuring by laser remelting**, Oliver Pütsch, André Temmler, RWTH Aachen (Germany); Jochen Stollenwerk, RWTH Aachen (Germany) and Fraunhofer Institute for Laser Technology (Germany); Edgar Willenborg, Fraunhofer-Institut für Lasertechnik (Germany); Peter Loosen, RWTH Aachen (Germany) and Fraunhofer Institute for Laser Technology (Germany) . . . . . [9356-26]

2:00 pm: **Very high speed large area surface processing using nanosecond pulsed lasers**, Nick Hay, Aos AlWaidh, Ian A. Baker, Young Kwon, Powerlase Photonics Ltd. (United Kingdom) . . . . . [9356-27]

2:20 pm: **Study of fundamental laser material interaction parameters in powder melting**, Wasiu Ayoola, Wojciech J. Suder, Stewart Williams, Cranfield Univ. (United Kingdom) . . . . . [9356-28]

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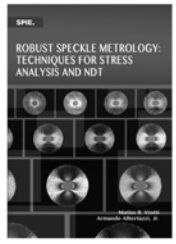

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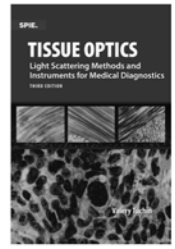

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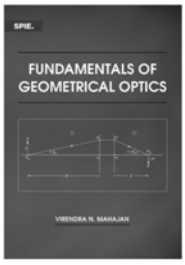

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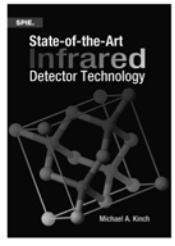

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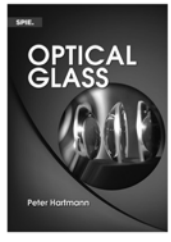

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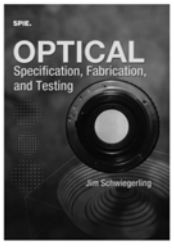

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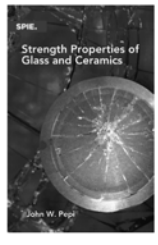

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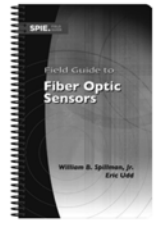

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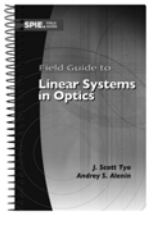

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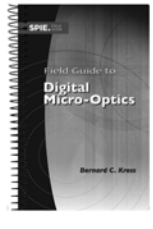

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Program Chair: **Benjamin Dingel,** Nasfine Photonics, Inc. (USA)

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Program Chair: **Klaus P. Streubel,** OSRAM AG (Germany)

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CONFERENCE 9357
LOCATION: ROOM 121 (EXHIBIT LEVEL)

Monday–Thursday 9–12 February 2015 • Proceedings of SPIE Vol. 9357

Physics and Simulation of Optoelectronic Devices XXIII

Conference Chairs: **Bernd Witzigmann,** Univ. Kassel (Germany); **Marek Osiński,** The Univ. of New Mexico (USA); **Fritz Henneberger,** Humboldt-Univ. zu Berlin (Germany); **Yasuhiko Arakawa,** The Univ. of Tokyo (Japan)

Program Committee: **Hiroshi Amano,** Nagoya Univ. (Japan); **Toshihiko Baba,** Yokohama National Univ. (Japan); **Enrico Bellotti,** Boston Univ. (USA); **Guillermo Carpintero del Barrio,** Univ. Carlos III de Madrid (Spain); **Weng W. Chow,** Sandia National Labs. (USA); **Alexandre Freundlich,** Univ. of Houston (USA); **Frédéric Grillot,** Télécom ParisTech (France); **Ortwin Hess,** Imperial College London (United Kingdom); **Thomas A. Klar,** Johannes Kepler Univ. Linz (Austria); **Stephan W. Koch,** Philipps-Univ. Marburg (Germany); **Vassilios I. Kovanis,** Air Force Research Lab. (USA); **Cun-Zheng Ning,** Arizona State Univ. (USA); **Joachim Piprek,** NUSOD Institute LLC (USA); **Ikuo Suemune,** Hokkaido Univ. (Japan)

Monday 9 February

OPTO PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA). . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA). . . . . [9371-202]

Coffee Break . . . . . Mon 10:10 am to 10:40 am

SESSION 1
LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . .MON 10:40 AM TO 12:00 PM

Nonlinear Effects in Semiconductor Lasers
Session Chair: **Vassilios I. Kovanis,** Air Force Research Lab. (USA)

10:40 am: **Chaos in VCSEL light polarization dynamics** *(Invited Paper)*, Marc Sciamanna, Supélec (France); Martin Virte, Supélec (France) and Vrije Univ. Brussel (Belgium); Emeric Mercier, Supélec (France); Hugo Thienpont, Krassimir Panajotov, Vrije Univ. Brussel (Belgium) . . . . . [9357-1]

11:10 am: **Free space ranging based on a chaotic long-wavelength VCSEL with optical feedback.**, Ana Quirce, Vrije Univ. Brussel (Belgium); Pablo Perez, Angel Valle, Luis Pesquera, Univ. de Cantabria (Spain); Ignacio Esquivias, Univ. Politécnica de Madrid (Spain); Krassimir Panajotov, Hugo Thienpont, Vrije Univ. Brussel (Belgium). . . . . [9357-2]

11:30 am: **Optothermally induced excitabilities and instabilities in quantum dot lasers**, Bryan Kelleher, Tyndall National Institute (Ireland) and Cork Institute of Technology (Ireland); Boguslaw Tykalewicz, David Goulding, Stephen P. Hegarty, Tyndall National Institute (Ireland); Guillaume Huyet, Tyndall National Institute (Ireland) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Thomas Erneux, Univ. Libre de Bruxelles (Belgium); Evgeny A. Viktorov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) and Univ. Libre de Bruxelles (Belgium) . . . . . [9357-3]

11:50 am: **Spectral phase aberration and its influence on pulse compression in an actively modulated ultrafast laser system**, Ke Wang, Ping Qiu, Shenzhen Univ. (China) . . . . . [9357-4]

Lunch Break . . . . . .Mon 12:10 pm to 1:50 pm

SESSION 2
LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . MON 1:50 PM TO 3:00 PM

Plasmonic Materials
Session Chair: **Paolo Biagioni,** Politecnico di Milano (Italy)

1:50 pm: **Coupled simulation of carrier transport and electrodynamics: the EMC/FDTD/MD technique** *(Invited Paper)*, Irena Knezevic, Univ. of Wisconsin-Madison (USA). . . . . [9357-5]

2:20 pm: **Large-area gate-tunable terahertz plasmonic metasurfaces employing graphene anti-dot array structures**, Peter Q. Liu, Federico Valmorra, Curdin Maissen, Giacomo Scalari, Jérôme Faist, ETH Zürich (Switzerland) . . . . . [9357-6]

2:40 pm: **Metal germanides for group IV based mid-infrared plasmonics**, Justin W. Cleary, Air Force Research Lab. (USA); Nima Nader, Solid State Scientific Corp. (USA); William Streyer, Univ. of Illinois at Urbana-Champaign (USA); Shiva R. Vangala, Solid State Scientific Corp. (USA); Daniel M. Wasserman, Univ. of Illinois at Urbana-Champaign (USA); Richard Soref, Univ. of Massachusetts Boston (USA) . . . . . [9357-7]

Coffee Break . . . . . .Mon 3:00 pm to 3:30 pm

SESSION 3
LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . .MON 3:30 PM TO 4:30 PM

Optoelectronics Active Materials I
Session Chair: **Irena Knezevic,** Univ. of Wisconsin-Madison (USA)

3:30 pm: **Modeling of optical amplifier waveguide based on silicon nanostructures and rare earth ions doped silica matrix gain media by a Finite difference time domain method: comparison of achievable gain with Er3+ or Nd3+ ions doped waveguide.**, Julien C. Cardin, Ctr. de Recherche sur les Ions, les Matériaux et la Photonique (France); Alexandre Fafin, Ecole Nationale Supérieure d'Ingenieurs de Caen et Ctr. de Recherche (France); Christian Dufour, Ctr. de Recherche sur les Ions, les Matériaux et la Photonique (France); Fabrice Gourbilleau, ENSICAEN (France). . . . . [9357-9]

3:50 pm: **Valley-selective optical pumping scheme in compound semiconductors**, Tetsuya Sakamoto, The Univ. of Tokyo (Japan); Yuhsuke Yasutake, The Univ. of Tokyo (Japan) and Japan Science and Technology Agency (Japan); Susumu Fukatsu, The Univ. of Tokyo (Japan) . . . . . [9357-10]

4:10 pm: **Photo-modulated reflection and temperature-dependent photoluminescence studies of Ga(AsBi) bulk and quantum well structures**, Nils Rosemann, Jan Kuhnert, Peter Ludewig, Lukas Nattermann, Kerstin Volz, Sangam Chatterjee, Philipps-Univ. Marburg (Germany). . . . . [9357-11]

Tuesday 10 February

SESSION 4

LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . TUE 8:30 AM TO 10:00 AM

Optoelectronics Active Materials II

Session Chair: **Shi-Wei Chu,** National Taiwan Univ. (Taiwan)

8:30 am: **Impact of alloy fluctuation effects on the optoelectronic properties of InAlN and InGaN materials and devices** *(Invited Paper)*, Eoin P. O'Reilly, Stefan Schulz, Tyndall National Institute (Ireland); Miguel A. Caro, Aalto Univ. (Finland). . . . . [9357-13]

9:00 am: **Dual-wavelength GaInNAs semiconductor quantum-well distributed feedback laser**, Xiao Sun, Qingjiang Chang, Alcatel-Lucent Shanghai Bell Co. Ltd. (China) . . . . . [9357-14]

9:20 am: **Modeling Extreme-ultraviolet emission from laser-produced plasma using particle-in-cell method**, Po-Yen Lai, Shih-Hung Chen, National Central Univ. (Taiwan) . . . . . [9357-15]

9:40 am: **Phonon absorption induced thermal bistability in PECVD grown silicon nitride waveguide**, Tingyi Gu, Columbia Univ. (USA); Mingbin Yu, Dim-Lee Kwong, A*STAR Institute of Microelectronics (Singapore); Chee Wei Wong, Columbia Univ. (USA) . . . . . [9357-16]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 5

LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . TUE 10:30 AM TO 12:10 PM

Plasmonics

Session Chair: **Yong-Hee Lee,** KAIST (Korea, Republic of)

10:30 am: **Mid-infrared sensing with plasmonic germanium antennas** *(Invited Paper)*, Paolo Biagioni, Emilie Sakat, Politecnico di Milano (Italy); Leonetta Baldassarre, Istituto Italiano di Tecnologia (Italy); Eugenio Calandrini, Univ. degli Studi di Roma La Sapienza (Italy); Antonio Samarelli, Kevin Gallacher, Univ. of Glasgow (United Kingdom); Jacopo Frigerio, Politecnico di Milano (Italy); Giovanni Isella, Lab. for Epitaxial Nanostructures on Silicon and Spintronics (Italy); Douglas J. Paul, Univ. of Glasgow (United Kingdom); Michele Ortolani, Univ. degli Studi di Roma La Sapienza (Italy). . . . . [9357-17]

11:00 am: **Nonlinear plasmonic scattering and its application to superresolution microscopy** *(Invited Paper)*, Shi-Wei Chu, Hsueh-Yu Wu, Yen-Ta Huang, Hsuan Lee, Kuan-Yu Li, Po-Hsuan Lee, Po-Ting Shen, National Taiwan Univ. (Taiwan); Ryosuke Oketani, Yasuo Yonemaru, Satoshi Kawata, Osaka Univ. (Japan); Chih-Wei Chang, National Taiwan Univ. (Taiwan); Kung-Hsuan Lin, Academia Sinica (Taiwan); Katsumasa Fujita, Osaka Univ. (Japan). . . . . [9357-18]

11:30 am: **Propagation characteristics of multilayered subwavelength gratings composed of metallic nanoparticles**, Joaquim Junior Isidio de Lima, Juarez Caetano da Silva, Vitaly Felix Rodriguez-Esquerre, Univ. Federal da Bahia (Brazil) . . . . . [9357-19]

11:50 am: **Effects of surface plasmon localization and grating shape on the light emission enhancement in quantum-well emitters**, Toufik Sadi, Jani Oksanen, Jukka J. Tulkki, Aalto Univ. (Finland). . . . . [9357-20]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 1:50 pm

SESSION 6

LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . TUE 1:50 PM TO 2:50 PM

Quantum Dot Lasers

Session Chair: **Alexander Carmele,** Technische Univ. Berlin (Germany)

1:50 pm: **Impact of the carrier relaxation paths on two-state operation in quantum dot lasers**, Grigorii S. Sokolovskii, Vladislav V. Dudelev, Ioffe Physical-Technical Institute (Russian Federation); Ekaterina D. Kolykhalova, Ioffe Physical-Technical Institute (Russian Federation) and St.Petersburg State Electrotechnical Univ. (Russian Federation); Ksenya K. Soboleva, Saint-Petersburg State Polytechnical Univ. (Russian Federation); Anton G. Deryagin, Innokenty I. Novikov, Mikhail V. Maximov, Ioffe Physical-Technical Institute (Russian Federation); Alexey E. Zhukov, St. Petersburg Academic Univ. (Russian Federation); Victor M. Ustinov, Vladimir I. Kuchinskii, Ioffe Physical-Technical Institute (Russian Federation); Wilson Sibbett, Univ. of St. Andrews (United Kingdom); Edik U. Rafailov, Aston Univ. (United Kingdom); Evgeny A. Viktorov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) and Univ. Libre de Bruxelles (Belgium); Thomas Erneux, Univ. Libre de Bruxelles (Belgium) . . . . . [9357-21]

2:10 pm: **Influence of Inhomogeneous Broadening on the Dynamics of Quantum Dot Lasers**, Cheng Wang, Institut National des Sciences Appliquées de Rennes (France); Mariangela Gioannini, Ivo Montrosset, Politecnico di Torino (Italy); Jacky Even, Institut National des Sciences Appliquées de Rennes (France); Frédéric Grillot, Télécom ParisTech (France) and Ecole Nationale Supérieure des Télécommunications (France) . . . . . [9357-22]

2:30 pm: **Ultrafast excitable switching between two lasing states in quantum dot lasers**, Bryan Kelleher, Tyndall National Institute (Ireland) and Cork Institute of Technology (Ireland); Boguslaw Tykalewicz, David Goulding, Stephen P. Hegarty, Tyndall National Institute (Ireland); Guillaume Huyet, Tyndall National Institute (Ireland) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Evgeny A. Viktorov, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) and Univ. Libre de Bruxelles (Belgium) . . . . . [9357-23]

Coffee Break . . . . . Tue 2:50 pm to 3:30 pm

SESSION 7

LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . TUE 3:30 PM TO 5:40 PM

Nanolasers

Session Chair: **Eoin P. O'Reilly,** Tyndall National Institute (Ireland)

3:30 pm: **How small can one make a semiconductor laser?** *(Invited Paper)*, Jacob B. Khurgin, Johns Hopkins Univ. (USA) . . . . . [9357-25]

4:00 pm: **Purcell effect of very small metallic cavity** *(Invited Paper)*, Yong-Hee Lee, Jung H. Shin, Jung-Hwan Song, KAIST (Korea, Republic of) . . . . . [9357-26]

4:30 pm: **Theory of an optically-driven quantum-dot phonon laser** *(Invited Paper)*, Julia Kabuss, Andreas Knorr, Technische Univ. Berlin (Germany) . . . . . [9357-27]

5:00 pm: **Rate equation analysis of high-speed nanolasers**, William Hayenga, Mercedeh Khajavikhan, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA). . . . . [9357-28]

5:20 pm: **Superradiance and super-thermal photon emission from quantum-dot microcavity lasers**, Christopher Gies, Univ. Bremen (Germany); Heinrich A. Leymann, Alexander Foerster, Jan Wiersig, Univ. of Magdeburg (Germany); Sven Höfling, Univ. of St. Andrews (United Kingdom); Marc Assmann, Manfred Bayer, Technische Univ. Dortmund (Germany); Frank Jahnke, Univ. Bremen (Germany) . . . . . [9357-29]

Wednesday 11 February

SESSION 8

LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . WED 8:30 AM TO 10:30 AM

Non-Classical Light

Session Chair: **Aldo Di Carlo,**
Univ. degli Studi di Roma "Tor Vergata" (Italy)

8:30 am: **Quantum optics in many-body physics: Superradiance, quantum feedback, and optomechanical quantum nonlinearities** *(Invited Paper)*, Alexander Carmele, Andreas Knorr, Technische Univ. Berlin (Germany) [9357-30]

9:00 am: **Theoretical and experimental considerations on threshold limitations of the SPASER** *(Invited Paper)*, Günter Kewes, Rogelio Rodriguez-Oliveros, Kathrin Höfer, Alexander Kuhlicke, Humboldt-Univ. zu Berlin (Germany); Kurt Busch, Humboldt-Univ. zu Berlin (Germany) and Max-Born Institut (Germany); Oliver Benson, Humboldt-Univ. zu Berlin (Germany) [9357-31]

9:30 am: **Theory of deterministic and robust entanglement of nitrogen-vacancy centers via low-Q photonic-crystal cavities**, Julia Kabuss, Technische Univ. Berlin (Germany); Janik Wolters, Oliver Benson, Humboldt-Univ. zu Berlin (Germany); Andreas Knorr, Technische Univ. Berlin (Germany) . . . . . [9357-32]

9:50 am: **Non-classical light from single and coupled quantum dots in semiconductor nanowires**, Milad Khoshnegar, Univ. of Waterloo (Canada); Tobias Huber, Univ. of Innsbruck (Austria); Dan Dalacu, National Research Council Canada (Canada); Ana Predojevic, Univ. of Innsbruck (Austria); Philip J. Poole, National Research Council Canada (Canada); Gregor Weihs, Univ. of Innsbruck (Austria); Amir H. Majedi, Univ. of Waterloo (Canada) . . . . . [9357-33]

10:10 am: **Photon pairs from a biexciton cascade with feedback-controlled polarization entanglement**, Sven M. Hein, Franz Schulze, Technische Univ. Berlin (Germany); Alexander Carmele, Technische Univ. Berlin (Austria); Andreas Knorr, Technische Univ. Berlin (Germany) . . . . . [9357-34]

Coffee Break . . . . . Wed 10:30 am to 11:00 am

OPTO

CONFERENCE 9357
LOCATION: ROOM 121 (EXHIBIT LEVEL)

SESSION 9
LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . WED 11:00 AM TO 12:20 PM

Semiconductor Lasers

Session Chair: **Bernd Witzigmann,** Univ. Kassel (Germany)

11:00 am: **Passive cavity laser and tilted wave laser for coherently-coupled bars and stacks**, Nikolay N. Ledentsov, Vitaly A. Shchukin, VI Systems GmbH (Germany); Mikhail V. Maximov, Nikita Y. Gordeev, Nikolay A. Kalyuzhnyi, Sergey A. Mintairov, Alexey S. Payusov, Yuri M. Shernyakov, Ioffe Physical-Technical Institute (Russian Federation) . . . . . [9357-35]

11:20 am: **Nonlinear conversion efficiency of InAs/InP nanostructured Fabry-Perot lasers**, Heming Huang, Télécom ParisTech (France); Kevin Schires, Télécom ParisTech (France) and Telecom ParisTech (France); Mohamed-Essghair Chaibi, Télécom ParisTech (France); Philip J. Poole, National Research Council Canada (Canada); Didier Erasme, Frédéric Grillot, Télécom ParisTech (France) . . . . . [9357-37]

11:40 am: **Transition from absolute to convective instabilities in a swept source laser**, Bryan Kelleher, Tyndall National Institute (Ireland) and Cork Institute of Technology (Ireland); Svetlana Slepneva, Ben O'Shaughnessy, David Goulding, Tyndall National Institute (Ireland); Andrei G. Vladimirov, Weierstrass-Institut für Angewandte Analysis und Stochastik (Germany); Stephen P. Hegarty, Tyndall National Institute (Ireland); Guillaume Huyet, Tyndall National Institute (Ireland) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9357-38]

12:00 pm: **Nitride-on-silicon microdisks resonators for deep-UV laser emission at room-temperature,** Julien Sellés, Guillaume Cassabois, Thierry Guillet, Christelle Brimont, Univ. Montpellier 2 (France); Philippe Boucaud, Xavier Checoury, I. Roland, Y. Zeng, Institut d'Électronique Fondamentale (France); Meletios Mexis, Fabrice Semond, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France); Bruno Gayral, Commissariat à l'Énergie Atomique (France . . . . . [9357-76]

Lunch/Exhibition Break . . . . . .Wed 12:00 pm to 1:40 pm

SESSION 10
LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . WED 1:40 PM TO 3:10 PM

Solar Cell Simulation

Joint Session with Conferences 9357 and 9358

Session Chairs: **Bernd Witzigmann,** Univ. Kassel (Germany); **Alexandre Freundlich,** Univ. of Houston (USA)

1:40 pm: **Simulation of solid-state dye solar cells based on organic and perovskite sensitizers** *(Invited Paper)*, Aldo Di Carlo, Desireé Gentilini, Univ. degli Studi di Roma "Tor Vergata" (Italy); Alessio Gagliardi, Technische Univ. München (Germany) . . . . . [9357-39]

2:10 pm: **Surface photo-voltage properties near grain boundaries in $Cu_2ZnSn(S,Se)_4$ thin-films solar cells**, Gee Yeong Kim, Ju Ri Kim, William Jo, Trang T. Nguyen, Hae-Young Shin, Seokhyun Yoon, Ewha Womans Univ. (Korea, Republic of); Dae-Ho Son, Dae-Hwan Kim, Jin-Kyu Kang, Daegu Gyeongbuk Institute of Science & Technology (Korea, Republic of) . . . [9357-40]

2:30 pm: **Impacts of contacts and interdot coupling on the photovoltaic performance of quantum dot arrays**, Aude Berbezier, Urs Aeberhard, Forschungszentrum Jülich GmbH (Germany) . . . . . [9358-24]

2:50 pm: **Radiative dark current in optically-thin III-V photovoltaic devices**, Roger E. Welser, Magnolia Optical Technologies, Inc. (USA); Rao Tatavarti, MicroLink Devices, Inc. (USA) . . . . . [9358-47]

Coffee Break . . . . . .Wed 3:10 pm to 3:40 pm

SESSION 11
LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . WED 3:40 PM TO 4:40 PM

Electromagnetics

Session Chair: **Frédéric Grillot,** Télécom ParisTech (France)

3:40 pm: **Modes analysis in random structures varying the disorder magnitude**, Carlo Molardi, Univ. degli Studi di Parma (Italy); Houkun Liang, Xia Yu, Singapore Institute of Manufacturing Technology (Singapore); Annamaria Cucinotta, Stefano Selleri, Univ. degli Studi di Parma (Italy); Ying Zhang, Singapore Institute of Manufacturing Technology (Singapore) . . . . . [9357-42]

4:00 pm: **Compact polarization beam splitter for silicon-based slot waveguides based on an asymmetrical multimode interference coupler**, Yin Xu, Jinbiao Xiao, Xiaohan Sun, Southeast Univ. (China). . . . . [9357-43]

4:20 pm: **Simulating the linear and nonlinear response of 1D nanostructures with a B-spline modal method**, Patrick Bouchon, ONERA (France); Paul Chevalier, ONERA (France) and Lab. de Photonique et de Nanostructures (France); Sébastien Héron, ONERA (France) and LPN/CNRS (France); Fabrice Pardo, Lab. de Photonique et de Nanostructures (France); Riad Haïdar, ONERA (France) . . . . . [9357-44]

POSTERS-WEDNESDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Graphene-based metamaterial structures with single and multiple tunable transparency windows, Jun Ding, Bayaner Arigong, Han Ren, Mi Zhou, Jin Shao, Yuankun Lin, Hualiang Zhang, Univ. of North Texas (USA) . . [9357-50]

Tunable graphene-based dual-frequency cross polarization converters, Jun Ding, Bayaner Arigong, Han Ren, Jin Shao, Mi Zhou, Yuankun Lin, Hualiang Zhang, Univ. of North Texas (USA) . . . . . [9357-51]

Cavity-mode properties of semiconductor lasers operating in strong-feedback regime, Qin Zou, Télécom SudParis (France) and Institut Mines-Télécom (France). . . . . [9357-52]

Multichannel high-current-sensitivity all-fiber current sensor, Junzhen Jiang, Fujian Normal Univ. (China); Hao Zhang, Fujian Jiangxia Univ. (China); Baocheng Lin, Zhangting Huang, Yishen Qiu, Fujian Normal Univ. (China) . . . . . [9357-53]

Polarization-dependent photocurrent in MoS_2 phototransistor, Jiu Li, Wentao Yu, Saisai Chu, Hong Yang, Peking Univ. (China); Kebin Shi, Qihuang Gong, Peking Univ. (China) and Collaborative Innovation Ctr. of Quantum Matter (China) . . . . . [9357-54]

Nano scale confinement using dielectric waveguides at the mid-infrared region, Rania Gamal, The American Univ. in Cairo (Egypt) and Zewail City of Science and Technology (Egypt); Sarah A. Shafaay, The American Univ. in Cairo (Egypt); Yehea Ismail, The American Univ. in Cairo (Egypt) and Zewail City of Science and Technology (Egypt); Mohamed A. Swillam, The American Univ. in Cairo (Egypt) . . . . . [9357-55]

Designing plasmonic slot waveguide networks using a semi-analytical approach, Mohamed A. Swillam, The American Univ. in Cairo (Egypt); Amr S. Helmy, Univ. of Toronto (Canada) . . . . . [9357-56]

Automatic modulation format recognition for the next-generation optical communication networks using artificial neural networks, Latifa Guesmi, Hraghi Abir, Mourad Menif, SUP'COM (Tunisia) . . . . . [9357-57]

High Q/V hybrid photonic-plasmonic crystal nanowire cavity at telecommunication wavelengths, Chih-Kai Chiang, Yi-Cheng Chung, National Taiwan Ocean Univ. (Taiwan); Pi-Ju Cheng, Academia Sinica (Taiwan); Chien-Wei Wu, National Taiwan Ocean Univ. (Taiwan); Chung-Hao Tien, National Chiao Tung University (Taiwan); Tzy-Rong Lin, National Taiwan Ocean Univ. (Taiwan) . . . . . [9357-58]

High efficiency and broadband superconducting nanowire single photon detector with a composite optical structure, Min Gu, Lin Kang, Labao Zhang, Tao Jia, Chao Wan, Ruiying Xu, Xiaozhong Yang, Peiheng Wu, Nanjing Univ. (China) . . . . . [9357-59]

Investigation of degraded efficiency in blue InGaN multiple-quantum well light-emitting diodes, Yen-Kuang Kuo, National Changhua Univ. of Education (Taiwan); Jih-Yuan Chang, Kuang-Ming Junior High School (Taiwan) . . [9357-60]

Parity-time symmetry breaking in surface-plasmon waveguides, Youngsun Choi, Jong Kyun Hong, Seok-Ho Song, Hanyang Univ. (Korea, Republic of) . . . . . [9357-62]

Analysis of microwave frequency combs generated by semiconductor lasers under hybrid optical injections, Yu-Shan Juan, Cheng-Ting Lin, Yi-Hua Wu, Yuan Ze Univ. (Taiwan) . . . . . [9357-63]

Investigation of the influence of unwanted micro lenses caused by semiconductor processing excursions on optical behavior of CMOS photodiodes, Andrea Kraxner, Jong Mun Park, Rainer Minixhofer, ams AG (Austria) . . . . . [9357-64]

Numerical simulation of the transverse coincidence distribution of SPDC light, Robert Elsner, Dirk Puhlmann, Axel Heuer, Ralf Menzel, Univ. Potsdam (Germany) . . . . . [9357-65]

Enhancement of figure of merit of a SPR based fiber optic sensor using tin oxide as an intermediate layer, Satyendra K. Mishra, Anisha Pathak, Banshi D. Gupta, Indian Institute of Technology Delhi (India) . . . . . [9357-66]

Circuit-level simulation of transistor lasers and its application to modelling of microwave photonic links, Stavros Iezekiel, Andreas Christou, Univ. of Cyprus (Cyprus) . . . . . [9357-67]

Constant-loss taper for mode conversion, Alexandre Horth, McGill Univ. (Canada); Raman Kashyap, Ecole Polytechnique de Montréal (Canada); Nathaniel Quitoriano, McGill Univ. (Canada) . . . . . [9357-68]

Numerical full vectorial modeling method for calculating dispersion characteristics of single-mode high-contrast arbitrary radial refractive index profile optical fibers, Raushan Mussina, Hadi Baghsiahi, F. Aníbal Fernández, David R. Selviah, Univ. College London (United Kingdom) . [9357-69]

A complete theoretical description of the first-order delta-sigma modulation for analog-to-binary conversion, Azad Siahmakoun, Erin Reeves, Rose-Hulman Institute of Technology (USA); Pablo A. Costanzo Caso, Ctr. de Investigaciones Ópticas (Argentina) . . . . . [9357-70]

Controllable harmonic generation by double couplings of ordinary rays-involved second-order processes, Yiqiang Qin, Nanjing Univ. (China) [9357-72]

Simulation of the influence of the passivation layer on the plasmonic filter for IR image sensors, Hong-Kun Lyu, Hui-Sup Cho, Daegu Gyeongbuk Institute of Science & Technology (Korea, Republic of); Sung-Hyun Jo, Jang-Kyoo Shin, Kyungpook National Univ. (Korea, Republic of) . . . . . [9357-73]

Optoelectronic properties of graphene on silicon substrate: effect of defects in graphene, Brahmanandam Javvaji, Indian Institute of Science (India); A. Ghan, National Institute of Technology, Karnataka (India); D. Roy Mahapatra, Gopalkrishna M. Hegde, Indian Institute of Science (India); R. Rahman, National Institute of Technology, Karnataka (India) . . . . . [9357-74]

Modeling and measurements of optical properties in InAs/GaSb superlattice structures, Julien Imbert, III-V Lab. (France) and ONERA (France); Virginie Trinite, III-V Lab. (France); Sophie Derelle, ONERA (France); Mathieu Carras, III-V Lab. (France); Riad Haidar, Julien Jaeck, ONERA (France); Borge Vinter, Univ. de Nice Sophia Antipolis (France); Jean-Baptiste Rodriguez, Philippe Christol, Institut d'Electronique du Sud (France) . . . . . [9357-75]

Thursday 12 February

SESSION 12

LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . THU 8:30 AM TO 10:10 AM

Optical Systems

Session Chair: **Marek Osiński,** The Univ. of New Mexico (USA)

8:30 am: **Coupled semiconductor laser network topologies for efficient synchronization**, Michail Bourmpos, Apostolos Argyris, Dimitris Syvridis, National and Kapodistrian Univ. of Athens (Greece) . . . . . [9357-45]

8:50 am: **Fiber-optic analog-to-binary conversion**, Azad Siahmakoun, Rose-Hulman Institute of Technology (USA) and Innovative Photonics Technologies LLC (USA); Erin Reeves, Rose-Hulman Institute of Technology (USA) . . [9357-46]

9:10 am: **On-chip generation and in-plane transmission of indistinguishable photons**, Sokratis Kalliakos, Toshiba Research Europe Ltd. (United Kingdom); Yarden Brody, Andre Schwagmann, Univ. of Cambridge (United Kingdom) and Toshiba Research Europe Ltd. (United Kingdom); Anthony J. Bennett, Martin B. Ward, David J. P. Ellis, Joanna Skiba-Szymanska, Toshiba Research Europe Ltd. (United Kingdom); Ian Farrer, Jonathan P. Griffiths, Geb A. C. Jones, David A. Ritchie, Univ. of Cambridge (United Kingdom); Andrew J. Shields, Toshiba Research Europe Ltd. (United Kingdom) . . . . . [9357-47]

9:30 am: **Comparison of photonic integrated circuits for millimeter-wave signal generation between dual wavelength sources for optical heterodyning and pulsed mode locked lasers**, Guillermo Carpintero del Barrio, Carlos Gordón Gallegos, Robinson C. Guzmán Martínez, Univ. Carlos III de Madrid (Spain); Frédéric Van Dijk, Gaël Kervella, III-V Lab. (France); Martyn J. Fice, Katarzyna Balakier, Cyril C. Renaud, Univ. College London (United Kingdom); Xaveer J. M. Leijtens, Technische Univ. Eindhoven (Netherlands) . . . . . [9357-48]

9:50 am: **Ultra-high sensitivity optical biosensor based on Vernier effect in triangular ring resonators (TRRs) with surface plasmon resonance (SPR)**, Tae-Ryong Kim, Jun Li, Hong-Seung Kim, Chung-Ang Univ. (Korea, Republic of); Geum-Yoon Oh, Korea Electronics Technology Institute (Korea, Republic of); Doo-Gun Kim, Korea Photonics Technology Institute (Korea, Republic of); Young Wan Choi, Chung-Ang Univ. (Korea, Republic of) . . . . . [9357-49]

CONFERENCE 9358
LOCATION: ROOM 232 (MEZZANINE)

Tuesday–Thursday 10–12 February 2015 • Proceedings of SPIE Vol. 9358

Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV

Conference Chairs: **Alexandre Freundlich,** Univ. of Houston (USA); **Jean-François Guillemoles,** Institut de Recherche et Développement sur l'Energie Photovoltaïque (France); **Masakazu Sugiyama,** The Univ. of Tokyo (Japan)

Program Committee: **Harry A. Atwater Jr.,** California Institute of Technology (USA); **Kylie R. Catchpole,** The Australian National Univ. (Australia); **Gavin Conibeer,** The Univ. of New South Wales (Australia); **Nicholas J. Ekins-Daukes,** Imperial College London (United Kingdom); **Louise C. Hirst,** U.S. Naval Research Lab. (USA); **Christiana B. Honsberg,** Arizona State Univ. (USA); **Seth M. Hubbard,** Rochester Institute of Technology (USA); **Laurent Lombez,** Institut de Recherche et Développement sur l'Energie Photovoltaïque (France); **Antonio Marti Vega,** Univ. Politécnica de Madrid (Spain); **Marek Osiński,** The Univ. of New Mexico (USA); **Robert J. Walters,** U.S. Naval Research Lab. (USA); **David M. Wilt,** Air Force Research Lab. (USA); **Peichen Yu,** National Chiao Tung Univ. (Taiwan)

Tuesday 10 February

SESSION 1

LOCATION: ROOM 232 (MEZZANINE) . . . . . TUE 8:30 AM TO 10:00 AM

Plasmonics for Sub-Wavelength Light Trapping

8:30 am: **Light-trapping in ultra-thin solar cells: a new paradigm based on multi-resonant absorption** *(Invited Paper)*, Stéphane Collin, Nicolas Vandamme, Clément Colin, Inès Massiot, Andrea Cattoni, Nathalie Bardou, Aristide Lemaitre, Lab. de Photonique et de Nanostructures (France); Jean-François Guillemoles, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France) . . . . . [9358-1]

9:00 am: **Exploring the effective absorption length of Si nanohole array for photovoltaic by plasmonic enhanced Raman scattering**, Zingway Pei, Thiyagu Subramani, Devi Parvathy, National Chung Hsing Univ. (Taiwan) . . . . . [9358-2]

9:20 am: **Sufficient condition for perfect antireflection by optical resonance at dielectric interface**, Ken X. Wang, Zongfu Yu, Sunil Sandhu, Victor Liu, Shanhui Fan, Stanford Univ. (USA) . . . . . [9358-3]

9:40 am: **Optimal subwavelength light trapping textures for photovoltaics**, Vidya Ganapati, Univ. of California, Berkeley (USA); Owen D. Miller, Massachusetts Institute of Technology (USA); Eli Yablonovitch, Univ. of California, Berkeley (USA) . . . . . [9358-4]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 2

LOCATION: ROOM 232 (MEZZANINE) . . . . . TUE 10:30 AM TO 12:00 PM

Advanced Light Management for Si Cells

10:30 am: **Advanced light trapping approaches in thin-film silicon solar cells** *(Invited Paper)*, Arno H. M. Smets, Fai Tong Si, Rudi Santbergen, Hairen Tan, Olindo Isabella, Miro Zeman, Technische Univ. Delft (Netherlands) . [9358-5]

11:00 am: **Nanofrustum hexagonal array solar cells for ultrathin crystalline silicon devices**, Yunae Cho, Dong-Wook Kim, Minji Gwon, Eunah Kim, Ewha Womans Univ. (Korea, Republic of); Joondong Kim, Incheon National Univ. (Korea, Republic of); Hyeong-Ho Park, KANC (Korea, Republic of) . . . . . [9358-6]

11:20 am: **Design of nano-pattern reflectors for thin-film solar cells based on three-dimensional optical and electrical modeling**, Hui-Hsin Hsiao, Hung-Chun Chang, Yuh-Renn Wu, National Taiwan Univ. (Taiwan). . . . . [9358-7]

11:40 am: **Angle selective light management in photovoltaics using self assembled anodized aluminum oxide nanopatterns**, Brian Roberts, Pei-Cheng Ku, Univ. of Michigan (USA) . . . . . [9358-8]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:30 pm

SESSION 3

LOCATION: ROOM 232 (MEZZANINE) . . . . . TUE 1:30 PM TO 3:10 PM

Advanced Light Management for III-V and Multi-Junction Cells

1:30 pm: **Impact of photon recycling and luminescent coupling in III-V photovoltaic devices** *(Invited Paper)*, Alexandre W. Walker, Oliver Höhn, Daniel M. Neves, Frank Dimroth, Fraunhofer-Institut für Solare Energiesysteme (Germany) . . . . . [9358-9]

2:00 pm: **Multi-junction-solar-cell designs and characterizations based on detailed-balance principle and luminescence yields** *(Invited Paper)*, Hidefumi Akiyama, The Univ. of Tokyo (Japan) . . . . . [9358-10]

2:30 pm: **Light management of quantum wells in thin GaAs solar cells with coherent back reflection**, Wei Wang, Akhil Mehrotra, Alexandre Freundlich, Univ. of Houston (USA) . . . . . [9358-11]

2:50 pm: **Impact of light management on photovoltaic characteristics of GaAs solar cells with selective filter**, Mu-Min Hung, National Chiao Tung Univ. (Taiwan); Chung-Yu Hong, Arima Photovoltaic & Optical Corp. (Taiwan); Tung-Ting Yang, Yi-Chin Wang, Peichen Yu, National Chiao Tung Univ. (Taiwan) . . . . . [9358-12]

Coffee Break . . . . . Tue 3:10 pm to 3:40 pm

SESSION 4

LOCATION: ROOM 232 (MEZZANINE) . . . . . TUE 3:40 PM TO 4:50 PM

Innovative Concentrator Design

3:40 pm: **Five-volt photonic power converter** *(Invited Paper)*, Christopher E. Valdivia, Matthew M. Wilkins, Univ. of Ottawa (Canada); Boussairi Bouzazi, Abdelatif Jaouad, Vincent Aimez, Richard Arès, Univ. de Sherbrooke (Canada); Denis P. Masson, Azastra Opto Inc. (Canada); Simon Fafard, Azastra Opto Inc. (Canada) and Univ. de Sherbrooke (Canada); Karin Hinzer, Univ. of Ottawa (Canada) . . . . . [9358-13]

4:10 pm: **Origami photovoltaics**, Chih-Wei Chien, Kyusang Lee, Stephen R. Forrest, Max Shtein, Pei-Cheng Ku, Univ. of Michigan (USA) . . . . . [9358-14]

4:30 pm: **Demonstration of a 5x5 cm^2 self-tracking solar concentrator**, Volker Zagolla, Eric J. Tremblay, Christophe Moser, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9358-15]

Wednesday 11 February

SESSION 5

LOCATION: ROOM 232 (MEZZANINE) . . . . . .WED 8:40 AM TO 10:10 AM

Growth of III-V Alloys and Nanostructures

8:40 am: **Monolithic integration of GaAsPN dilute-nitride compounds on silicon substrates: toward the III-V/Si tandem solar cell** *(Invited Paper)*, Olivier Durand, Samy Almosni, Yanping Wang, Charles Cornet, Antoine Létoublon, Christophe Levallois, Alain Rolland, Jacky Even, Nicolas Bertru, Alain Le Corre, Institut National des Sciences Appliquées de Rennes (France); Pierre Rale, Laurent Lombez, Jean-François Guillemoles, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France); Anne Ponchet, Ctr. d'Elaboration de Matériaux et d'Etudes Structurales (France) . . . . . [9358-16]

9:10 am: **Time-resolved PL and TEM studies of MOVPE-grown bulk dilute nitride and bismide quantum well heterostructure**, Yongkun Sin, Zachary Lingley, Miles Brodie, William T. Lotshaw, Steven C. Moss, The Aerospace Corp. (USA); Tae Wan Kim, Yingxin Guan, Kamran Forghani, Luke J. Mawst, Thomas F. Kuech, Univ. of Wisconsin-Madison (USA) . . . . . [9358-17]

9:30 am: **Stacked GaAs(Sb)(N)-capped InAs/GaAs quantum dots for enhanced solar cell efficiency**, Antonio D. Utrilla, Jose María M. Ulloa, ?arko Gacevic, Univ. Politécnica de Madrid (Spain); Daniel F. Reyes, David González, Teresa Ben, Univ. de Cádiz (Spain); Alvaro Guzmán, Adrian Hierro, Univ. Politécnica de Madrid (Spain) . . . . . [9358-18]

9:50 am: **Characterization of regrown interfaces in a nipi solar cell**, Michael A. Slocum, David V. Forbes, Seth M. Hubbard, Rochester Institute of Technology (USA) . . . . . [9358-19]

Coffee Break . . . . . .Wed 10:10 am to 10:40 am

SESSION 6

LOCATION: ROOM 232 (MEZZANINE) . . . . . WED 10:40 AM TO 12:00 PM

Characterization and Transport Properties

10:40 am: **Investigation on carrier collection in InAs quantum dots solar cell**, Yushuai Dai, Stephen J. Polly, Staffan Hellström, Rochester Institute of Technology (USA); Paul J. Roland, The Univ. of Toledo (USA); David V. Forbes, Rochester Institute of Technology (USA); Randy J. Ellingson, The Univ. of Toledo (USA); Seth M. Hubbard, Rochester Institute of Technology (USA) . . . . . [9358-20]

11:00 am: **Optoelectronic characterization of polycrystalline solar cells using time-resolved biased luminescence techniques**, Gilbert El Hajje, Daniel Ory, Myriam Paire, Jean-Françcois Guillemoles, Laurent Lombez, Electricité de France (France) and Institut de Recherche et Développement sur l'Energie Photovoltaïque (France) . . . . . [9358-21]

11:20 am: **Numerical modeling of radiation effects in triple-junction solar cell**, Alexandre I. Fedoseyev, CFD Research Corp. (USA); Seth M. Hubbard, Rochester Institute of Technology (USA); Ashok Raman, CFD Research Corp. (USA); David V. Forbes, Rochester Institute of Technology (USA); Alexandre Freundlich, Univ. of Houston (USA). . . . . [9358-22]

11:40 am: **Transient lateral photovoltaic effect in patterned ferromagnetic metal-oxide-semiconductor films**, Farkhad G. Aliev, Isidoro Martinez, Juanpedro Cascales, Univ. Autónoma de Madrid (Spain) . . . . . [9358-23]

Lunch/Exhibition Break . . . . . .Wed 12:00 pm to 1:40 pm

SESSION 7

LOCATION: ROOM 121 (EXHIBIT LEVEL) . . . . . WED 1:40 PM TO 3:10 PM

NOTE ROOM CHANGE

Solar Cell Simulation

Joint Session with Conferences 9357 and 9358

Session Chairs: **Bernd Witzigmann,** Univ. Kassel (Germany); **Alexandre Freundlich,** Univ. of Houston (USA)

1:40 pm: **Simulation of solid-state dye solar cells based on organic and perovskite sensitizers** *(Invited Paper)*, Aldo Di Carlo, Desireé Gentilini, Univ. degli Studi di Roma "Tor Vergata" (Italy); Alessio Gagliardi, Technische Univ. München (Germany) . . . . . [9357-39]

2:10 pm: **Surface photo-voltage properties near grain boundaries in $Cu_2ZnSn(S,Se)_4$ thin-films solar cells**, Gee Yeong Kim, Ju Ri Kim, William Jo, Trang T. Nguyen, Hae-Young Shin, Seokhyun Yoon, Ewha Womans Univ. (Korea, Republic of); Dae-Ho Son, Dae-Hwan Kim, Jin-Kyu Kang, Daegu Gyeongbuk Institute of Science & Technology (Korea, Republic of) . . . [9357-40]

2:30 pm: **Impacts of contacts and interdot coupling on the photovoltaic performance of quantum dot arrays**, Aude Berbezier, Urs Aeberhard, Forschungszentrum Jülich GmbH (Germany) . . . . . [9358-24]

2:50 pm: **Radiative dark current in optically-thin III-V photovoltaic devices**, Roger E. Welser, Magnolia Optical Technologies, Inc. (USA); Rao Tatavarti, MicroLink Devices, Inc. (USA) . . . . . [9358-47]

Coffee Break . . . . . .Wed 3:10 pm to 3:40 pm

SESSION 8

LOCATION: ROOM 232 (MEZZANINE) . . . . . .WED 3:40 PM TO 5:00 PM

NOTE ROOM CHANGE

Hybrid and Nanowire Materials for Solar Energy Conversion

3:40 pm: **Improved photovoltaic performance of hybrid organic/silicon-nanowire heterojunction solar cells via interface engineering**, Yi-Chun Lai, Yu-Fan Chang, Peichen Yu, Hsin-Fei Meng, Gou-Chung Chi, National Chiao Tung Univ. (Taiwan) . . . . . [9358-26]

4:00 pm: **Optimization of the fabricated silicon nanowires for energy-harvesting applications**, Sara H. Abel Razek Mohamed, Nageh K. Allam, Mohamed A. Swillam, The American Univ. in Cairo (Egypt) . . . . . [9358-27]

4:20 pm: **Simulation of exciton diffusion in carbon nanotube-based photovoltaics**, Amirhossein Davoody, Irena Knezevic, Univ. of Wisconsin-Madison (USA). . . . . [9358-28]

4:40 pm: **High-efficiency photoelectrochemical water splitting using InGaN/GaN nanowires grown directly on Si**, Bandar M. Alotaibi, Shizhao Fan, Zetian Mi, McGill Univ. (Canada) . . . . . [9358-29]

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

hybrid multi-junction silicon solar cell simulation, Robert LaFleur, Ronald A. Coutu Jr., Air Force Institute of Technology (USA). . . . . [9358-42]

The durability of the dye-sensitized solar cell with silicon resin, Hyun Chul Ki, Seon Hoon Kim, Doo-Gun Kim, Tae Un Kim, Haengyun Jung, Korea Photonics Technology Institute (Korea, Republic of); Jae-Man Yoon, TKHT Co., LTD (Korea, Republic of) . . . . . [9358-43]

Density-controlled ZnO/TiO_2 nanocomposite photoanode for improving dye-sensitized solar cells performance, Jimmy Yao, Chih-Min Lin, Shizhuo Yin, The Pennsylvania State Univ. (USA). . . . . [9358-44]

Continuous and time-resolved photoluminescence as a probing tool for the growth of Cu(In,Ga)Se_2, Matthieu Moret, Yoann Robin, Bernard Gil, Olivier Briot, Univ. Montpellier 2 (France). . . . . [9358-45]

Laser-assisted manufacturing of micro-optical volume elements for improving the amount of light absorbed by solar cells in photovoltaic modules, Gerhard Peharz, Ladislav Kuna, Claude Leiner, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria) . . . . . [9358-46]

Thursday 12 February

SESSION 9

LOCATION: ROOM 232 (MEZZANINE) . . . . . THU 8:40 AM TO 10:00 AM

Advanced Photovoltaic Concepts: IBSC

8:40 am: **Extreme broadband photocurrent spectroscopy on InAs quantum dot solar cells**, Ryo Tamaki, Yasushi Shoji, Shunya Naitoh, Yoshitaka Okada, Kenjiro Miyano, The Univ. of Tokyo (Japan) . . . . . [9358-30]

9:00 am: **Characterization of a novel AlAsSb/InAlAs heterojunction emitter design for InAs/AlAsSb quantum-dot intermediate-band solar cell**, Zachary S. Bittner, Staffan Hellström, Rochester Institute of Technology (USA); Ramesh Babu Laghumavarapu, Diana L. Huffaker, Univ. of California, Los Angeles (USA); Seth M. Hubbard, Rochester Institute of Technology (USA). . . . . [9358-31]

9:20 am: **Suppression of thermal carrier escape and enhanced two-step photon absorption in quantum-dot intermediate-band solar cells with a high-potential barrier**, Shigeo Asahi, Haruyuki Teranishi, Naofumi Kasamatsu, Tomoyuki Kada, Toshiyuki Kaizu, Takashi Kita, Kobe Univ. (Japan) . . . [9358-32]

9:40 am: **Investigation of carrier collection and open-circuit voltage of multi-quantum well solar cells by luminescence**, Amaury Delamarre, Hiromasa Fujii, Kentaroh Watanabe, The Univ. of Tokyo (Japan); Laurent Lombez, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France); Jean-François Guillemoles, The Univ. of Tokyo (Japan) and Institut de Recherche et Développement sur l'Energie Photovoltaïque (France); Yoshiaki Nakano, Masakazu Sugiyama, The Univ. of Tokyo (Japan) . . . . . [9358-33]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 10

LOCATION: ROOM 232 (MEZZANINE) . . . . . THU 10:30 AM TO 12:00 PM

Advanced Photovoltaic Concepts: Hot Carriers

10:30 am: **Hot carriers at elevated temperatures in InAs/AlAsSb quantum wells: an interesting system for practical hot-carrier solar cells** *(Invited Paper)*, Jinfeng Tang, Vincent R. Whiteside, Hamidreza Esmaielpour, Sangeetha Vijeyaragunathan, Michael B. Santos, Ian R. Sellers, The Univ. of Oklahoma (USA) . . . . . [9358-34]

11:00 am: **A metallic hot carrier photovoltaic cell**, James A. R. Dimmock, Sharp Labs. of Europe Ltd. (United Kingdom) and Imperial College London (United Kingdom); Matthias Kauer, Sharp Labs. of Europe Ltd. (United Kingdom); Paul Stavrinou, Nicholas J. Ekins-Daukes, Imperial College London (United Kingdom). . . . . [9358-35]

11:20 am: **Below band edge light recovery with plasmonics**, Scott K. Cushing, Jiangtian Li, Alan D. Bristow, Nianqiang Wu, West Virginia Univ. (USA) . . . . . [9358-36]

11:40 am: **Molecular-plasmonics and hot electrons: merging photovoltaics and thermoelectrics**, Ahmet A. Yanik, Golam I. Hossain, Univ. of California, Santa Cruz (USA). . . . . [9358-37]

Lunch/Exhibition Break . . . . . Thu 12:00 pm to 1:30 pm

SESSION 11

LOCATION: ROOM 232 (MEZZANINE) . . . . . THU 1:30 PM TO 3:00 PM

Advanced Photovoltaic Concepts: Photon Conversion and Spectral Shaping

1:30 pm: **Rare-earths-doped materials for up-conversion** *(Invited Paper)*, Anne-Laure Joudrier, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France); Nicolas Vandamme, Lab. de Photonique et de Nanostructures (France); Laurent Lombez, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France); Stéphane Collin, Lab. de Photonique et de Nanostructures (France); Gérard P. Aka, Ecole Nationale Supérieure de Chimie de Paris (France); Jean-François Guillemoles, Institut de Recherche et Développement sur l'Energie Photovoltaïque (France). . . [9358-38]

2:00 pm: **Radiative cooling for solar cells**, Linxiao Zhu, Aaswath P. Raman, Ken X. Wang, Marc A. Anoma, Shanhui Fan, Stanford Univ. (USA) . . . . [9358-39]

2:20 pm: **Thermally-enhanced photoluminescence for efficient photovoltaics**, Assaf Manor, Leopoldo L. Martin, Carmel Rotschild, Technion-Israel Institute of Technology (Israel). . . . . [9358-40]

2:40 pm: **GaSb thermophotovoltaics: current challenges and solutions**, Nassim Rahimi, Virginia Polytechnic Institute and State Univ. (USA); Andrew A. Aragon, Darryl M. Shima, Orlando S. Romero, Thomas J. Rotter, Tito L. Busani, Olga Lavrova, Ganesh Balakrishnan, The Univ. of New Mexico (USA); Luke F. Lester, Virginia Polytechnic Institute and State Univ. (USA) . . . . . [9358-41]

CONFERENCE 9359
LOCATION: ROOM 222 (MEZZANINE)

Monday–Wednesday 9–11 February 2015 • Proceedings of SPIE Vol. 9359

Optical Components and Materials XII

Conference Chairs: **Shibin Jiang,** AdValue Photonics, Inc. (USA); **Michel J. F. Digonnet,** Stanford Univ. (USA)

Program Committee: **Jean-Luc Adam,** Univ. de Rennes 1 (France); **Joel Bagwell,** Edmund Optics Inc. (USA); **Rolindes Balda,** Univ. del País Vasco (Spain); **Robert P. Dahlgren,** NASA Ames Research Ctr. (USA), Silicon Valley Photonics (United States); **Leonid B. Glebov,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Seppo K. Honkanen,** Univ. of Eastern Finland (Finland); **Jacques Lucas,** Univ. de Rennes 1 (France); **Yasutake Ohishi,** Toyota Technological Institute (Japan); **Aydogan Ozcan,** Univ. of California, Los Angeles (USA); **Giancarlo C. Righini,** Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi (Italy); **Setsuhisa Tanabe,** Kyoto Univ. (Japan); **John M. Zavada,** National Science Foundation (USA)

Monday 9 February

OPTO PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA). . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA). . . . . [9371-202]

Coffee Break . . . . . Mon 10:10 am to 10:30 am

SESSION 1
LOCATION: ROOM 222 (MEZZANINE) . . . . . MON 10:30 AM TO 12:00 PM

Optical Nonlinearity Based Devices
Session Chair: **Jacques Lucas,** Univ. de Rennes 1 (France)

10:30 am: **Two-dimensional semiconductors for ultrafast photonic applications** *(Invited Paper)*, Jun Wang, Shanghai Institute of Optics and Fine Mechanics (China). . . . . [9359-1]

11:00 am: **Widely tunable soliton self-frequency shift and dispersive wave generation in a highly nonlinear fiber**, Dinghuan Deng, Tonglei Cheng, Xiaojie Xue, Tuan H. Tong, Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan). . . . . [9359-2]

11:20 am: **Raman gain of SiC as a potential medium for Raman lasers**, Larry D. Merkle, Jun Zhang, U.S. Army Research Lab. (USA); Graham S. Allen, Jay W. Dawson, Lawrence Livermore National Lab. (USA); Mark Dubinskii, U.S. Army Research Lab. (USA) . . . . . [9359-3]

11:40 am: **Ultra-long fiber Raman lasers: design considerations**, Igor Koltchanov, Dimitar Kroushkov, André Richter, VPIphotonics GmbH (Germany) . . . . . [9359-4]

Lunch Break . . . . . Mon 12:00 pm to 1:10 pm

SESSION 2
LOCATION: ROOM 222 (MEZZANINE) . . . . . MON 1:10 PM TO 3:00 PM

Nano Materials and Devices
Session Chair: **Michel Digonnet,** Stanford Univ. (USA)

1:10 pm: **Design of nanomaterials for advanced energy storage** *(Invited Paper)*, Cengiz Sinan Ozkan, Univ. of California, Riverside (USA) [9359-5]

1:40 pm: **Third harmonic generation and multiphoton fluorescence in graphene using a compact femtosecond 1.56 µm laser**, Antti Säynätjoki, Lasse Karvonen, Juha Riikonen, Wonjae Kim, Joonas Mäkinen, Aalto Univ. (Finland); Seyed Soroush Mehravar, Robert A. Norwood, The Univ. of Arizona (USA); Nasser Peyghambarian, The Univ. of Arizona (USA) and Aalto Univ. (Finland); Harri Lipsanen, Aalto Univ. School of Science and Technology (Finland); Khanh Q. Kieu, The Univ. of Arizona (USA) . . . . . [9359-6]

2:00 pm: **Amorphous chalcogenide layers and nanocomposites for direct surface patterning**, Sandor Molnar, Roland Bohdan, The Univ. of Debrecen (Hungary); Julia E. Burunkova, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Istvan Csarnovics, Sandor J. Kokenyesi, The Univ. of Debrecen (Hungary) . . . . . [9359-7]

2:20 pm: **Spectral analysis based on compressive sensing in nanophotonic structures**, Zhu Wang, Univ. of Wisconsin-Madison (USA) . . . . . [9359-8]

2:40 pm: **Optical properties of MgF2 nano-composite films dispersed with noble metal nanoparticles synthesized by sol-gel method**, Moriaki Wakaki, Nobuaki Soujima, Takehisa Shibuya, Tokai Univ. (Japan) . . . . . [9359-9]

Coffee Break . . . . . Mon 3:00 pm to 3:30 pm

SESSION 3
LOCATION: ROOM 222 (MEZZANINE) . . . . . MON 3:30 PM TO 5:10 PM

Optical Filters
Session Chair: **Giancarlo C. Righini,** Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi (Italy)

3:30 pm: **Apodized reflective volume Bragg grating for high-resolution spectroscopy**, Sergiy Mokhov, Daniel Ott, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Vadim Smirnov, OptiGrate Corp. (USA); Ivan B. Divliansky, Boris Y. Zeldovich, Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9359-10]

3:50 pm: **Reflection type CMY color filters incorporating a aluminum-coated nanoporous anodic aluminum oxide cavity**, Wenjing Yue, Vivek R. Shrestha, Chul-Soon Park, Sang-Shin Lee, Yang Li, Cong Wang, Nam-Young Kim, Eun-Soo Kim, Kwangwoon Univ. (Korea, Republic of) . . . . . [9359-11]

4:10 pm: **bending strength measurements at different materials used for IR-cut filters in mobile camera devices**, Volker Dietrich, Franca Kerz, Peter Hartmann, SCHOTT AG (Germany) . . . . . [9359-12]

4:30 pm: **Acousto-Optic Tunable Filter for imaging applications with high performance in the IR region**, Stefano Valle, Jon D. Ward, Gooch & Housego plc (United Kingdom); Christopher N. Pannell, Gooch & Housego plc (USA); Nigel P. Johnson, Univ. of Glasgow (United Kingdom). . . . . [9359-13]

4:50 pm: **Angle insensitive thin-film color filters based on an etalon structure incorporating a top dielectric layer**, Chul-Soon Park, Vivek R. Shrestha, Sang-Shin Lee, Eun-Soo Kim, Kwangwoon Univ. (Korea, Republic of); Duk Yong Choi, The Australian National Univ. (Australia) . . . . . [9359-14]

CONFERENCE 9359
LOCATION: ROOM 222 (MEZZANINE)

Tuesday 10 February

SESSION 4
LOCATION: ROOM 222 (MEZZANINE) . . . . . TUE 8:00 AM TO 10:00 AM

Microstructured and Novel Fibers
Session Chair: **Rolindes Balda,** Univ. del País Vasco (Spain)

8:00 am: **Linear and nonlinear optical properties of chalcogenide microstructured optical fibers** *(Invited Paper)*, Johann Troles, Univ. de Rennes 1 (France); Laurent Brilland, PERFOS (France); Celine Caillaud, Univ. de Rennes 1 (France); Gilles Renversez, Univ. of Aix Marseille (France); David Mechin, PERFOS (France); Jean-Luc Adam, Univ. de Rennes 1 (France) . . . . . [9359-15]

8:30 am: **Design and performance of Multi-Core Fiber (MCF) optimized towards communications and sensing applications**, Judith Hankey, Tristram Read, Mark D. Hill, Peter Maton, Fibercore Ltd. (United Kingdom) . . . . [9359-16]

8:50 am: **Opportunities for designing microstructured optical fibers for efficient femtosecond laser grating inscription**, Tigran Baghdasaryan, Thomas Geernaert, Hugo Thienpont, Francis Berghmans, Vrije Univ. Brussel (Belgium) . . . . . [9359-17]

9:10 am: **The role of highly non-linear index change mechanism during femtosecond grating writing in microstructured optical fibers**, Tigran Baghdasaryan, Thomas Geernaert, Hugo Thienpont, Francis Berghmans, Vrije Univ. Brussel (Belgium) . . . . . [9359-18]

9:30 am: **Advances in Chalcogenide galsses and Optical fibers** *(Invited Paper)*, Younes Messaddeq, Sandra H. Messaddeq, Univ. Laval (Canada); Mohammed El-Amraoui, Univ. de Laval (Canada); Jean-Philippe Bérubé, Univ. Laval (Canada); Réal Vallée, Univ. de laval (Canada) . . . . [9359-19]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 5
LOCATION: ROOM 222 (MEZZANINE) . . . . . TUE 10:30 AM TO 12:10 PM

Plasmonic Devices
Session Chair: **Seppo K. Honkanen,** Univ. of Eastern Finland (Finland)

10:30 am: **Hybrid Reflection Type Metasurface Design for Optical Needle Field Generation**, Shiyi Wang, Qiwen Zhan, Univ. of Dayton (USA) . . . [9359-20]

10:50 am: **Hot carrier generation in SWIR-active plasmonic TCO-Si heterostructures,** Joshua D. Caldwell, Alexander J. Giles, Heungsoo Kim, María González, Sharka M. Prokes, Orest J. Glembocki, Antti J. Makinen, U.S. Naval Research Lab. (USA) . . . . . [9359-21]

11:10 am: **Various surface plasmon polariton waveguide with gap**, Dong Hun Lee, Myung-Hyun Lee, Sungkyunkwan Univ. (Korea, Republic of) . . . . . [9359-22]

11:30 am: **Enhanced Solar Absorption in Thin Film Photovoltaic Cells via Embedded Silica-Coated Silver Nanoparticles**, Sam Aminfard, The Univ. of Texas at Austin (USA); Richard Harrison, Sandia National Labs. (USA); Adela Ben-Yakar, The Univ. of Texas at Austin (USA) . . . . . [9359-23]

11:50 am: **super focusing using plasmonic lens based on super oscillation effect**, Mahmoud El Maklizi, Mostafa Hendawy, Mohamed A. Swillam, The American Univ. in Cairo (Egypt). . . . . [9359-24]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 1:30 pm

SESSION 6
LOCATION: ROOM 222 (MEZZANINE) . . . . . TUE 1:30 PM TO 3:00 PM

Fiber Based Components
Session Chair: **Leonid B. Glebov,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

1:30 pm: **Latest advance on fused fiber components for power scaling of fiber lasers** *(Invited Paper)*, Baishi Wang, Vytran LLC (USA) . . . . . [9359-25]

2:00 pm: **Characterization of multimode polymer optical fiber coupler development using lapping technique and**

load force, Latifah S. Supian, Univ. Kebangsaan Malaysia (Malaysia) and National Defence Univ. of Malaysia (Malaysia); Mohd Syuhami Ab Rahman, Norhana Arsad, Univ. Kebangsaan Malaysia (Malaysia) . . . . . [9359-26]

2:20 pm: **High signal-to-noise acoustic sensor using phase shift gratings interrogated by the Pound Drever Hall technique**, Peter Kung, QPS Photronics Inc. (Canada); Maria I. Comanici, McGill Univ. (Canada) . . . [9359-27]

2:40 pm: **Fiber Bragg grating based sensors in conventional double clad large mode area fibers**, Alexander Nieborowsky, Benjamin Weigand, Photonik-Zentrum Kaiserslautern e.V. (Germany); Jürgen Bartschke, Xiton Photonics GmbH (Germany); René Beigang, Johannes A. L'huillier, Photonik-Zentrum Kaiserslautern e.V. (Germany) . . . . . [9359-28]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 7
LOCATION: ROOM 222 (MEZZANINE) . . . . . TUE 3:30 PM TO 5:50 PM

Rare-Earth Doped Materials and Lasers I
Session Chair: **Angel Flores,** Air Force Research Lab. (USA)

3:30 pm: **Advances in laser development based on fully-crystalline double-clad fibers** *(Invited Paper)*, Mark Dubinskii, U.S. Army Research Lab. (USA) . . . . . [9359-30]

4:00 pm: **UV-visible absorption and luminescence properties of Yb:CALGO laser crystal**, Anael Jaffres, Suchinder K. Sharma, Pascal Loiseau, IRCP Chimie Paristech (France); Bruno Viana, Ecole Nationale Supérieure de Chimie de Paris (France); Jean Louis Doualan, Ctr. de Recherche sur les Ions, les Matériaux et la Photonique (France); Richard Moncorge, Ctr. de Recherche sur les Ions, les Matériaux et la Photonique, Univ. de Caen (France). . . . . [9359-31]

4:20 pm: **Investigation of Yb-Tm energy transfer constant in highly-doped tellurite glasses**, Stefano Taccheo, Swansea Univ. (United Kingdom); Daniel Milanese, Politecnico di Torino (Italy); Hrvoje Gebavi, Swansea Univ. (United Kingdom) and Institut Ruder Bo?kovic (Croatia). . . . . [9359-32]

4:40 pm: **Down- and up-conversion emissions in Er-doped transparent fluorotellurite glass-ceramics** *(Invited Paper)*, Adrian Miguel, Univ. del País Vasco (Spain); Roberta Morea, Jose A. Gonzalo, Consejo Superior de Investigaciones Científicas (Spain); Joaquín Fernández, Univ. del País Vasco (Spain) and Ctr. de Fisica de Materiales (Spain); Rolindes Balda, Univ. del País Vasco (Spain) and Ctr. de Fisica de Materiales (Sudan) . . . . . [9359-33]

5:10 pm: **Modelling of photodarkening in Yb-doped fibre lasers**, Stefano Taccheo, Swansea Univ. (United Kingdom) . . . . . [9359-34]

5:30 pm: **Low threshold rare-earth-doped microring lasers monolithically integrated on silicon chips,** Jonathan D. B. Bradley, Ehsan Shah Hosseini, Purnawirman Purnawirman, Zhan Su, Anna Baldycheva, Massachusetts Institute of Technology (United States); Thomas N. Adam, Gerald Leake, Douglas Coolbaugh, SUNY College of Nanoscale Science and Engineering (United States); Michael R. Watts, Massachusetts Institute of Technology (USA) . . . . . [9359-81]

Wednesday 11 February

SESSION 8

LOCATION: ROOM 222 (MEZZANINE) . . . . . .WED 8:20 AM TO 10:10 AM

Rare-Earth Doped Materials and Lasers II

Session Chair: **Younès Messaddeq,**
Ctr. d'Optique, Photonique et Laser (Canada)

8:20 am: **Rare-earth-ion-doped waveguide lasers on a silicon chip** *(Invited Paper)*, Markus Pollnau, KTH Royal Institute of Technology (Sweden) . . . . . [9359-35]

8:50 am: **Optical and magnetic studies of InGaN nanorods doped with ytterbium**, Wojciech M. Jadwisienczak, Jingzhou Wang, Ohio Univ. (USA); Kiran Dasari, Univ. of Puerto Rico (USA); Venkata R. Thota, Ohio Univ. (USA); Ratnakar Palai, Univ. of Puerto Rico (USA); Eric A. Stinaff, Ohio Univ. (USA) . . . . . [9359-36]

9:10 am: **Comparison of photodarkening in 1030 nm and 1070 nm Yb-doped fibre lasers**, Riccardo Piccoli, Swansea Univ. (United Kingdom) and Univ. of Pavia (Italy); Hrvoje Gebavi, Swansea Univ. (United Kingdom) and Institut Ruder Boskovic (Croatia); Maurizio Ferrari, Istituto di Fotonica e Nanotecnologie (Italy); Stefano Taccheo, Swansea Univ. (United Kingdom) . . . . . [9359-37]

9:30 am: **Upconversion against direct emission in Er^{3+}-Tm^{3+}-codoped tellurite-glass containing gold nanoparticles**, Victor A. Garcia Rivera, Otávio de Brito Silva, Univ. de São Paulo (Brazil); Mohammed El-Amraoui, Yannick Ledemi, Ctr. d'Optique, Photonique et Laser (Canada); Younes Messaddeq, Univ. Laval (Canada); Euclydes Marega Jr., Univ. de São Paulo (Brazil) [9359-38]

9:50 am: **The REPUSIL process and the capability of fluorine doping for the adjustment of optical and thermochemical properties in silica materials**, Kay Schuster, Stephan Grimm, André Kalide, Frank Froehlich, Jan Dellith, Anka Schwuchow, Matthias Jäger, Hartmut Bartelt, Institut für Photonische Technologien e.V. (Germany) . . . . . [9359-39]

Coffee Break . . . . . .Wed 10:10 am to 10:30 am

SESSION 9

LOCATION: ROOM 222 (MEZZANINE) . . . . . WED 10:30 AM TO 12:10 PM

Sub-Wavelength Optics

Session Chair: **Jun Wang,**
Shanghai Institute of Optics and Fine Mechanics (China)

10:30 am: **Polarization-independent light-dispersing device based on diffractive optics**, Jun Amako, Toyo Univ. (Japan); Eiichi Fujii, Seiko Epson Corp. (Japan). . . . . [9359-41]

10:50 am: **Optical performance of random anti-reflection structures on curved surfaces**, Courtney D. Taylor, Menelaos K. Poutous, Kevin J. Major, Rajendra Joshi, The Univ. of North Carolina at Charlotte (USA); Lynda E. Busse, Jesse A. Frantz, Jasbinger S. Sanghera, U.S. Naval Research Lab. (USA); Ishwar D. Aggarwal, The Univ. of North Carolina at Charlotte (USA) . . . . . [9359-42]

11:10 am: **ALD-tuned nanobeam cavity on titanium dioxide platform operating in the visible**, Arijit Bera, Markus Häyrinen, Matthieu Roussey, Markku Kuittinen, Seppo K. Honkanen, Univ. of Eastern Finland (Finland). . . . . [9359-43]

11:30 am: **A graphene-based microfiber in-line polarizer with stereo rod-microfiber-air structure**, Fei Xu, Nanjing Univ. (China). . . . . [9359-44]

11:50 am: **Wide-angle structural color filter featuring highly-efficient transmission and high-excitation purity**, Vivek R. Shrestha, Sang-Shin Lee, Eun-Soo Kim, Kwangwoon Univ. (Korea, Republic of); Duk Yong Choi, The Australian National Univ. (Australia) . . . . . [9359-45]

Lunch/Exhibition Break . . . . . .Wed 12:10 pm to 1:30 pm

SESSION 10

LOCATION: ROOM 222 (MEZZANINE) . . . . . .WED 1:30 PM TO 3:10 PM

Detector, Switch and Modulator

Session Chair: **Joel Bagwell,** Edmund Optics Inc. (USA)

1:30 pm: **Through silicon via developments for silicon photomultiplier sensors**, Carl Jackson, Kevin O'Neill, Liam A. Wall, Brian McGarvey, Deborah Herbert, SensL (Ireland) . . . . . [9359-46]

1:50 pm: **Fully-CMOS analog and digital SiPMs**, Yu Zou, Federica A. Villa, Danilo Bronzi, Politecnico di Milano (Italy); Simone Tisa, Micro Photon Devices S.r.l. (Italy); Alberto Tosi, Franco Zappa, Politecnico di Milano (Italy) . . . [9359-47]

2:10 pm: **Ultra-low noise and exceptional uniformity of SensL C-series SiPM sensors**, Carl Jackson, Kevin O'Neill, Brian McGarvey, Liam A. Wall, Deborah Herbert, SensL (Ireland) . . . . . [9359-49]

2:30 pm: **Effect of multi-input injection locking on hysteresis width and switching time in single-mode Fabry-Perot laser diode for short pulse controlled switching**, Bikash Nakarmi, Yonghyub Won, KAIST (Korea, Republic of) . . . . . [9359-50]

2:50 pm: **Monolithically-integrated quantum dot optical gain modulator with semiconductor optical amplifier for 10-Gb/s photonic transmission**, Naokatsu Yamamoto, Kouichi Akahane, Toshimasa Umezawa, Tstsuya Kawanishi, National Institute of Information and Communications Technology (Japan). . . . . [9359-51]

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Development of a long-gauge fiber-optics-distributed vibration sensor, Peter Kung, QPS Photronics Inc. (Canada); Maria I. Comanici, McGill Univ. (Canada) . . . . . [9359-53]

Diffraction gratings as humidity sensors, Sergio Calixto-Carrera, Ctr. de Investigaciones en Óptica, A.C. (Mexico); Miguel V. Andrés, Univ. de Valencia (Spain) . . . . . [9359-54]

Fabry-Pérot fiber interferometer formed by fusion splicing and chemical etching, Hsuan Chen, Chin-Ping Yu, National Sun Yat-Sen Univ. (Taiwan) . . . . . [9359-55]

Flattened supercontinuum generation in tellurite-phosphate and chalcogenide-tellurite hybrid microstructured optical fibers with tailored chromatic dispersion profiles, Tuan H. Tong, Hiroyasu Kawashima, Koji Asano, Zhongchao Duan, Tonglei Cheng, Dinghuan Deng, Toyota Technological Institute (Japan); Morio Matsumoto, Tezuka Hiroshige, Furukawa Denshi Co., Ltd. (Japan); Takenobu Suzuki, Yasutake Ohishi, Xiaojie Xue, Toyota Technological Institute (Japan) . . . . . [9359-56]

Experimental research on the multi-order acousto-optic diffraction based on Raman-Nath diffraction, Huadong Gu, Suzhou Institute of Biomedical Engineering and Technology (China) and Jiangsu Key Lab. of Medical Optics (China); Zhongxing Shao, Suzhou Institute of Biomedical Engineering and Technology (China); Chenqi Zheng, Suzhou Institute of Biomedical Engineering and Technology (China) and Jiangsu Key Lab. Medical Optics (China); Ruitao Chen, Jie Yang, Suzhou Institute of Biomedical Engineering and Technology (China) and Jiangsu Key Lab. of Medical Optics (China); Zetong Gu, Suzhou Institute of Biomedical Engineering and Technology (China) . . . . . [9359-57]

Luminescence of $(Mg,Zn)Al_2O_4$:Tb mixed spinel thin films prepared by spin-coating, Robin E. Kroon, Univ. of the Free State (South Africa); Wael A. I. Tabaza, Univ. of the Free State (South Africa) and Islamic Univ. (Palestinian Territory, Occupied); H. C. Swart, Univ. of the Free State (South Africa) [9359-58]

Optical properties and size distribution of the nanocolloids made of rare-earth ion-doped $NaYF_4$, Darayas N. Patel, Oakwood Univ. (USA); Sergey S. Sarkisov, SSS Optical Technologies, LLC (USA); Ashley Lewis, Donald Wright III, Danielle Lewis, Maucus Valentine, Oakwood Univ. (USA) . . . . . [9359-59]

Activation of in-situ dopants in GeSn by rapid thermal anneal, Birendra R. Dutt, APIC Corp. (USA); Elizabeth H. Edwards, PhotonIC Corp. (USA); Colleen K. Shang, James S. Harris, Stanford Univ. (USA); Yi-Chiau Huang, Yihwan Kim, Applied Materials, Inc. (USA). . . . . [9359-60]

OPTO

CONFERENCE 9359
LOCATION: ROOM 222 (MEZZANINE)

Application of photo-doping phenomenon in amorphous chalcogenide GeS_2 film to optical devices, Yoshihisa Murakami, National Univ. Corp. Tsukuba Univ. of Technology (Japan); Katsuya Arai, Moriaki Wakaki, Takehisa Shibuya, Tokai Univ. (Japan); Toshihiro Shintaku, Tokyo Polytechnic Univ. (Japan) . . . . . [9359-61]

Optical and electronic properties of Si ion implantation of silver atoms, Yevheniia Chernukha, Vasyl S. Stashchuk, National Taras Shevchenko Univ. of Kyiv (Ukraine) . . . . . [9359-62]

Nonlinear electro-optic tuning of plasmonic nano-filter, Rehab K. Abd-Allah, The American Univ. in Cairo (Egypt); Yehea Ismail, Zewail City of Science and Technology (Egypt); Mohamed A. Swillam, The American Univ. in Cairo (Egypt) . . . . . [9359-63]

Ultra-flat and broad gain bandwidth of optical parametric amplification in highly-nonlinear tellurite hybrid microstructured optical fibers, Lei Cheng, Toyota Technological Institute (Japan); Tuan H. Tong, TTI (Japan); Xiaojie Xue, Dinghuan Deng, Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan) . . . . . [9359-64]

Requirements for gain/oscillation in Yb^{3+}/Er^{3+}-codoped microring resonators, Juan A. Valles, Univ. de Zaragoza (Spain); Ramona M. Gălăţus, Technical Univ. of Cluj Napoca (Romania) . . . . . [9359-65]

Yb^{3+}-doped TeO_2-WO_3-ZrO_2 glasses for high-power laser applications, Venkataiah G., Sri Venkateswara Univ. Tirupati (India); Babu P., Government Degree College Satyavedu (India); Inocencio Rafael Martín Benenzuela, Victor Lavín della Ventura, Univ. de La Laguna (Spain); Chalicheemalapalli K. Jayasankar, Sri Venkateswara Univ. (India); Venkata Krishnaiah, Ecole Polytechnique de Montréal (Canada) . . . . . [9359-66]

Optical characterization of Er^{3+} ions doped zincfluorophosphate glasses, Sreedhar V.B., Vijaya N., Sri Venkateswara Univ. (India); Krishna M. Nutakki, Akkineni Nage Swara Rao College (India); Chalicheemalapalli K. Jayasankar, Sri Venkateswara Univ. (India) . . . . . [9359-67]

Optical properties of Pr^{3+}-, Ce^{3+}-, and Eu^{3+}-doped KPb_2Cl_5, EiEi Brown, Uwe H. Hömmerich, Hampton Univ. (USA); Althea G. Bluiett, Elizabeth City State Univ. (USA); Sudhir B. Trivedi, Brimrose Corp. of America (USA) . [9359-68]

Chirped long-period grating for dispersion minimization, Krishna C. Patra, Sambalpur Univ. (India) . . . . . [9359-69]

Nonlinear optical properties of single crystal cadmium magnesium telluride, David Lombardo, Shekhar Guha, Air Force Research Lab. (USA) . . . . . [9359-70]

Optical thermal sensing based on neodymium-doped materials with excitation and emission within the first biological window, Kagola Upendra Kumar, Weslley Queiroz Santos, Carlos Jacinto da Silva, Univ. Federal de Alagoas (Brazil) . . . . . [9359-71]

Assessment of fiber optic sensors for ageing monitoring of industrial liquid coolants, Christos Riziotis, National Hellenic Research Foundation (Greece); Alexandros El Sachat, National Hellenic Research Foundation (Greece) and Institut Català de Nanotecnologia (Spain); Christos Markos, National Hellenic Research Foundation (Greece) and DTU Fotonik (Denmark); Anastasia Meristoudi, National Hellenic Research Foundation (Greece); Aggelos Papadopoulos, Kleemann S.A. (Greece) . . . . . [9359-72]

Azobenzene-based surfaces for liquid crystal alignment, Amalya Minasyan, Tigran V. Galstian, Univ. Laval (Canada) . . . . . [9359-73]

Spectroscopic investigation and optical properties of Eu^{3+} ions in fluorophosphate glasses, Kiran Kumar K., Basavapoornima Ch, Vijaya N., Chalicheemalapalli K. Jayasankar, Sri Venkateswara Univ. (India); Venkata Krishnaiah, Ecole Polytechnique de Montréal (Canada) . . . . . [9359-75]

Chalcogenide amorphous nanoparticles doped poly(methyl methacrylate) with high nonlinearity for optical waveguide, Xiaojie Xue, Tonglei Cheng, Takenobu Suzuki, Yasutake Ohishi, Toyota Technological Institute (Japan) . . . . . [9359-76]

Multi-wavelength fiber laser based on liquid crystal filter, Hyun Ji Lee, Myoung Ock Ko, Moon Deock Kim, Jong-Hyun Kim, Min Yong Jeon, Chungnam National Univ. (Korea, Republic of) . . . . . [9359-77]

Intense highly-efficient solid-state yellow light source based on rare-earth-doped luminescent concentrator, Juna Sathian, Neil M. Alford, Mark Oxborrow, Imperial College London (United Kingdom) . . . . . [9359-78]

Packaging of glass-based phosphor-converted white light-emitting diodes for solid-state lighting, Chun-Chin Tsai, Cheng-Feng Yue, Far East Univ. (Taiwan); Yu-Chun Lee, Lextar Electronics Corp. (Taiwan); Kai-Jo Fu, Shanghai Univ. of Finance and Economics (China); Wood-Hi Cheng, National Sun Yat-sen Univ. (Taiwan) . . . . . [9359-79]

Measurement of refractive index distribution of photochromic materials by scanning focused refractive index microscopy, Teng-Qian Sun, Qing Ye, Xiao-Wan Wang, Jin Wang, Zhi-Chao Deng, Jian-Chun Mei, Wen-Yuan Zhou, Chun-Ping Zhang, Jianguo Tian, Nankai Univ. (China) . . . . . [9359-80]

CONFERENCE 9360
LOCATION: ROOM 276 (MEZZANINE)

Monday–Wednesday 9–11 February 2015 • Proceedings of SPIE Vol. 9360

Organic Photonic Materials and Devices XVII

Conference Chairs: **Christopher E. Tabor,** Air Force Research Lab. (USA); **François Kajzar,** Univ. Politehnica of Bucharest (Romania); **Toshikuni Kaino,** Tohoku Univ. (Japan); **Yasuhiro Koike,** Keio Univ. (Japan)

Program Committee: **Chantal Andraud,** Ecole Normale Supérieure de Lyon (France); **Werner J. Blau,** Trinity College Dublin (Ireland); **Andreas Bräuer,** Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Fabrice Charra,** Commissariat à l'Énergie Atomique (France); **Raluca Dinu,** GigOptix, Inc. (USA); **Manfred Eich,** Technische Univ. Hamburg-Harburg (Germany); **Alain F. Fort,** Institut de Physique et Chimie des Matériaux de Strasbourg (France); **James G. Grote,** Air Force Research Lab. (USA); **F. Kenneth Hopkins,** Air Force Research Lab. (USA); **Alex K. Y. Jen,** Univ. of Washington (USA); **Michael H. C. Jin,** Johns Hopkins Univ. Applied Physics Lab., LLC (USA); **Eunkyoung Kim,** Yonsei Univ. (Korea, Republic of); **Jang-Joo Kim,** Seoul National Univ. (Korea, Republic of); **Nakjoong Kim,** Hanyang Univ. (Korea, Republic of); **Isabelle Ledoux-Rak,** Ecole Normale Supérieure de Cachan (France); **Charles Y. C. Lee,** Air Force Office of Scientific Research (USA); **Kwang-Sup Lee,** Hannam Univ. (Korea, Republic of); **Misoon Y. Mah,** Asian Office of Aerospace Research and Development (Japan); **Seth R. Marder,** Georgia Institute of Technology (USA); **Antoni C. Mitus,** Wroclaw Univ. of Technology (Poland); **Jaroslaw Mysliwiec,** Wroclaw Univ. of Technology (Poland); **Robert L. Nelson,** Air Force Research Lab. (USA); **Robert A. Norwood,** College of Optical Sciences, The Univ. of Arizona (USA); **Jean-Michel Nunzi,** Queen's Univ. (Canada); **Shuji Okada,** Yamagata Univ. (Japan); **Akira Otomo,** National Institute of Information and Communications Technology (Japan); **Ileana Rau,** Univ. Politehnica of Bucharest (Romania); **Niyazi Serdar Sariciftci,** Johannes Kepler Univ. Linz (Austria); **Devanand K. Shenoy,** Defense Advanced Research Projects Agency (USA); **Kenneth D. Singer,** Case Western Reserve Univ. (USA); **Attila A. Szep,** Air Force Research Lab. (USA); **Rebecca E. Taylor,** Lockheed Martin Space Systems Co. (USA); **Jeong-Weon Wu,** Ewha Womans Univ. (Korea, Republic of); **Shiyoshi Yokoyama,** Kyushu Univ. (Japan); **Roberto Zamboni,** Istituto per la Sintesi Organica e la Fotoreattività (Italy)

Monday 9 February

OPTO PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA). . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA). . . . . [9371-202]

Coffee Break . . . . . .Mon 10:10 am to 10:30 am

SESSION 1
LOCATION: ROOM 276 (MEZZANINE) . . . . . MON 10:30 AM TO 12:10 PM

Biotronics
Session Chair: **François Kajzar,**
Univ. Politehnica of Bucharest (Romania)

10:30 am: **Biopolymers in optoelectronics** *(Keynote Presentation)*, James G. Grote, Air Force Research Lab. (USA); Fahima Ouchen, Univ. of Dayton Research Institute (USA); Emily M. Heckman, Air Force Research Lab. (USA); Larry R. Dalton, Univ. of Washington (USA) . . . . . [9360-1]

11:10 am: **Rare earth-DNA materials for application in electronics** *(Invited Paper)*, Ileana Rau, Maria Mihaly, Cosmina Lazar, Aurelia Meghea, François Kajzar, Univ. Politehnica of Bucharest (Romania). . . . . [9360-2]

11:40 am: **Iridescent organisms from nature: inspiration for reflective materials** *(Invited Paper)*, Evelien De Meulenaere, Dimitri D. Deheyn, Scripps Institution of Oceanography, Univ. of California, San Diego (USA). . . . . [9360-3]

Lunch Break . . . . . .Mon 12:10 pm to 1:30 pm

SESSION 2
LOCATION: ROOM 276 (MEZZANINE) . . . . . MON 1:30 PM TO 3:30 PM

Organic Photoluminescence and Lasing
Session Chair: **Ileana Rau,** Univ. Politehnica of Bucharest (Romania)

1:30 pm: **Measuring the coherence of organic light sources** *(Invited Paper)*, Ifor D. W. Samuel, Guohua Xie, Mingzhou Chen, Yue Wang, Shuyu Zhang, Guy L. Whitworth, Fei Chen, Michael Mazilu, Kishan Dholakia, Univ. of St. Andrews (United Kingdom); Thomas F. Krauss, The Univ. of York (United Kingdom); Graham A. Turnbull, Univ. of St. Andrews (United Kingdom) . [9360-4]

2:00 pm: **From gold nanoparticles to luminescent hybrid nano-objects** *(Invited Paper)*, Frederic Lerouge, Ecole Normale Supérieure de Lyon (France); Julien R. G. Navarro, Ecole Normale Supérieure de Lyon (France) and Dept. of Materials and Environmental Chemistry (Sweden); Delphine Manchon, Emmanuel Cottancin, Jean Lermé, Institut Lumière Matière (France); Cyrille Monnereau, Chantal Andraud, Guillaume Micouin, Ecole Normale Supérieure de Lyon (France); Patrice L. Baldeck, Ecole Normale Supérieure de Lyon (France) and Univ. Joseph Fourier (France); Stéphane Parola, Univ. Claude Bernard Lyon 1 (France). . . . . [9360-5]

2:30 pm: **Low-threshold lasing from organic and polymeric microdisk printed by room temperature atmosphere ink-jet technique**, Cong Chen, Soichiro Ryu, Hiroaki Yoshioka, Kyushu Univ. (Japan); Kei Yasui, Nissan Chemical Industries, Ltd. (Japan); Yuji Oki, Kyushu Univ. (Japan) . . . . . [9360-6]

2:50 pm: **Amplified spontaneous emission and lasing from a fluorene-based copolymer**, Pradeep Chandran, Mathew Sebastian, C. P. Vallabhan, Cochin Univ. of Science & Technology (India); P. Radhakrishnan, Cochin Univ. of Science and Technology (India); V. P. N. Nampoori, Cochin Univ. of Science & Technology (India) . . . . . [9360-7]

3:10 pm: **Blue phosphorescent organic light-emitting devices with a ten-fold improved operational lifetime**, Jaesang Lee, Yifan Zhang, Stephen R. Forrest, Univ. of Michigan (USA) . . . . . [9360-8]

Coffee Break . . . . . .Mon 3:30 pm to 4:00 pm

OPTO

CONFERENCE 9360
LOCATION: ROOM 276 (MEZZANINE)

SESSION 3
LOCATION: ROOM 276 (MEZZANINE) . . . . . .MON 4:00 PM TO 5:20 PM

Miscellaneous I
Session Chair: **Ifor D. W. Samuel,** Univ. of St. Andrews (United Kingdom)

4:00 pm: **Nanopatterning of photoanodes for efficient light harvesting in solid-state solar cells**, Jongbeom Na, Younghoon Kim, Chihyun Park, Jeonghun Kim, Eunkyoung Kim, Yonsei Univ. (Korea, Republic of) . . . . . [9360-9]

4:20 pm: **Comparing optical properties of different species of diatoms**, Christian Maibohm, Søren M. M. Friis, Karsten Rottwitt, DTU Fotonik (Denmark); Yanyan Su, Univ. of Copenhagen (Denmark) . . . . . [9360-10]

4:40 pm: **Optical properties of organotin sulfide clusters**, Nils Rosemann, Jens Eußner, Stefanie Dehnen, Sangam Chatterjee, Philipps-Univ. Marburg (Germany) . . . . . [9360-11]

5:00 pm: **Electro-optic diffraction switches mediated with imidazolium ions for high bistability**, Chihyun Park, Seogjae Seo, Haijin Shin, Jongbeom Na, Eunkyoung Kim, Yonsei Univ. (Korea, Republic of) . . . . . [9360-12]

Tuesday 10 February

SESSION 4
LOCATION: ROOM 276 (MEZZANINE) . . . . . TUE 8:00 AM TO 10:00 AM

Nonlinear Optics I
Session Chair: **André-Jean Attias,** Univ. Pierre et Marie Curie (France)

8:00 am: **Nonlinear chromophores with NIR properties for applications in biology and defense** *(Keynote Presentation)*, Chantal Andraud, Ecole Normale Supérieure de Lyon (France) . . . . . [9360-13]

8:40 am: **From nonlinear magneto-optics to organic magnetism** *(Invited Paper)*, André P. Persoons, Katholieke Univ. Leuven (Belgium). [9360-14]

9:10 am: **Hybrid molecule/nanowire systems with a hyperpolarizability that approaches the fundamental limit** *(Invited Paper)*, Mark G. Kuzyk, Sean M. Mossman, Washington State Univ. (USA). . . . . [9360-15]

9:40 am: **Triphenylmethyl- and triphenylsilyl-based molecular glasses for photonic applications**, Martins A. Rutkis, Univ. of Latvia (Latvia); Kaspars Traskovskis, Riga Technical Univ. (Latvia) . . . . . [9360-16]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 5
LOCATION: ROOM 276 (MEZZANINE) . . . . . .TUE 10:30 AM TO 12:00 PM

Nonlinear Optics II
Session Chair: **Mark G. Kuzyk,** Washington State Univ. (USA)

10:30 am: **Non-linear photobleaching for optical data storage** *(Invited Paper)*, Kenneth D. Singer, Cory W. Christenson, Anuj Saini, Case Western Reserve Univ. (USA); Christopher J. Ryan, Folio Photonics LLC (USA); Guoqiang Zhang, Lei Zhu, Case Western Reserve Univ. (USA); Christoph Weder, Univ. de Fribourg (Switzerland); Eric Baer, Jie Shan, Case Western Reserve Univ. (USA) . [9360-17]

11:00 am: **Active tunable photonics and ultrafast nonlinear optics with nematic and blue phase liquid crystals** *(Invited Paper)*, Iam Choon Khoo, The Pennsylvania State Univ. (USA). . . . . [9360-18]

11:30 am: **Time-resolved circular dichroism: What can we learn on conformational changes?** *(Invited Paper)*, Francois Hache, Lab. d'Optique et Biosciences (France) . . . . . [9360-19]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:20 pm

SESSION 6
LOCATION: ROOM 276 (MEZZANINE) . . . . . TUE 1:20 PM TO 3:20 PM

Materials I
Session Chair: **Toshikuni Kaino,** Tohoku Univ. (Japan)

1:20 pm: **Quantum dot-based organic-inorganic hybrid materials with optoelectronic functions** *(Invited Paper)*, Kwang-Sup Lee, Hannam Univ. (Korea, Republic of). . . . . [9360-20]

1:50 pm: **Janus tectons: a versatile platform for self-assembling chromophores on sp2-carbon based substrates** *(Invited Paper)*, André-Jean Attias, Ping Du, David Kreher, Fabrice Mathevet, Univ. Pierre et Marie Curie (France); Zheng Han, Vincent Bouchiat, Institut NÉEL (France); Fabrice Charra, Commissariat à l'Énergie Atomique (France) . . . . . [9360-21]

2:20 pm: **Two-dimensional inorganic-organic perovskite hexagonal nanosheets: growth and mechanism**, Suman L. Shakya, G. Vijaya Prakash, Indian Institute of Technology Delhi (India) . . . . . [9360-22]

2:40 pm: **The relationship between polymer waveguide optical interconnection end facet roughness and the optical input and output coupling losses**, Hadi Baghsiahi, David R. Selviah, Univ. College London (United Kingdom); Kai Wang, Richard C. Pitwon, Seagate Technology LLC (United Kingdom). . . . . [9360-23]

3:00 pm: **Optical waveguides using PDMS-metal oxide hybrid nanocomposites**, Arash Hosseinzadeh, Christopher T. Middlebrook, Michael Mullins, Michigan Technological Univ. (USA) . . . . . [9360-24]

Coffee Break . . . . . Tue 3:20 pm to 3:50 pm

SESSION 7
LOCATION: ROOM 276 (MEZZANINE) . . . . . .TUE 3:50 PM TO 5:30 PM

Materials II
Session Chair: **Kenneth D. Singer,** Case Western Reserve Univ. (USA)

3:50 pm: **Diketopyrrolopyrroles-porphyrins conjugates: from Ferrari to photodynamic therapy** *(Invited Paper)*, Frederic Bolze, Valerie Heitz, Julie Schmitt, Univ. de Strasbourg (France); Barbara Ventura, Lucia Flamigni, Istituto per la Sintesi Organica e la Fotoreattività (Italy) . . . . . [9360-25]

4:20 pm: **Evaluation and improvement of thermal stability in poled electro-optic polymers using thermally-stimulated depolarization current measurement** *(Invited Paper)*, Akira Otomo, Isao Aoki, Chiyumi Yamada, Toshiki Yamada, National Institute of Information and Communications Technology (Japan); Ryoma Ikemoto, Dai Taguchi, Takaaki Manaka, Mitsumasa Iwamoto, Tokyo Institute of Technology (Japan) . . . . . [9360-26]

4:50 pm: **Understanding degradation phenomena in organic photovoltaic devices**, Jagdish A. K., G. Pavan Kumar, Praveen C. Ramamurthy, D. Roy Mahapatra, Gopalkrishna M. Hegde, Indian Institute of Science (India). [9360-27]

5:10 pm: **Molecular organization and phase transition at the air-water interface investigated by second-harmonic generation**, Emmanuel Benichou, Aurélie Bruyère, Emilie Forel, Oriane Bonhomme, Pierre-François Brevet, Univ. Claude Bernard Lyon 1 (France) . . . . . [9360-28]

Wednesday 11 February

SESSION 8

LOCATION: ROOM 276 (MEZZANINE) . . . . . .WED 8:30 AM TO 10:10 AM

Photophysics and Solar Energy Conversion

Session Chair: **Chantal Andraud,**
Ecole Normale Supérieure de Lyon (France)

8:30 am: **Structural origins of voc tunability in ternary blend solar cells** *(Keynote Presentation)*, Petr P. Khlyabich, Yueh-Lin Loo, Princeton Univ. (USA) . . . . . [9360-29]

9:10 am: **Photophysics of organic semiconductors: from ensemble to the single-molecule level**, Rebecca R. Grollman, Whitney E. B. Shepherd, Alexander Robertson, Keshab R. Paudel, Oregon State Univ. (USA); John E. Anthony, Univ. of Kentucky (USA); Oksana Ostroverkhova, Oregon State Univ. (USA) . . . . . [9360-30]

9:30 am: **Towards multicolor photolithographic structuring of organic electroluminescent displays: influence of bilayer resist processing on p-i-n OLEDs**, Simonas Krotkus, Technische Univ. Dresden (Germany); Robby Janneck, Shrujan Kalkura, Alexander A. Zakhidov, Fraunhofer-COMEDD (Germany); Daniel Kasemann, Simone Hofmann, Karl Leo, Sebastian Reineke, Technische Univ. Dresden (Germany). . . . . [9360-31]

9:50 am: **Anisotropic singlet-exciton fission in single-crystalline perfluoropentace**, Kolja Kolata, Tobias Breuer, Gregor Witte, Sangam Chatterjee, Philipps-Univ. Marburg (Germany) . . . . . [9360-33]

Coffee Break . . . . . .Wed 10:10 am to 10:40 am

SESSION 9

LOCATION: ROOM 276 (MEZZANINE) . . . . . .WED 10:40 AM TO 11:50 AM

Miscellaneous II

Session Chair: **Christopher E. Tabor,** Air Force Research Lab. (USA)

10:40 am: **High-speed 3D laser printing by two-photon induced chemistry: breaking the centimeter-scale limit** *(Invited Paper)*, Pablo M. Romero, Nerea O. Otero, AIMEN - Asociación de Investigación Metalúrgica del Noroeste (Spain); Olivier Stephan, Univ. Joseph Fourier (France); Kevin J. Heggarty, Télécom Bretagne (France); Maria Farsari, Foundation for Research and Technology-Hellas (Greece); Boris Chichkov, Laser Zentrum Hannover e.V. (Germany); Patrice L. Baldeck, Univ. Joseph Fourier (France) and Ctr. National de la Recherche Scientifique (France). . . . . [9360-34]

11:10 am: **Peculiarities of carrier dynamics at PEN/C60 interfaces studied by time resolved photoluminescence**, Nils Rosemann, Andrea Karthäuser, Robin Döring, Tobias Breuer, Gregor Witte, Sangam Chatterjee, Philipps-Univ. Marburg (Germany) . . . . . [9360-35]

11:30 am: **Time-resolved spectroscopy of charge transfer phenomena in organic solar cells**, Marina Gerhard, Philipps-Univ. Marburg (Germany); Andreas Arndt, Aina Quintilla, Karlsruher Institut für Technologie (Germany); Arash Rahimi-Iman, Philipps-Univ. Marburg (Germany); Uli Lemmer, Karlsruher Institut für Technologie (Germany); Martin Koch, Philipps-Univ. Marburg (Germany) . . . . . [9360-36]

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Comprehensive photo-physics investigation of novel Corroles, Sai Santosh Kumar Raavi, Indian Institute of Technology Hyderabad (India) and Nanyang Technological Univ. (Singapore) and Istituto Italiano di Tecnologia (Italy); Jun Yin, Nanyang Technological Univ. (Singapore); Giulia Grancini, Istituto Italiano di Tecnologia (Italy); Lingamallu Giribabu, Indian Institute of Chemical Technology (India); Cesare Soci, Indian Institute of Chemical Technology (Singapore) and Nanyang Technological Univ. (Singapore); Soma Venogopal Rao, Univ. of Hyderabad (India) . . . . . [9360-32]

Directional solidification of C8-BTBT films induced by temperature gradients and its application for transistors, Ichiro Fujieda, Naoki Iizuka, Yosuke Onishi, Ritsumeikan Univ. (Japan) . . . . . [9360-37]

Fabrication of Au nanoparticle monolayer embedded in the photoactive layer using oxygen plasma to improve the efficiency of organic solar cell, Sun-Joo Park, Kwan-Yong Lee, Do-Hyun Kim, Cheolsang Yoon, Hyoungjun Jeon, Kangtaek Lee, Young-Joo Kim, Yonsei Univ. (Korea, Republic of) . . . . . [9360-38]

Symmetry breaking and birth of chirality in molecular film at the air/water interface: an approach with nonlinear optics, Aurélie Bruyère, Emmanuel Benichou, Univ. Claude Bernard Lyon 1 (France); Pierre-François Brevet, Institut Lumière Matière (France) . . . . . [9360-39]

Optical absorption and photoluminescence properties of perylene single-crystals, Andre Rinn, Andre Pick, Gregor Witte, Sangam Chatterjee, Philipps-Univ. Marburg (Germany) . . . . . [9360-40]

Optical tweezers-based probe of charge transfer in organic semiconductors at microscopic scales, Rebecca R. Grollman, Jacob Busche, Oksana Ostroverkhova, Oregon State Univ. (USA). . . . . [9360-41]

Analysis of light scattering in SI-POFs by using side illumination technique, Iñaki Bikandi, Univ. del País Vasco (Spain) . . . . . [9360-42]

Charge separation in OPV bulk heterojunctions, Andrew B. Matheson, Arvydas Ruseckas, Ifor D. W. Samuel, Univ. of St. Andrews (United Kingdom) . . . . . [9360-43]

Thermally-induced third-order optical nonlinearity of Aniline blue diammonium salt investigated by Z-scan technique for nonlinear optical applications, Poornesh P, Manipal Univ. (India); Pramodini S. Sandhya, Manipal Institute of Technology (India) . . . . . [9360-45]

Effect of acid dopants in gellan gum gel polymer electrolytes and the performance in an electrochemical double-layer capacitor, Y. N. Sudhakar, M. Selvakumar, Manipal Institute of Technology (India) . . . . . [9360-46]

Preparation and properties of graphene sheets coupled with magnetic nanoparticles, Yi-Seul Han, Hannam Univ. (Korea, Republic of); Kyung Eun Lee, KAIST (Korea, Republic of); Sung-Hyun Kim, Hannam Univ. (Korea, Republic of); Sang-Ouk Kim, KAIST (Korea, Republic of); Ji-Hwan Park, Kwang-Sup Lee, Hannam Univ. (Korea, Republic of) . . . . . [9360-47]

Growth, characterization and molecular hyperpolarizabilities of 1-(5-chlorothiophen-2-yl)-3-(2, 3-dimethoxyphenyl)prop-2-en-1-one single crystal: a superior NLO organic material, Ashwatha N. Prabhu, Vyasa Upadhyaya, Manipal Institute of Technology (India). . . . . [9360-48]

Growth and characterization of a new nonlinear optical organic crystal: 2,4,6-trimethylacetanilide, Vyasa Upadhyaya, Manipal Institute of Technology (India); Sharada G. Prabhu, NMAM Institute of Technology (India). . . . . [9360-49]

CONFERENCE 9361
LOCATION: ROOM 270 (MEZZANINE)

Sunday–Wednesday 8–11 February 2015 • Proceedings of SPIE Vol. 9361

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Ultrafast Phenomena and Nanophotonics XIX

Conference Chairs: **Markus Betz,** Technische Univ. Dortmund (Germany); **Abdulhakem Y. Elezzabi,** Univ. of Alberta (Canada); **Kong-Thon Tsen,** Arizona State Univ. (USA)

Program Committee: **Alan D. Bristow,** West Virginia Univ. (USA); **Yujie J. Ding,** Lehigh Univ. (USA); **Kazuhiko Hirakawa,** The Univ. of Tokyo (Japan); **Rupert Huber,** Univ. Regensburg (Germany); **Robert A. Kaindl,** Lawrence Berkeley National Lab. (USA); **Dai-Sik Kim,** Seoul National Univ. (Korea, Republic of); **Xiaoqin Li,** The Univ. of Texas at Austin (USA); **Christoph Lienau,** Carl von Ossietzky Univ. Oldenburg (Germany); **Torsten Meier,** Univ. Paderborn (Germany); **Walter Pfeiffer,** Univ. Bielefeld (Germany); **Volker J. Sorger,** The George Washington Univ. (USA); **Fabrice Vallee,** Univ. Claude Bernard Lyon 1 (France)

Sunday 8 February

SESSION 1

LOCATION: ROOM 270 (MEZZANINE) . . . . . SUN 8:30 AM TO 10:15 AM

Ultrafast Optical Properties of Graphene and Low Dimensional Materials

Session Chair: **Abdulhakem Y. Elezzabi,** Univ. of Alberta (Canada)

8:30 am: **Ultrafast plasmon dynamics in graphene** *(Invited Paper)*, Francisco Javier García de Abajo, ICFO - Institut de Ciències Fotòniques (Spain). . [9361-1]

9:00 am: **Imaging carrier transport in one-dimensional nanoscale devices using femtosecond photocurrent microscopy** *(Invited Paper)*, Yeong Hwan Ahn, Ajou Univ. (Korea, Republic of) . . . . . [9361-2]

9:30 am: **Q-switched fiber laser based on carbon nano wall saturable absorber**, Soichiro Omi, IHI Corp. (Japan) and Kyushu Univ. (Japan); Norihito Kawaguchi, IHI Corp. (Japan); Yuji Oki, Kyushu Univ. (Japan) . . . . . [9361-3]

9:45 am: **Efficient Auger scattering in Landau-quantized graphene**, Florian Wendler, Technische Univ. Berlin (Germany); Martin Mittendorff, Stephan F. Winnerl, Manfred Helm, Helmholtz-Zentrum Dresden-Rossendorf e. V. (Germany); Andreas Knorr, Ermin Malic, Technische Univ. Berlin (Germany) . . . . . [9361-4]

10:00 am: **Optical nonlinearities in few-layer gallium selenide**, Lasse Karvonen, Antti Säynätjoki, Aalto Univ. (Finland); Seyed Soroush Mehravar, College of Optical Sciences, The Univ. of Arizona (USA); Raul D. Rodriquez, Susanne Hartmann, Dietrich R. T. Zahn, Technische Univ. Chemnitz (Germany); Seppo K. Honkanen, Univ. of Eastern Finland (Finland); Robert A. Norwood, College of Optical Sciences, The Univ. of Arizona (USA); Nasser N. Peyghambarian, College of Optical Sciences, The Univ. of Arizona (USA) and Aalto Univ. (Finland) and Univ. of Eastern Finland (Finland); Khanh Q. Kieu, College of Optical Sciences, The Univ. of Arizona (USA); Harri Lipsanen, Juha Riikonen, Aalto Univ. School of Science and Technology (Finland). [9361-5]

Coffee Break . . . . . Sun 10:15 am to 10:45 am

SESSION 2

LOCATION: ROOM 270 (MEZZANINE) . . . . . SUN 10:45 AM TO 12:15 PM

Coherent Optical Spectroscopy

Session Chair: **Alan D. Bristow,** West Virginia Univ. (USA)

10:45 am: **Pulse shaping of the intense few-cycle terahertz pulses for nonlinear spectroscopy** *(Invited Paper)*, Masaya Nagai, Osaka Univ. (Japan) . . . . . [9361-6]

11:15 am: **Elucidating photodynamics with ultrafast pulse sequences: pump-repump, multidimensional spectroscopy, and beyond** *(Invited Paper)*, Patrick Nürnberger, Ruhr-Univ. Bochum (Germany) and Julius-Maximilians-Univ. Würzburg (Germany); Stefan Ruetzel, Tobias Brixner, Julius-Maximilians-Univ. Würzburg (Germany) . . . . . [9361-7]

11:45 am: **Detection of non-secular relaxation processes by coherent nano-optical spectroscopy**, Markus Krecik, Sven M. Hein, Marten Richter, Technische Univ. Berlin (Germany) . . . . . [9361-8]

12:00 pm: **Signatures of Förster and Dexter transfer processes in coupled nanostructures for linear and two-dimensional coherent optical spectroscopy**, Judith F. Specht, Andreas Knorr, Marten Richter, Technische Univ. Berlin (Germany). . . . . [9361-9]

Lunch Break . . . . . Sun 12:15 pm to 1:30 pm

SESSION 3

LOCATION: ROOM 270 (MEZZANINE) . . . . . SUN 1:30 PM TO 3:30 PM

Ultrafast Phenomena in 1D and 2D Nanomaterials and Nanostructures

Session Chair: **Patrick Nürnberger,** Ruhr-Univ. Bochum (Germany)

1:30 pm: **Excitonic dark states in single atomic layer of tungsten disulfide** *(Invited Paper)*, Ziliang Ye, Ting Cao, Kevin O'Brien, Hanyu Zhu, Univ. of California, Berkeley (USA); Xiaobo Yin, Univ. of Colorado at Boulder (USA); Yuan Wang, Steven G. Louie, Xiang Zhang, Univ. of California, Berkeley (USA) . . . . . [9361-10]

2:00 pm: **Environmental effects in relaxation pathways of 1D and 2D nanostructures** *(Invited Paper)*, Libai Huang, Purdue Univ. (USA) . . . . [9361-11]

2:30 pm: **Ultrafast carrier dynamics in atomically thin WS_2 layers in the low- and high-density regime**, Claudia Ruppert, Technische Univ. Dortmund (Germany) and Columbia Univ. (USA); Alexey Chernikov, Heather M. Hill, Albert Rigosi, Tony F. Heinz, Columbia Univ. (USA) . . . . . [9361-12]

2:45 pm: **Excitonic effect in single atomic layers of transition metal dichalcogenides** *(Invited Paper)*, Jie Shan, The Pennsylvania State Univ. (USA) . . . . . [9361-13]

3:15 pm: **Continuously-tunable ultrastrong light-matter interaction**, Curdin Maissen, Giacomo Scalari, Mattias Beck, Jérôme Faist, ETH Zürich (Switzerland) . . . . . [9361-14]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 4

LOCATION: ROOM 270 (MEZZANINE) . . . . . SUN 4:00 PM TO 5:15 PM

Spectroscopy of Complex Systems

Session Chair: **Xiang Zhang,** Univ. of California, Berkeley (USA)

4:00 pm: **Relaxation dynamics in single-crystalline perfluoropentacene**, Kolja Kolata, Tobias Breuer, Gregor Witte, Sangam Chatterjee, Philipps-Univ. Marburg (Germany) . . . . . [9361-15]

4:15 pm: **Effect of the Zn coordination complex on the excited-state and two-photon absorption spectra of a novel salicylidene compound,** Marcelo G. Vivas, Univ. Federal de Alfenas (Brazil); Jose Germino, Cristina Barboza, Univ. Estadual de Campinas (Brazil); Leonardo De Boni, Univ. de São Paulo (Brazil); Tereza Atvarz, Univ. Estadual de Campinas (Brazil); Cleber R. Mendonça, Univ. de São Paulo (Brazil). . . . . [9361-16]

4:30 pm: **A spectroscopic ruler for intermediate-zone FRET measurements**, Garth A. Jones, David L. Andrews, Univ. of East Anglia (United Kingdom) . . . . . [9361-17]

4:45 pm: **Polyethylene terephthalate: nonlinear optical material for compression of ultra-high-power laser pulses**, Efim A. Khazanov, Sergey Y. Mironov, Vladislav Ginzburg, Ekaterina I. Gacheva, Dmitry E. Silin, Andrey A. Shaykin, Institute of Applied Physics (Russian Federation); Gérard A. Mourou, Ecole Polytechnique (France) . . . . . [9361-18]

5:00 pm: **Chirp scanning technique to determine the non-degenerate two-photon absorption**, Renato Juliano Martins, Instituto de Física de São Carlos (Brazil); Cleber R. Mendonça, Univ. de São Paulo (Brazil) . . . . . [9361-19]

Monday 9 February

OPTO PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA). . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA). . . . . [9371-202]

Coffee Break . . . . . Mon 10:10 am to 10:30 am

SESSION 5
LOCATION: ROOM 270 (MEZZANINE) . . . . . MON 10:30 AM TO 12:15 PM

Nonlinear Nanoplasmonics

Session Chair: **Abdulhakem Y. Elezzabi,** Univ. of Alberta (Canada)

10:30 am: **controlling femtosecond dynamics on the nanometer scale** *(Keynote Presentation)*, Nicolo Accanto, Lukasz Piatkowski, Jan Renger, ICFO - Institut de Ciències Fotòniques (Spain); Niek F. van Hulst, ICFO - Institut de Ciències Fotòniques (Andorra) and Institució Catalana de Recerca i Estudis Avançats (Spain) . . . . . [9361-20]

11:15 am: **Enhancement mechanisms for second-harmonic generation from metal nanostructures** *(Invited Paper)*, Martti Kauranen, Robert Czaplicki, Jouni Mäkitalo, Kalle O. Koskinen, Tampere Univ. of Technology (Finland); Joonas Lehtolahti, Janne Laukkanen, Markku Kuittinen, Univ. of Eastern Finland (Finland). . . . . [9361-21]

11:45 am: **Second-harmonic generation with double resonant hybrid plasmonic/dielectric antennas**, Heiko Linnenbank, Stefan Linden, Rheinische Friedrich-Wilhelms-Univ. Bonn (Germany) . . . . . [9361-22]

12:00 pm: **Nano-scale characterization of gold nanostructures using polarized nonlinear microscopy**, Naveen K. Balla, Institut Fresnel Equipe MOSAIC (France); Carolina Rendon, Institut Fresnel (France) and Ctr. National de la Recherche Scientifique (France); Esteban B. Ureña, ICFO - Institut de Ciències Fotòniques (Spain); Pawel Karpinski, Wroclaw Univ. of Technology (Poland); Julien Dubboiset, Institut Fresnel (France); Patrick Ferrand, Hervé Rigneault, Institut Fresnel (France) and Ctr. National de la Recherche Scientifique (France); Romain Quidant, ICFO - Institut de Ciències Fotòniques (Spain); Sophie Brasselet, Institut Fresnel (France) and Ctr. National de la Recherche Scientifique (France) . . . . . [9361-23]

Lunch Break . . . . . Mon 12:15 pm to 2:00 pm

SESSION 6
LOCATION: ROOM 270 (MEZZANINE) . . . . . MON 2:00 PM TO 3:45 PM

Extreme Resolution Imaging, Detection, and Spectroscopy

Session Chair: **Martti Kauranen,** Tampere Univ. of Technology (Finland)

2:00 pm: **Nano-focused ultrafast spectroscopy and imaging reaching the single quantum level** *(Invited Paper)*, Markus B. Raschke, Univ. of Colorado at Boulder (USA) . . . . . [9361-24]

2:30 pm: **An electrically-driven plasmon nanosource** *(Invited Paper)*, Elizabeth Boer-Duchemin, Univ. Paris-Sud 11 (France); Tao Wang, National Univ. of Singapore (Singapore); Eric Le Moal, Gérald Dujardin, Univ. Paris-Sud 11 (France). . . . . [9361-25]

3:00 pm: **Single photon detector with high-polarization extinction ratio** *(Invited Paper)*, Lixing You, Shanghai Institute of Microsystem and Information Technology (China) . . . . . [9361-26]

3:30 pm: **Far-field super resolution microscopy based on the nonlinear response of photothermal excitation**, Omer Tzang, Ori Cheshnovsky, Tel Aviv Univ. (Israel) . . . . . [9361-27]

Coffee Break . . . . . Mon 3:45 pm to 4:05 pm

SESSION 7
LOCATION: ROOM 270 (MEZZANINE) . . . . . MON 4:05 PM TO 6:05 PM

Femtosecond Electrons and Applications

Session Chair: **Markus Betz,** Univ. Paris-Sud 11 (France)

4:05 pm: **Cooperative atomic motion probed by femtosecond electron diffraction** *(Invited Paper)*, Jure Demsar, Technische Univ. Ilmenau (Germany); Maximilian Eichberger, Technische Univ. Ilmenau (Germany) and Univ. Konstanz (Germany) . . . . . [9361-28]

4:35 pm: **Terahertz field acceleration, angular tuning, and kinetic energy tailoring of ultrashort electron pulses**, Shawn R. Greig, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) . . . . . [9361-29]

4:50 pm: **Plasmoemission: Emission of photoelectrons from a plasmonic field** *(Invited Paper)*, Frank J. Meyer zu Heringdorf, Univ. Duisburg-Essen (Germany) . . . . . [9361-30]

5:20 pm: **Ultrafast low-energy electron diffraction (ULEED) driven by nanotip cathodes** *(Invited Paper)*, Claus Ropers, Univ. Göttingen (Germany) . . . . . [9361-31]

5:50 pm: **Classical electron trajectories and birth time in polar-asymmetric two-color laser fields**, Aram Gragossian, The Univ. of New Mexico (USA); Denis V. Seletskiy, Univ. Konstanz (Germany); Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) . . . . . [9361-32]

Tuesday 10 February

SESSION 8
LOCATION: ROOM 270 (MEZZANINE) . . . . . TUE 8:00 AM TO 10:45 AM

Nanoplasmonics I

Session Chair: **Alexandre Bouhelier,** Univ. de Bourgogne (France)

8:00 am: **Theory of the quantum emission of a many emitter spaser: a numerically exact model of the plasmon and exciton statistics** *(Invited Paper)*, Marten Richter, Technische Univ. Berlin (Germany); Michael Gegg, Technische Univ. Berlin (Germany) and Freie Univ. Berlin (Germany); T. Sverre Theuerholz, Andreas Knorr, Technische Univ. Berlin (Germany) . . . . . [9361-33]

8:30 am: **Bandwidth-energy limits in photonic and plasmonic modulators** *(Invited Paper)*, Juejun Hu, Hongtao Lin, Okechukwu A. Ogbuu, Univ. of Delaware (USA); Jifeng Liu, Dartmouth College (USA); Lin Zhang, Jurgen Michel, Massachusetts Institute of Technology (USA) . . . . . [9361-34]

9:00 am: **Long-range hybrid plasmonic modes in asymmetric structures** *(Invited Paper)*, Amr S. Helmy, Charles Lin, Wen Ma, Univ. of Toronto (Canada) . . . . . [9361-35]

9:30 am: **Bloch oscillations and Anderson localization in plasmonic waveguide arrays** *(Invited Paper)*, Stefan Linden, Rheinische Friedrich-Wilhelms-Univ. Bonn (Germany) . . . . . [9361-36]

CONFERENCE 9361

LOCATION: ROOM 270 (MEZZANINE)

10:00 am: **Routing of deep-subwavelength optical beams without reflection and diffraction using infinitely anisotropic metamaterials** *(Invited Paper)*, Peter B. Catrysse, Shanhui Fan, Stanford Univ. (USA) . . . . . [9361-37]

10:30 am: **Ultrafast silicon nanoplasmonic grid-gate transistor**, Shawn R. Greig, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) . . . . . [9361-38]

Coffee Break . . . . . Tue 10:45 am to 11:05 am

SESSION 9

LOCATION: ROOM 270 (MEZZANINE) . . . . . TUE 11:05 AM TO 12:20 PM

Dropletons, Excitons, and Quantum Systems

Session Chair: **Markus Betz,** Technische Univ. Dortmund (Germany)

11:05 am: **Quantum-optical spectroscopy on dropletons** *(Invited Paper)*, Mackillo Kira, Martin Mootz, Stephan W. Koch, Philipps-Univ. Marburg (Germany); Andrew Almand-Hunter, Hebin Li, Steven Cundiff, JILA (USA) . . . . . [9361-39]

11:35 am: **Quantum droplets of electrons and holes** *(Invited Paper)*, Steven Cundiff, JILA (USA) . . . . . [9361-40]

12:05 pm: **Ultrafast biexciton dynamics in single CdSe/ZnSe quantum dots**, Denis V. Seletskiy, Christopher Hinz, Johannes Haase, Christian Traum, Florian Werschler, Stefan Lohner, Alfred Leitenstorfer, Univ. Konstanz (Germany) . . . . . [9361-42]

Lunch/Exhibition Break . . . . . Tue 12:20 pm to 1:50 pm

SESSION 10

LOCATION: ROOM 270 (MEZZANINE) . . . . . TUE 1:50 PM TO 3:35 PM

Nanoplasmonics II

Session Chair: **Amr S. Helmy,** Univ. of Toronto (Canada)

1:50 pm: **Transducing electron and photons in electrically-contacted optical gap antennas** *(Invited Paper)*, Alexandre Bouhelier, Ctr. National de la Recherche Scientifique (France) . . . . . [9361-43]

2:20 pm: **Ultrafast acousto-magneto-plasmonics** *(Invited Paper)*, Vasily V. Temnov, Univ. du Maine (France) and Centre National de la Recherche Scientifique (France) . . . . . [9361-44]

2:50 pm: **Active and passive optical modulation via Bi:YIG based magnetoplasmonic waveguides**, Curtis J. Firby, Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada) . . . . . [9361-45]

3:05 pm: **Interfacial effects in plasmonic resonant energy and charge transfer**, Scott K. Cushing, Jiangtian Li, Alan D. Bristow, Nianqiang Wu, West Virginia Univ. (USA) . . . . . [9361-46]

3:20 pm: **Reverse design of a bull's eye structure for oblique illumination and wider angular transmission efficiency**, Akira Yamada, Mitsuhiro Terakawa, Keio Univ. (Japan) . . . . . [9361-47]

Coffee Break . . . . . Tue 3:35 pm to 4:00 pm

SESSION 11

LOCATION: ROOM 270 (MEZZANINE) . . . . . TUE 4:00 PM TO 5:45 PM

THz Spectroscopy

Session Chair: **Shawn Greig,** Univ. of Alberta (Canada)

4:00 pm: **Higgs amplitude mode in s-wave superconductors revealed by terahertz pump-terahertz probe spectroscopy** *(Invited Paper)*, Ryusuke Matsunaga, Ryo Shimano, The Univ. of Tokyo (Japan) . . . . . [9361-48]

4:30 pm: **Nanoscale charge-order dynamics in stripe-phase nickelates probed via ultrafast THz spectroscopy**, Giacomo Coslovich, Sascha Behl, Bernhard Huber, Lawrence Berkeley National Lab. (USA); Takao Sasagawa, Tokyo Institute of Technology (Japan); Wei-Sheng Lee, Zhi-Xun Shen, Stanford Univ. (USA); Hans A. Bechtel, Michael C. Martin, Robert A. Kaindl, Lawrence Berkeley National Lab. (USA) . . . . . [9361-49]

4:45 pm: **Control of intra-excitonic scattering in semiconductor quantum wells by an external magnetic field**, Harald Schneider, Jayeeta Bhattacharyya, Sabine Zybell, Faina Esser, Helmholtz-Zentrum Dresden-Rossendorf e. V. (Germany); Manfred Helm, Helmholtz-Zentrum Dresden-Rossendorf e. V. (Germany) and Technische Univ. Dresden (Germany); Lukas Schneebeli, Christoph N. Böttge, Benjamin Breddermann, Mackillo Kira, Stephan W. Koch, Philipps-Univ. Marburg (Germany) . . . . . [9361-50]

5:00 pm: **Broadband transient THz conductivity of the transition-metal dichalcogenide MoS_2**, Jan H. Buss, Ryan P. Smith, Giacomo Coslovich, Robert A. Kaindl, Lawrence Berkeley National Lab. (USA) . . . . . [9361-51]

5:15 pm: **Time-resolved observation of excitonic dynamics under coherent terahertz excitation in GaAs quantum wells**, Kento Uchida, Kyoto Univ. (Japan); Hideki Hirori, Kyoto Univ. (Japan) and Japan Science and Technology Agency-CREST (Japan); Takao Aoki, Waseda Univ. (Japan) and Japan Science and Technology Agency-CREST (Japan); Christian Wolpert, Kyoto Univ. (Japan) and Japan Science and Technology Agency-CREST (Japan); Yu Mukai, Kyoto Univ. (Japan); Koichiro Tanaka, Kyoto Univ. (Japan) and Japan Science and Technology Agency-CREST (Japan); Toshimitsu Mochizuki, Changsu Kim, Masahiro Yoshita, Hidehumi Akiyama, The Univ. of Tokyo (Japan); Loren N. Pfeiffer, Kenneth W. West, Princeton Univ. (USA) . . . . . [9361-52]

5:30 pm: **Accurate simulation of terahertz transmission through doped silicon junctions**, Chih-Yu Jen, Christiaan Richter, Rochester Institute of Technology (USA) . . . . . [9361-53]

Wednesday 11 February

SESSION 12

LOCATION: ROOM 270 (MEZZANINE) . . . . . WED 8:30 AM TO 10:15 AM

Ultrafast Magnetization Dynamics and Spin Manipulation

Session Chair: **Abdulhakem Y. Elezzabi,** Univ. of Alberta (Canada)

8:30 am: **Manipulation of the valley degree of freedom in MoS_2 transistors** *(Invited Paper)*, Kin Fai Mak, The Pennsylvania State Univ. (USA) . . . . . [9361-54]

9:00 am: **Ultrafast element-specific magnetization dynamics of complex magnetic materials on a table top** *(Invited Paper)*, Stefan Mathias, Technische Univ. Kaiserslautern (Germany); Chan La-O-Vorakiat, Univ. of Colorado (USA) and National Institute of Standards and Technology (USA); Justin M. Shaw, National Institute of Standards and Technology (USA); Emrah Turgut, Patrik Grychtol, Univ. of Colorado (USA) and National Institute of Standards and Technology (USA); Roman Adam, Denis Rudolf, Forschungszentrum Jülich GmbH (Germany) and JARA-FIT (Germany); Hans T. Nembach, Thomas J. Silva, National Institute of Standards and Technology (USA); Martin Aeschlimann, Technische Univ. Kaiserslautern (Germany); Claus M. Schneider, Forschungszentrum Jülich GmbH (Germany) and JARA-FIT (Germany); Henry C. Kapteyn, Margaret M. Murnane, Univ. of Colorado (USA) and National Institute of Standards and Technology (USA) . . . . . [9361-55]

9:30 am: **Nonlinear magnetization dynamics in $HoFeO_3$ induced by strong terahertz magnetic field**, Yu Mukai, Hideki Hirori, Takafumi Yamamoto, Hiroshi Kageyama, Koichiro Tanaka, Kyoto Univ. (Japan) . . . . . [9361-56]

9:45 am: **Simultaneous excitation of the magnetic and electronic systems in a ferromagnetic cobalt by ultra intense λ3 THz bullet**, Mostafa Shalaby, Carlo Vicario, Paul Scherrer Institut (Switzerland); Yan Luning, Univ. Pierre et Marie Curie (France); Christoph P. Hauri, Paul Scherrer Institut (Switzerland) . . . . . [9361-57]

10:00 am: **Novel nanoring structure for light-induced generation of ultrashort magnetic pulses**, Guillaume G. Vienne, A*STAR - Data Storage Institute (Singapore) and Nanyang Technological Univ. (Singapore); Xiaoye Chen, Ying Shi Teh, Ying Jye Ng, Nyap Oon Chia, Ching Pin Ooi, A*STAR - Data Storage Institute (Singapore) . . . . . [9361-58]

Coffee Break . . . . . Wed 10:15 am to 10:35 am

SESSION 13

LOCATION: ROOM 270 (MEZZANINE) . . . . . WED 10:35 AM TO 12:20 PM

THz Plasmonic Metamaterials

Session Chair: **Stefan Mathias,**
Technische Univ. Kaiserslautern (Germany)

10:35 am: **Nonlinear semiconducting metamaterials at terahertz frequencies** *(Invited Paper)*, Richard D. Averitt, Univ. of California, San Diego (USA) . . . . . [9361-59]

11:05 am: **Terahertz monopole resonators using planar plasmonic metamaterials** *(Invited Paper)*, Joong-Wook Lee, Chonnam National Univ. (Korea, Republic of) . . . . . [9361-60]

11:35 am: **High-Q fully-switchable THz superconducting complementary metasurfaces**, Giacomo Scalari, ETH Zürich (Switzerland); Sara Cibella, Istituto di Fotonica e Nanotecnologie (Italy); Curdin Maissen, ETH Zürich (Switzerland); Roberto Leoni, Istituto di Fotonica e Nanotecnologie (Italy); Mattias Beck, Jérôme Faist, ETH Zürich (Switzerland) . . . . . [9361-61]

11:50 am: **Sensitive detection of microorganisms using terahertz metamaterials and plasmonic devices**, SaeJune Park, Yeong Hwan Ahn, Ajou Univ. (Korea, Republic of) . . . . . [9361-62]

12:05 pm: **High-power and broadband terahertz generation through large-area plasmonic photoconductive emitters**, Nezih T. Yardimci, Univ. of California, Los Angeles (USA) . . . . . [9361-63]

Lunch/Exhibition Break . . . . . .Wed 12:20 pm to 1:40 pm

SESSION 14

LOCATION: ROOM 270 (MEZZANINE) . . . . . WED 1:40 PM TO 3:10 PM

Optical Control and Coherent Dynamics

Session Chair: **Yujie J. Ding,** Lehigh Univ. (USA)

1:40 pm: **Experimentally determining the true coupled rate equation for charge dynamics in semiconductor heterostructures** *(Invited Paper)*, Alan D. Bristow, Scott K. Cushing, Tess R. Senty, West Virginia Univ. (USA) . . . . . [9361-64]

2:10 pm: **Optical control of patterns and polariton flow in semiconductor microcavities** *(Invited Paper)*, Stefan Schumacher, Univ. Paderborn (Germany) . . . . . [9361-65]

2:40 pm: **Time-resolved measurements and calculations of shift current in (110)-oriented GaAs**, Reinold Podzimski, Torsten Meier, Univ. Paderborn (Germany); Huynh T. Duc, Vietnamese Academy of Science and Technology (Viet Nam); Shekhar Priyadarshi, Christian Schmidt, Mark Bieler, Physikalisch-Technische Bundesanstalt (Germany). . . . . [9361-66]

2:55 pm: **Ultrafast optical control over the exciton polariton propagation in CdZnTe**, Jan Lohrenz, Stefan Melzer, Claudia Ruppert, Technische Univ. Dortmund (Germany); Matthias Reichelt, Torsten Meier, Univ. Paderborn (Germany); Markus Betz, Technische Univ. Dortmund (Germany) . . . . . [9361-67]

Coffee Break . . . . . .Wed 3:10 pm to 3:30 pm

FEMTOLASERS AWARD CEREMONY

LOCATION: ROOM 270 (MEZZANINE) . . . . . .3:30 PM TO 3:50 PM

SESSION 15

LOCATION: ROOM 270 (MEZZANINE) . . . . . WED 3:50 PM TO 5:20 PM

Ultrafast THz Spectroscopy and Nonlinear Effects

Session Chair: **Elizabeth Boer-Duchemin,**
Technische Univ. Dortmund (Germany)

3:50 pm: **Investigation of coupled optical parametric oscillators for novel applications** *(Invited Paper)*, Yujie J. Ding, Lehigh Univ. (USA) . . . . . [9361-68]

4:20 pm: **Intense THz radiation from laser plasma with controllable waveform and polarization** *(Invited Paper)*, Peng Liu, Ya Bai, Liwei Song, Ruxin Li, Zhizhan Xu, Shanghai Institute of Optics and Fine Mechanics (China) . . . . . [9361-69]

4:50 pm: **Temporal characterization of full attosecond pulse by THz streaking**, Fernando Ardana Lamas, Paul Scherrer Institut (Switzerland) and Ecole Polytechnique Fédérale de Lausanne (Switzerland); Christian Erny, Paul Scherrer Institute (Switzerland) and Ecole Polytechnique Fédérale de Lausanne (Switzerland); Andrey Stepanov, Paul Scherrer Institut (Switzerland); Ishkhan Gorgisyan, Paul Scherrer Institut (Switzerland) and Ecole Polytechnique Fédérale de Lausanne (Switzerland); Pavle Juranic, Paul Scherrer Institut (Switzerland); Christoph P. Hauri, Paul Scherrer Institut (Switzerland) and Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9361-70]

5:05 pm: **Split ring resonator based THz-driven electron streak camera featuring femtosecond resolution**, Justyna Fabiańska, Univ. Bern (Switzerland); Günther H. Kassier, Max-Planck-Institut für Struktur und Dynamik der Materie (Germany); Thomas Feurer, Univ. Bern (Switzerland) . . . . . [9361-71]

OPTO

CONFERENCE 9362
LOCATION: ROOM 238 (MEZZANINE)

COSPONSOR:

Tuesday–Thursday 10–12 February 2015 • Proceedings of SPIE Vol. 9362

Terahertz, RF, Millimeter, and Submillimeter-Wave Technology and Applications VIII

Conference Chairs: **Laurence P. Sadwick,** InnoSys, Inc. (USA); **Tianxin Yang,** Tianjin Univ. (China)

Program Committee: **Jianji Dong,** Huazhong Univ. of Science and Technology (China); **Robert H. Giles,** Univ. of Massachusetts Lowell (USA); **R. Jennifer Hwu,** InnoSys, Inc. (USA); **J. Anthony Murphy,** National Univ. of Ireland, Maynooth (Ireland); **Créidhe O'Sullivan,** National Univ. of Ireland, Maynooth (Ireland); **Kyung Hyun Park,** Electronics and Telecommunications Research Institute (Korea, Republic of); **Zachary D. Taylor,** Univ. of California, Los Angeles (USA); **Michael C. Wanke,** Sandia National Labs. (USA); **Jiangfeng Zhou,** Univ. of South Florida (USA)

Tuesday 10 February

SESSION 1

LOCATION: ROOM 238 (MEZZANINE) . . . . . TUE 1:30 PM TO 3:00 PM

Terahertz I

Session Chairs: **Laurence P. Sadwick,** InnoSys, Inc. (USA); **Tianxin Yang,** Tianjin Univ. (China)

1:30 pm: **Intra-operative terahertz probe for detection of breast cancer**, Alessia Portieri, TeraView Ltd. (United Kingdom) . . . . . [9362-1]

1:50 pm: **Numerical studies of supercontinuum generation based on quasi-continuous wave pumping**, Tonghui Liu, Dongfang Jia, Ying Liu, Zhaoying Wang, Tianxin Yang, Tianjin Univ. (China). . . . . [9362-2]

2:10 pm: **Incoherent sub-terahertz radiation source with a photomixer array for active imaging in smoky environments**, Naofumi Shimizu, Nippon Telegraph and Telephone Corp. (Japan); Ken Matsuyama, Hidetake Uchida, Tokyo Univ. of Science (Japan). . . . . [9362-3]

2:30 pm: **Structured-surface-plasmon-inspired THz components and devices** *(Invited Paper)*, Elliott R. Brown, Wright State Univ. (USA) . . . . . [9362-4]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 2

LOCATION: ROOM 238 (MEZZANINE) . . . . . TUE 3:30 PM TO 5:40 PM

Terahertz II

Session Chairs: **Tianxin Yang,** Tianjin Univ. (China); **J. Anthony Murphy,** National Univ. of Ireland, Maynooth (Ireland)

3:30 pm: **Glasses and ceramics for THz photonics** *(Invited Paper)*, S. K. Sundaram, New York State College of Ceramics at Alfred Univ. (USA) . . . . . [9362-47]

4:00 pm: **Photoconductive materials for THz generation at 1550 nm: ErAs:GaAs- vs InGaAs-based materials**, Matthieu Martin, Elliott R. Brown, Wright State Univ. (USA) . . . . . [9362-5]

4:20 pm: **A compact fiber-coupled terahertz sensor system for industrial automation applications**, Alireza Zandieh, Daniel M. Hailu, TeTechS Inc. (Canada); Mohamed Missous, The Univ. of Manchester (United Kingdom); Daryoosh Saeedkia, TeTechS Inc. (Canada). . . . . [9362-6]

4:40 pm: **Terahertz wavefront assessment based on 2D electro-optic imaging**, Harsono Cahyadi, Ryuji Ichikawa, Univ. of Tokushima (Japan); Jérôme Degert, Eric Freysz, Univ. Bordeaux 1 (France); Takeshi Yasui, Univ. of Tokushima (Japan); Emmanuel Abraham, Univ. Bordeaux 1 (France) . . . [9362-7]

5:00 pm: **Terahertz plasmonic channel waveguide based on metallic rod arrays**, Borwen You, National Taiwan Univ. (Taiwan) and National Cheng Kung Univ. (Taiwan); Wen-Jie Cheng, Ja-Yu Lu, National Cheng Kung Univ. (Taiwan) . . . . . [9362-8]

5:20 pm: **Terahertz photonic crystals based on two-dimensional rod array**, Borwen You, National Taiwan Univ. (Taiwan); Wen-Jie Cheng, Ja-Yu Lu, National Cheng Kung Univ. (Taiwan). . . . . [9362-9]

Wednesday 11 February

SESSION 3

LOCATION: ROOM 238 (MEZZANINE) . . . . . WED 8:20 AM TO 10:10 AM

Terahertz III

Session Chairs: **Tianxin Yang,** Tianjin Univ. (China); **Laurence P. Sadwick,** InnoSys, Inc. (USA)

8:20 am: **Preliminary results of non-contact THz imaging of cornea** *(Invited Paper)*, Shijun Sung, James Garritano, Neha Bajwa, Sophie Deng, Jean-Pierre Hubschman, Warren S. Grundfest M.D., Zachary D. Taylor, Univ. of California, Los Angeles (USA). . . . . [9362-10]

8:50 am: **Flexible waveguide-enabled single-channel terahertz endoscopic system**, Pallavi Doradla, Univ. of Massachusetts Lowell (USA); Karim Alavi, Univ. of Massachusetts Medical School (USA); Cecil S. Joseph, Robert H. Giles, Univ. of Massachusetts Lowell (USA) . . . . . [9362-11]

9:10 am: **A new scheme for ultra-intense terahertz pulse production and nonlinear THz science**, Christoph P. Hauri, Carlo Vicario, Paul Scherrer Institut (Switzerland) . . . . . [9362-12]

9:30 am: **Room-temperature zero-bias plasmonic THz detection by asymmetric dual-grating-gate HEMT**, Takayuki Watanabe, Tetsuya Kawasaki, Akira Satou, Stephane A. Boubanga Tombet, Tetsuya Suemitsu, Tohoku Univ. (Japan); Guillaume Ducournau, Institut d'Electronique de Microélectronique et de Nanotechnologie (France); Dominique Coquillat, Wojciech Knap, Univ. Montpellier 2 (France); Hiroaki Minamide, Hiromasa Ito, RIKEN (Japan); Yahya M. Meziani, Univ. de Salamanca (Spain); Vyacheslav V. Popov, Institute of Radio Engineering and Electronics (Russian Federation); Taiichi Otsuji, Tohoku Univ. (Japan). . . . . [9362-13]

9:50 am: **Enhancing the low frequency THz resonances (< 1 THz) of organic molecules via electronegative atom substitution**, Jyotirmayee Dash, CSIR Madras Complex (India); Shaumik Ray, CSIR-Madras Complex (India); Kathirvel Nallappan, CSIR Madras Complex (India); Nitin Basutkar, Rajesh Gonnade, Ashootosh Ambade, CSIR - National Chemical Lab. (India); Bala Pesala, CSIR Madras Complex (India) . . . . . [9362-14]

Coffee Break . . . . . Wed 10:10 am to 10:40 am

SESSION 4

LOCATION: ROOM 238 (MEZZANINE) . . . . . WED 10:40 AM TO 12:10 PM

New Developments in THz, RF, Millimeter-waves, and Sub-Millimeter-waves I

Session Chairs: **Robert H. Giles,** Univ. of Massachusetts Lowell (USA); **R. Jennifer Hwu,** InnoSys, Inc. (USA)

10:40 am: **Deep sub-wavelength structure empowered THz components** *(Invited Paper)*, Jinghua Teng, A*STAR Institute of Materials Research and Engineering (Singapore) . . . . . [9362-15]

11:10 am: **Video rate imaging of narrow band THz radiation based on frequency upconversion**, Patrick F. Tekavec, Microtech Instruments, Inc. (USA); Vladimir G. Kozlov, Microtech Instruments Inc. (USA); Ian McNee, Microtech Instruments, Inc. (USA); Igor E. Spektor, Sergey P. Lebedev, A. M. Prokhorov General Physics Institute (Russian Federation) . . . . . [9362-16]

11:30 am: **Novel method of generation of linear frequency modulation optical waveforms with swept range of over 200 GHz for lidar systems**, Tianxin Yang, Yuchen Zhang, Tianhe Wang, Changren Qiu, Chunfeng Ge, Tianjin Univ. (China). . . . . [9362-17]

11:50 am: **Introduction of liquid crystal device into THz phase imaging**, Ryota Ito, Takuya Takahashi, Michinori Honma, Toshiaki Nose, Akita Prefectural Univ. (Japan) . . . . . [9362-18]

Lunch/Exhibition Break . . . . . Wed 12:10 pm to 1:30 pm

SESSION 5

LOCATION: ROOM 238 (MEZZANINE) . . . . . WED 1:30 PM TO 3:20 PM

New Developments in THz, RF, Millimeter-waves, and Sub-Millimeter-waves II

Session Chairs: **Jiangfeng Zhou,** Univ. of South Florida (USA);
Jianji Dong, Huazhong Univ. of Science and Technology (China)

1:30 pm: **Plasmonic photomixers for high-power continuous-wave terahertz generation** *(Invited Paper)*, Christopher W. Berry, Univ. of Michigan (USA); Mohammad R. Hashemi, Univ. of California, Los Angeles (USA) and Univ. of Michigan (USA); Sascha Preu, Technische Univ. Darmstadt (Germany); Hong Lu, Arthur C. Gossard, Univ. of California, Santa Barbara (USA); Mona Jarrahi, Univ. of California, Los Angeles (USA) and Univ. of Michigan (USA) . . . . . [9362-19]

2:00 pm: **Optical multi-coset sampling of GHz-band chirped signals**, George C. Valley, George A. Sefler, Thomas J. Shaw, Stephen L. Smith, The Aerospace Corp. (USA) . . . . . [9362-20]

2:20 pm: **Optical and quasi-optical analysis of system components for a far-infrared space interferometer**, Colm P. Bracken, Créidhe O'Sullivan, National Univ. of Ireland, Maynooth (Ireland); Giorgio Savini, Univ. College London (United Kingdom); Peter A. R. Ade, Cardiff Univ. (United Kingdom); J. Anthony Murphy, National Univ. of Ireland, Maynooth (Ireland); Enzo Pascale, Cardiff Univ. (United Kingdom); Locke D. Spencer, Univ. of Lethbridge (Canada); Roser Juanola-Parramon, Univ. College London (United Kingdom); Ian Walker, Cardiff Univ. (United Kingdom); Kjetil Dohlen, Aix Marseille Univ. (France); John F. Lightfoot, Science and Technology Facilities Council (United Kingdom); Martyn Jones, David D. Walker, Alison McMillan, Glyndwr Univ. (United Kingdom); Nicola Baccichet, Univ. College London (United Kingdom); Anthony Donohoe, Neil A. Trappe, National Univ. of Ireland, Maynooth (Ireland) . . . . . [9362-21]

2:40 pm: **Antenna-coupled silicon-organic hybrid integrated photonic crystal modulator for broadband electromagnetic wave detection**, Xingyu Zhang, The Univ. of Texas at Austin (USA); Amir Hosseini, Harish Subbaraman, Omega Optics, Inc. (USA); Shiyi Wang, Qiwen Zhan, Univ. of Dayton (USA); Jingdong Luo, Alex K. Y. Jen, Univ. of Washington (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) . . . . . [9362-22]

3:00 pm: **Integrated broadband bowtie antenna on transparent substrate**, Xingyu Zhang, The Univ. of Texas at Austin (USA); Shiyi Wang, Univ. of Dayton (USA); Harish Subbaraman, Amir Hosseini, Omega Optics, Inc. (USA); Qiwen Zhan, Univ. of Dayton (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) . . . . . [9362-23]

Coffee Break . . . . . .Wed 3:20 pm to 3:50 pm

SESSION 6

LOCATION: ROOM 238 (MEZZANINE) . . . . . WED 3:50 PM TO 5:10 PM

New Developments in THz, RF, Millimeter-waves, and Sub-Millimeter-waves III

Session Chairs: **Jianji Dong,**
Huazhong Univ. of Science and Technology (China);
J. Anthony Murphy, National Univ. of Ireland, Maynooth (Ireland)

3:50 pm: **A multistandard and multiservice radio-over-fiber system for next-generation network**, Sarra Rebhi, Rim Barrak, Mourad Menif, SUP'COM (Tunisia) . . . . . [9362-24]

4:10 pm: **Demonstration of high-resolution doping profile mapping using terahertz time domain spectroscopy with electrochemical anodization**, Chih-Yu Jen, Gaurav Tulsyan, Christiaan Richter, Rochester Institute of Technology (USA) . . . . . [9362-25]

4:30 pm: **Performance of microwave optoelectronic oscillators based on crystalline whispering-gallery mode resonators**, Khaldoun Saleh, Guoping Lin, Souleymane Diallo, Rémi Henriet, Romain Martinenghi, FEMTO-ST (France); Romain M. Nguimdo, Vrije Univ. Brussel (France); Patrice Salzenstein, Irina V. Balakireva, Aurélien Coillet, Yanne K. Chembo, FEMTO-ST (France) . . [9362-26]

4:50 pm: **High-performance PIN photodetector at 67GHz and beyond for radio-over-fiber applications**, Toshimasa Umezawa, Naokatsu Yamamoto, Kouichi Akahane, Atsushi Kanno, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan). . . . . [9362-27]

HÜBNER AWARD CEREMONY

LOCATION: ROOM 238 (MEZZANINE) . . . . . .5:20 PM TO 5:30 PM

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Terahertz wave modulators using organic/inorganic hybrid structures, Joong-Wook Lee, Chonnam National Univ. (Korea, Republic of) . . . . . [9362-43]

A distributed online optical power monitor based on optoelectronic oscillator, Han Chen, Southeast Univ. (China); Mingyu Xia, Southeast University (China); Mingming Sun, Xiaohan Sun, Southeast Univ. (China); Chun Cai, Xueming Sun, Shenzhen Academy of Metrology & Quality Inspection (China) . . . . . [9362-44]

Numerical modeling of bi-directional dual-wavelength pumped L-band few-mode erbium doped fiber amplifiers, Changren Qiu, Tianxin Yang, Dongfang Jia, Tianjin Univ. (China) . . . . . [9362-45]

A low-noise readout integrated circuit based on 0.18 μm SiGe process for Nb_5N_6 microbolometer array, Chao Wan, Yufeng Pei, Nanjing Univ. (China); Chao Wang, Jie Ma, China Key System Integrated Circuit Co. Ltd. (China); Xuecou Tu, Lin Kang, Peiheng Wu, Nanjing Univ. (China) . . . . . [9362-46]

Thin-film sensing with phase delayed terahertz pulses, Tae-In Jeon, Hyeon Sang Bark, Jingshu Zha, Korea Maritime Univ. (Korea, Republic of); Eui Su Lee, Electronics and Telecommunications Research Institute (Korea, Republic of). . . . . [9362-48]

Large loop antenna to enhance impedance matching characteristics for a terahertz photomixer, Han-Cheol Ryu, Sahmyook Univ. (Korea, Republic of); Eui Su Lee, Kyung Hyun Park, Electronics and Telecommunications Research Institute (Korea, Republic of). . . . . [9362-49]

Yb-doped short pulse fiber laser for terahertz radiation, Moon Sik Kong, Min Hee Kim, Yong Seok Kwon, Chungnam National Univ. (Korea, Republic of); Sang-Pil Han, Namje Kim, Kyung Hyun Park, Electronics and Telecommunications Research Institute (Korea, Republic of); Han-Cheol Ryu, Sahmyook Univ. (Korea, Republic of); Min Yong Jeon, Chungnam National Univ. (Korea, Republic of). . . . . [9362-50]

OPTO

Thursday 12 February

SESSION 7

LOCATION: ROOM 238 (MEZZANINE) . . . . . THU 8:00 AM TO 10:20 AM

New Developments in THz, RF, Millimeter-waves, and Sub-Millimeter-waves IV

Session Chairs: **Laurence P. Sadwick,** InnoSys, Inc. (USA);
Tianxin Yang, Tianjin Univ. (China)

8:00 am: **Frequency tuning of THz quantum cascade lasers** *(Invited Paper)*, Andriy Danylov, Alexander R. Light, Jerry Waldman, Univ. of Massachusetts Lowell (USA); Neal Erickson, Univ. of Massachusetts Amherst (USA); Xifeng Qian, Univ. of Massachusetts Lowell (USA) . . . . . [9362-28]

8:30 am: **Development of portable terahertz scanner for imaging and spectroscopy using InP-related devices** *(Invited Paper)*, Kyung Hyun Park, Electronics and Telecommunications Research Institute (Korea, Republic of) . . . . . [9362-29]

9:00 am: **Multiple-angle approach for enhanced terahertz spectroscopic pattern recognition**, Frank Ellrich, Daniel Molter, Soufiene Krimi, Joachim Jonuscheit, Georg von Freymann, Fraunhofer-Institut für Physikalische Messtechnik (Germany); Frank Platte, Christoph Fredebeul, Konstantinos Nalpantidis, IANUS Simulation GmbH (Germany); Daniel Hübsch, Tobais Würschmidt, Thorsten Sprenger, HÜBNER GmbH & Co KG (Germany) [9362-30]

9:20 am: **High-power photodetector modules for microwave photonic applications**, Kejia Li, Xiaojun Xie, Univ. of Virginia (USA); Efthymios Rouvalis, Sascha Fedderwitz, Andreas G. Steffan, Finisar Corp. (Germany); Qinglong Li, Zhanyu Yang, Andreas Beling, Joe C. Campbell, Univ. of Virginia (USA)[9362-31]

9:40 am: **Wavelength-spacing tunable multiwavelength erbium-doped fiber laser using polarization-differential time delay for photonic microwave filter**, Soo Kyung Kim, Young Bo Shim, Sunduck Kim, Young-Geun Han, Hanyang Univ. (Korea, Republic of) . . . . . [9362-32]

10:00 am: **Recent developments in electroabsorption modulators at Acreo Swedish ICT**, Qin Wang, Andy Z. Zhang, Susanne Almqvist, Stephane Junique, Bertrand Noharet, Duncan Platt, Michael Salter, Jan Y. Andersson, Acreo Swedish ICT AB (Sweden). . . . . [9362-33]

Coffee Break . . . . . Thu 10:20 am to 10:50 am

SESSION 8

LOCATION: ROOM 238 (MEZZANINE) . . . . . THU 10:50 AM TO 12:10 PM

New Developments in THz, RF, Millimeter-waves, and Sub-Millimeter-waves V

Session Chairs: **Kyung Hyun Park,** Electronics and Telecommunications Research Institute (Korea, Republic of); **Tianxin Yang,** Tianjin Univ. (China)

10:50 am: **Compensating the carrier screening effect in plasmonic photoconductive terahertz sources**, Shang Hua Yang, Univ. of Michigan (USA) and Univ. of California Los Angeles (USA); Nezih T. Yardimci, Univ. of California, Los Angeles (USA); Mona Jarrahi, Univ. of California, Los Angeles (USA) and Univ. of Michigan (USA) . . . . . [9362-34]

11:10 am: **Hydration kinetics of cement composites with varying water-cement ratio using terahertz spectroscopy**, Shaumik Ray, CSIR-Madras Complex (India); Kathirvel Nallappan, Jyotirmayee Dash, CSIR Madras Complex (India); Saptarshi Sasmal, CSIR - Structural Engineering Research Ctr. (India); Bala Pesala, CSIR Madras Complex (India) . . . . . [9362-35]

11:30 am: **Design of hybrid optical delay line for automotive radar test system**, Byung-Hee Son, Kwang-Jin Kim, Ye Li, Young Wan Choi, Chung-Ang Univ. (Korea, Republic of) . . . . . [9362-36]

11:50 am: **Broadband receiver-based distortion elimination in phase-modulated analog optical links using four-wave mixing**, Amit Bhatia, Hong-fu Ting, Mark Foster, Johns Hopkins Univ. (USA). . . . . [9362-37]

Lunch/Exhibition Break . . . . . Thu 12:10 pm to 1:30 pm

SESSION 9

LOCATION: ROOM 238 (MEZZANINE) . . . . . THU 1:40 PM TO 3:00 PM

New Developments in THz, RF, Millimeter-waves, and Sub-Millimeter-waves VI

Session Chairs: **Kyung Hyun Park,** Electronics and Telecommunications Research Institute (Korea, Republic of); **Laurence P. Sadwick,** InnoSys, Inc. (USA)

1:40 pm: **Reconfigurable thermo-optic polymer switch based true-time-delay network utilizing imprinting and inkjet printing**, Zeyu Pan, The Univ. of Texas at Austin (USA); Harish Subbaraman, Omega Optics, Inc. (USA); Xingyu Zhang, Yi Zou, The Univ. of Texas at Austin (USA); Xiaochuan Xu, Omega Optics, Inc. (USA); Xiaohui Lin, The Univ. of Texas at Austin (USA); Qiaochu Li, Cheng Zhang, Tao Ling, L. Jay Guo, Univ. of Michigan (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) . . . . . [9362-39]

2:00 pm: **Fourier transform molecular rotational resonance spectroscopy for reprogrammable chemical sensing**, Brent J. Harris, Robin L. Pulliam, Justin L. Neill, Matt T. Muckle, Roger Reynolds, Dave McDaniel, Brooks H. Pate, BrightSpec (USA) . . . . . [9362-40]

2:20 pm: **Design and characterization of evanescently-coupled dual-photodiodes for 1.3 µm wavelength**, Eui Su Lee, Won-Hui Lee, Namje Kim, Jeong-Woo Park, Sang-Pil Han, Kyung Hyun Park, Electronics and Telecommunications Research Institute (Korea, Republic of) . . . . . [9362-41]

2:40 pm: **Aluminum-doped zinc-oxide for radio frequency applications**, Seyma Canik, Mohammad Amin Nazirzadeh, Berk Berkan Turgut, Kagan Topalli, Ali Kemal Okyay, Bilkent Univ. (Turkey) . . . . . [9362-42]

CONFERENCE 9363
LOCATION: ROOM 130 (EXHIBIT LEVEL)

Monday–Thursday 9–12 February 2015 • Proceedings of SPIE Vol. 9363

Gallium Nitride Materials and Devices X

Conference Chairs: **Jen-Inn Chyi,** National Central Univ. (Taiwan); **Hiroshi Fujioka,** The Univ. of Tokyo (Japan); **Hadis Morkoç,** Virginia Commonwealth Univ. (USA)

Conference Co-Chairs: **Yasushi Nanishi,** Ritsumeikan Univ. (Japan); **Joachim Piprek,** NUSOD Institute LLC (USA); **Ulrich T. Schwarz,** IMTEK, Univ. Freiburg (Germany); **Jong-In Shim,** Hanyang Univ. (Korea, Republic of)

Program Committee: **Hiroshi Amano,** Nagoya Univ. (Japan); **Michal Bockowski,** Institute of High Pressure Physics (Poland); **Enrique Calleja,** Univ. Politécnica de Madrid (Spain); **Shigefusa F. Chichibu,** Tohoku Univ. (Japan); **Bernard Gil,** Univ. Montpellier 2 (France); **Nicolas Grandjean,** Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Hideki Hirayama,** RIKEN (Japan); **Ray-Hua Horng,** National Chung Hsing Univ. (Taiwan); **Stacia Keller,** Univ. of California, Santa Barbara (USA); **Michael Kneissl,** Technische Univ. Berlin (Germany); **Hao-Chung Kuo,** National Chiao Tung Univ. (Taiwan); **Masaaki Kuzuhara,** Univ. of Fukui (Japan); **Koh Matsumoto,** Taiyo Nippon Sanso Corp. (Japan); **Hideto Miyake,** Mie Univ. (Japan); **Eva Monroy,** CEA Grenoble (France); **Yong-Tae Moon,** LG Electronics Inc. (Korea, Republic of); **Ki-Bum Nam,** Seoul Semiconductor (Korea, Republic of); **Ümit Özgür,** Virginia Commonwealth Univ. (USA); **Tae-Yeon Seong,** Korea Univ. (Korea, Republic of); **Chih-Chung Yang,** National Taiwan Univ. (Taiwan); **Euijoon Yoon,** Seoul National Univ. (Korea, Republic of); **Enrico Zanoni,** Univ. degli Studi di Padova (Italy)

Monday 9 February

OPTO PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA). . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA). . . . . [9371-202]

Coffee Break . . . . . Mon 10:10 am to 10:30 am

SESSION 1
LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . MON 10:30 AM TO 12:30 PM

Growth I
Session Chair: **Hadis Morkoç,** Virginia Commonwealth Univ. (USA)

10:30 am: **Ammonothermal growth of polar and non-polar bulk GaN crystal** *(Invited Paper)*, Yutaka Mikawa, Takayuki Ishinabe, Shinichiro Kawabata, Tae Mochiduki, Atsuhiko Kojima, Yuji Kagamitani, Hideo Fujisawa, Mitsubishi Chemical Corp. (Japan). . . . . [9363-1]

11:00 am: **High-purity and highly-transparent AlN bulk crystal growth for UVC LED application by HVPE** *(Invited Paper)*, Yoshinao Kumagai, Tokyo Univ. of Agriculture and Technology (Japan); Toru Nagashima, Toru Kinoshita, Tokuyama Corp. (Japan); Rie Togashi, Tokyo Univ. of Agriculture and Technology (Japan); Reo Yamamoto, Tokuyama Corp. (Japan); Baxter Moody, HexaTech, Inc. (USA); Hisashi Murakami, Tokyo Univ. of Agriculture and Technology (Japan); Ramon Collazo, North Carolina State Univ. (USA); Akinori Koukitu, Tokyo Univ. of Agriculture and Technology (Japan); Zlatko Sitar, HexaTech Inc. (USA) and North Carolina State Univ. (USA) . . . . . [9363-2]

11:30 am: **Thermodynamic principle for AlN growth using Ga-Al flux and its growth mechanism** *(Invited Paper)*, Hiroyuki Fukuyama, Tohoku Univ. (Japan). . . . . [9363-3]

12:00 pm: **Ammonothermal growth of GaN on HVPE crystals prepared with the use of ammonothermal seeds**, Robert Kucharski, Marcin Zajac, Malgorzata Iwinska, Romuald Stankiewicz, Ammono S.A. (Poland); Tomasz Sochacki, TopGaN sp. z o.o. (Poland) and Institute of High Pressure Physics (Poland); Jan L. Weyher, Institute of High Pressure Physics (Poland); Michal Bockowski, TopGaN sp. z o.o. (Poland) and Institute of High Pressure Physics (Poland) . . . . . [9363-4]

12:15 pm: **Current status of hydride vapor phase epitaxy on ammonothermally-grown GaN seeds**, Michal Bockowski, Institute of High Pressure Physics (Poland). . . . . [9363-5]

Lunch Break . . . . . Mon 12:30 pm to 1:30 pm

SESSION 2
LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . . MON 1:30 PM TO 3:15 PM

Growth II
Session Chair: **Michal Bockowski,** TopGaN sp. z o.o. (Poland)

1:30 pm: **Growth of GaN and related materials on large silicon substrates** *(Invited Paper)*, Michael Heuken, AIXTRON SE (Germany) and RWTH Aachen Univ. (Germany). . . . . [9363-6]

2:00 pm: **GaN on Si: new approaches for stress engineering and doping** *(Invited Paper)*, Stephanie Fritze, LayTec AG (Germany) and Otto-von-Guericke-Univ. Magdeburg (Germany); Armin Dadgar, André Strittmatter, Alois J. Krost, Otto-von-Guericke-Univ. Magdeburg (Germany) . . . . . [9363-7]

2:30 pm: **In-situ x-ray diffraction analysis for MOVPE growth of nitride semiconductors** *(Invited Paper)*, Motoaki Iwaya, Taiji Yamamoto, Koji Ishihara, Tetsuya Takeuchi, Satoshi Kamiyama, Meijo Univ. (Japan); Isamu Akasaki, Meijo Univ. (Japan) and Nagoya Univ. (Japan) . . . . . [9363-8]

3:00 pm: **Green laser diodes: dependence of in-composition fluctuations on substrate polarity**, Lucja Marona, Marcin Sarzynski, Grzegorz Staszczak, Institute of High Pressure Physics (Poland); Wojciech Zaleszczyk, Institute of Physics (Poland); Piotr Perlin, Tadek Suski, Institute of High Pressure Physics (Poland) . . . . . [9363-9]

Coffee Break . . . . . Mon 3:15 pm to 3:45 pm

OPTO

CONFERENCE 9363
LOCATION: ROOM 130 (EXHIBIT LEVEL)

SESSION 3
LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . . MON 3:45 PM TO 6:00 PM

Growth III
Session Chair: **Yasushi Nanishi,** Ritsumeikan Univ. (Japan)

3:45 pm: **Theoretical aspects in growth of In-rich InGaN** *(Invited Paper)*, Yoshihiro Kangawa, Koichi Kakimoto, Kyushu Univ. (Japan) . . . . . [9363-10]

4:15 pm: **Progress in GaInN growth by RF-MBE and development to optical device fabrication** *(Invited Paper)*, Tomohiro Yamaguchi, Kogakuin Univ. (Japan); Tsutomu Araki, Ritsumeikan Univ. (Japan); Takeyoshi Onuma, Tokyo National College of Technology (Japan) and Kogakuin Univ. (Japan); Tohru Honda, Kogakuin Univ. (Japan); Yasushi Nanishi, Ritsumeikan Univ. (Japan). . . . . [9363-11]

4:45 pm: **High-density nitrogen plasma source for growing high In content InGaN by plasma-assisted MBE** *(Invited Paper)*, Hiroki Kondo, Masaru Hori, Hiroshi Amano, Nagoya Univ. (Japan). . . . . [9363-12]

5:15 pm: **HVPE growth of $Al_XGa_{1-X}N$ templates for UV-LED applications** *(Invited Paper)*, Chi-Tsung Tsai, Jia-Hao Liang, Tsung-Yen Tsai, Ray-Hua Horng, National Chung Hsing Univ. (Taiwan); Dong-Sing Wuu, National Chung Hsing Univ. (Taiwan) and Da-Yeh Univ. (Taiwan) . . . . . [9363-13]

5:45 pm: **Homoepitaxial HVPE-GaN growth in non-polar and semi-polar directions**, Mikolaj Amilusik, Michal Bockowski, Institute of High Pressure Physics (Poland) . . . . . [9363-14]

Tuesday 10 February

SESSION 4
LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . . TUE 8:00 AM TO 10:00 AM

Material Characterization I
Session Chair: **Bernd Witzigmann,** Univ. Kassel (Germany)

8:00 am: **Bandgap renormalization and Burstein-Moss shift in heavily doped GaN** *(Invited Paper)*, Ruediger Goldhahn, Otto-von-Guericke-Univ. Magdeburg (Germany) . . . . . [9363-15]

8:30 am: **Off-resonant plasmonic enhancement of linear and multi-photon emission from InGaN-GaN quantum wells**, Arup Neogi, Jie Lin, Univ. of North Texas (USA); Sergio Pereira, Univ. de Aveiro (Poland); Ian M. Watson, Univ. of Strathclyde (United Kingdom) . . . . . [9363-16]

8:45 am: **An electrical-pumped single-photon source with polarization control**, Lei Zhang, Chu-Hsiang Teng, Pei-Cheng Ku, Hui Deng, Univ. of Michigan (USA) . . . . . [9363-17]

9:00 am: **Temperature-dependent time-resolved photoluminescence measurements of (1-101)-oriented semi-polar AlGaN/GaN MQWs**, Daniel Rosales, Bernard Gil, Thierry Bretagnon, Univ. Montpellier 2 (France) and Lab. Charles Coulomb (France); Morteza Monavarian, Fan Zhang, Serdal Okur, Natalia Izyumskaya, Vitaliy Avrutin, Ümit Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (USA) . . . . . [9363-18]

9:15 am: **Photoluminescence behavior of amber light emitting GaInN-GaN heterostructures**, Huong Thi Ngo, Daniel Rosales, Bernard Gil, Pierre Valvin, Univ. Montpellier 2 (France) and Lab. Charles Coulomb (France); Benjamin Damilano, Kaddour Lekhal, Philippe De Mierry, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France) . . . . . [9363-19]

9:30 am: **Identification of point defects in HVPE-grown GaN by steady-state and time-resolved photoluminescence**, Michael A. Reshchikov, Denis O. Demchenko, Virginia Commonwealth Univ. (USA); Alexander S. Usikov, Nitride Crystals, Inc. (USA) and National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Heikki I. Helava, Yuri Makarov, Nitride Crystals, Inc. (USA) . . . . . [9363-20]

9:45 am: **Interface state trap density on characteristics of MOS-HEMT**, Ming-Chun Tseng, Ming-Hsien Hung, Dong-Sing Wuu, Ray-Hua Horng, National Chung Hsing Univ. (Taiwan) . . . . . [9363-21]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 5
LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . . TUE 10:30 AM TO 12:15 PM

Material Characterization II
Session Chair: **Bernard Gil,** Univ. Montpellier 2 (France)

10:30 am: **Structural characterization of low defect density III-Nitrides semipolar films and heterostructures by transmission electron microscopy** *(Invited Paper)*, Philippe Vennéguès, Florian Tendille, Ctr. National de la Recherche Scientifique (France); Michel Khoury, Ctr. National de la Recherche Scientifique (France) and CEA-LETI (France); Jesus Zuniga-Perez, Lars Kappei, Julien Brault, Ctr. National de la Recherche Scientifique (France); Maxim Korytov, Nikolay Cherkashin, Ctr. d'Elaboration de Matériaux et d'Etudes Structurales (France); Guy Feuillet, CEA-LETI (France) and CRHEA (France); Philippe De Mierry, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France) . . . . . [9363-22]

11:00 am: **Nanoscale structural analysis of nitride-based nanostructures: a multi-technique approach** *(Invited Paper)*, Catherine Bougerol, Institut NÉEL (France) and CNRS (France); Jean Paul Barnes, Mark Beeler, Edith Bellet-Amalric, Bastien Bonef, Adeline Grenier, Pierre-Henri Jouneau, Miguel Lopez-Haro, Eva Monroy, Eric Robin, CEA Grenoble (France) . . . . . [9363-23]

11:30 am: **Stress related aspects of the physics of GaN materials growth**, Ephraim Suhir, ERS Co. (USA) . . . . . [9363-24]

11:45 am: **Highly-spatially-resolved cathodoluminescence of GaN/AlN quantum dots directly performed in a scanning transmission electron microscope**, Gordon Schmidt, Christoph Berger, Sebastian Metzner, Peter Veit, Frank Bertram, Armin Dadgar, André Strittmatter, Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany) . . . . . [9363-25]

12:00 pm: **Direct imaging of nitride-based microrod LED structures using nano-scale scanning transmission electron microscope cathodoluminescence**, Marcus Müller, Benjamin Max, Christopher Karbaum, Gordon Schmidt, Peter Veit, Frank Bertram, Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); Martin Mandl, Tilman Schimpke, Martin Strassburg, OSRAM Opto Semiconductors GmbH (Germany) . . . . . [9363-26]

Lunch/Exhibition Break . . . . . Tue 12:15 pm to 1:45 pm

SESSION 6
LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . . TUE 1:45 PM TO 3:15 PM

Nanostructures and Devices I
Session Chair: **Enrique Calleja,** Univ. Politécnica de Madrid (Spain)

1:45 pm: **A theoretical study of III-nitride nanowire arrays for emission and detection** *(Invited Paper)*, Bernd Witzigmann, Univ. Kassel (Germany) . [9363-27]

2:15 pm: **Photocathode electron beam sources using GaN and InGaN with NEA surface** *(Invited Paper)*, Tomohiro Nishitani, Takuya Maekawa, Yoshio Honda, Masao Tabuchi, Nagoya Univ. (Japan); Takashi Meguro, Tokyo Univ. of Science (Japan); Hiroshi Amano, Nagoya Univ. (Japan) . . . . . [9363-28]

2:45 pm: **Ordered arrays of InGaN/GaN dot-in-a-wire nanostructures as single-photon emitters** *(Invited Paper)*, Sne?ana Lazic, Ekaterina Chernysheva, Univ. Autónoma de Madrid (Spain); ?arko Gacevic, Noemi García-Lepetit, Univ. Politécnica de Madrid (Spain); Herko P. van der Meulen, Univ. Autónoma de Madrid (Spain); Marcus Müller, Frank Bertram, Otto-von-Guericke-Univ. Magdeburg (Germany); Almudena Torres-Pardo, José María González Calbet, Univ. Complutense de Madrid (Spain); Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); Enrique Calleja, Univ. Politécnica de Madrid (Spain); José Manuel Calleja, Univ. Autónoma de Madrid (Spain) . . . . . [9363-29]

Coffee Break . . . . . Tue 3:15 pm to 3:45 pm

SESSION 7

LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . . TUE 3:45 PM TO 5:30 PM

Nanostructures and Devices II

Session Chair: **Joachim Piprek,** NUSOD Institute LLC (USA)

3:45 pm: **Prospects and problems for III-N solar cells: theoretical and experimental** *(Invited Paper)*, Akihiko Yoshikawa, Chiba Univ. (Japan). [9363-30]

4:15 pm: **Transport measurements in GaN nanowires** *(Invited Paper)*, Norman A. Sanford, National Institute of Standards and Technology (USA) . . . . . [9363-31]

4:45 pm: **Improved performance of GaN MSM photodetectors by ultrathin interfacial Hafnia layer**, Burak Tekcan, Manoj Kumar, Ali K. Okyay, Bilkent Univ. (Turkey). . . . . [9363-32]

5:00 pm: **Screening of the quantum confined stark-effect in AlN/GaN hetero-structures based on GaN nanowires with Germanium doping**, Nils Rosemann, Philipps-Univ. Marburg (Germany); Pascal Hille, Jan Müßener, Justus-Liebig-Univ. Giessen (Germany); Pascal Becker, Philipps-Univ. Marburg (Germany); Maria de la Mata, Institut de Ciència de Materials de Barcelona (Spain); César Magén Domínguez, Instituto de Nanociencia de Aragon (Spain); Jordi Arbiol, Institut de Ciència de Materials de Barcelona (Spain) and Institució Catalana de Recerca i Estudis Avançats (Spain); Jörg Teubert, Jörg Schörmann, Martin H. Eickhoff, Justus-Liebig-Univ. Giessen (Germany); Sangam Chatterjee, Philipps-Univ. Marburg (Germany) . . . . . [9363-33]

5:15 pm: **Optical properties of small GaN-$Al_{0.5}Ga_{0.5}N$ quantum dots grown on (11-22) GaN**, Daniel Rosales, Julien Selles, Bernard Gil, Thierry Bretagnon, Thierry Guillet, Guillaume Cassabois, Univ. Montpellier 2 (France) and Lab. Charles Coulomb (France); Julien Brault, Benjamin Damilano, Philippe Vennéguès, Philippe De Mierry, Jean Massies, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France) . . . . . [9363-34]

Wednesday 11 February

SESSION 8

LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . . WED 8:00 AM TO 10:15 AM

Electron Devices I

Session Chair: **Jen-Inn Chyi,** National Central Univ. (Taiwan)

8:00 am: **Present and future of GaN power devices and their applications** *(Invited Paper)*, Daisuke Ueda, Kyoto Institute of Technology (Japan) . . [9363-35]

8:30 am: **Direct comparison of GaN-based e-mode architectures (recessed MISHEMT and p-GaN HEMTs) processed on 200mm GaN-on-Si with Au-free technology** *(Invited Paper)*, Denis Marcond, Marleen E. Van Hove, Dirk Wellekens, Niels Posthuma, Shuzhen You, Xuanwu Kang, Tian-Li Wu, Maarten Willems, Steve Stoffels, Stefaan Decoutere, IMEC (Belgium). . [9363-36]

9:00 am: **Enhancement of AlGaN/GaN high-electron mobility transistor off-state drain breakdown voltage via backside proton irradiation** *(Invited Paper)*, Fan Ren, Univ. of Florida (USA) . . . . . [9363-37]

9:30 am: **GaN power switches based on cascode configuration** *(Invited Paper)*, Yifeng Wu, Transphorm, Inc. (USA) . . . . . [9363-38]

10:00 am: **Trapping processes related to iron and carbon doping in AlGaN/GaN power HEMTs**, Matteo Meneghini, Davide Bisi, Isabella Rossetto, Carlo De Santi, Antonio Stocco, Fabiana Rampazzo, Gaudenzio Meneghesso, Enrico Zanoni, Univ. degli Studi di Padova (Italy) . . . . . [9363-39]

Coffee Break . . . . . .Wed 10:15 am to 10:45 am

SESSION 9

LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . WED 10:45 AM TO 12:00 PM

Electron Devices II

Session Chair: **Russell D. Dupuis,**
Georgia Institute of Technology (USA)

10:45 am: **Vertical power semiconductor electronic devices based on bulk GaN substrates** *(Invited Paper)*, Isik C. Kizilyalli, Avogy, Inc. (USA) . . . [9363-40]

11:15 am: **High-breakdown-voltage and low-on-resistance GaN p-n junction diodes on free-standing GaN substrates** *(Invited Paper)*, Yohei Otoki, Masatomo Shibata, Hitachi Metals (Japan); Kazuki Nomoto, Univ. of Notre Dame (USA); Akihisa Terano, Tomoyoshi Mishima, Hitachi, Ltd. (Japan); Naoki Kaneda, Hitachi Metals (Japan); Tohru Nakamura, Hosei Univ. (Japan). [9363-41]

11:45 am: **Theoretical modelling of GaN inversion layer transport properties**, Sara Shishehchi, Enrico Bellotti, Boston Univ. (USA) . . . . . [9363-42]

Lunch/Exhibition Break . . . . . .Wed 12:00 pm to 1:30 pm

SESSION 10

LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . . WED 1:30 PM TO 3:30 PM

Laser Diodes I

Session Chair: **Ulrich T. Schwarz,** IMTEK, Univ. Freiburg (Germany)

1:30 pm: **InGaN power laser chips in a novel 50W multi-die package** *(Invited Paper)*, Andreas Loeffler, Christoph Eichler, Jens Mueller, Sven Gerhard, Bernhard Stojetz, Soenke Tautz, Jelena Ristic, Adrian Avramescu, Markus Horn, Thomas Hager, Christoph Walter, Thomas D. Dobbertin, Harald Koenig, Uwe Strauss, OSRAM Opto Semiconductors GmbH (Germany) . . . . . [9363-43]

2:00 pm: **Internal optical waveguide loss in nitride laser diodes**, Agata Bojarska, Szymon Stańczyk, Institute of High Pressure Physics (Poland); Robert Czernecki, Institute of High Pressure Physics (Poland) and TopGaN Ltd. (Poland); Alexandr Khachapuridze, Institute of High Pressure Physics (Poland); Piotr Perlin, Institute of High Pressure Physics (Poland) and TopGaN Ltd. (Poland) . . . . . [9363-44]

2:15 pm: **Advances in single-mode and high-power AlGaInN laser diode technology for systems applications**, Stephen P. Najda, Piotr Perlin, Tadek Suski, Lujca Marona, Michal Bockowski, Mike Leszczynski, Piotr Wisniewski, Robert Czernecki, TopGaN Ltd. (Poland); Robert Kucharski, Ammono Sp. z o.o. (Poland); Grzegorz Targowski, TopGaN Ltd. (Poland); Scott Watson, Anthony E. Kelly, Univ. of Glasgow (United Kingdom) . . . . . [9363-45]

2:30 pm: **Low-threshold deep UV lasers grown on sapphire substrates**, Russell D. Dupuis, Xiao-Hang Li, Theeradetch Detchprohm, Yuh-Shiuan Liu, Tsung-Ting Kao, Shyh-Chiang Shen, Mahbub Satter, P. Douglas Yoder, Georgia Institute of Technology (USA); Shuo Wang, Yong Wei, Hongen Xie, Alex M. Fischer, Fernando A. Ponce, Arizona State Univ. (USA); Tim Wernicke, Christoph Reich, Martin Martens, Michael Kneissl, Technische Univ. Berlin (Germany) . . . . . [9363-46]

2:45 pm: **352-nm AlGaN laser diodes enabled by low-dislocation-density AlGaN templates**, Mary H. Crawford, Andrew A. Allerman, Michael L. Smith, Karen C. Cross, Sandia National Labs. (USA). . . . . [9363-47]

3:00 pm: **Ultralow threshold electrically-injected AlGaN nanowire ultraviolet lasers on Si**, Kwai Hei Li, Xianhe Liu, Songrui Zhao, Qi Wang, Zetian Mi, McGill Univ. (Canada). . . . . [9363-48]

3:15 pm: **Influence of the quantum well thickness on optical properties of blue-violet InGaN laser diodes**, Szymon Stańczyk, Anna Kafar, Lucja Marona, Ewa Grzanka, Szymon Grzanka, Alexandr Khachapuridze, Katarzyna Pieniak, Grzegorz Targowski, Tadek Suski, Piotr Perlin, Institute of High Pressure Physics (Poland) . . . . . [9363-49]

Coffee Break . . . . . .Wed 3:30 pm to 4:00 pm

SESSION 11

LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . . WED 4:00 PM TO 5:45 PM

Laser Diodes II

Session Chair: **Andreas Loeffler,**
OSRAM Opto Semiconductors GmbH (Germany)

4:00 pm: **buried tunnel junction for micro-LEDs and VCSELs** *(Invited Paper)*, Marco Malinverni, Denis Martin, Lorenzo Lugani, Lise Lahourcade, Nicolas Grandjean, Ecole Polytechnique Fédérale de Lausanne (Switzerland). . [9363-50]

4:30 pm: **Status and future of GaN-based vertical-cavity surface-emitting lasers** *(Invited Paper)*, Daniel F. Feezell, The Univ. of New Mexico (USA) . . . . . [9363-51]

5:00 pm: **GaN-based bipolar-cascade vertical-cavity surface-emitting laser**, Joachim Piprek, NUSOD Institute LLC (USA) . . . . . [9363-52]

5:15 pm: **All nitride confinement structures for deep UV microcavity lasers**, Alexander Franke, Marc P. Hoffmann, Isaac S. Bryan, Zachary Bryan, Milena Bobea, James Tweedie, Felix Kaess, Ronny Kirste, North Carolina State Univ. (USA); Michael Gerhold, U.S. Army Research Office (USA); Ramon Collazo, Zlatko Sitar, North Carolina State Univ. (USA) . . . . . [9363-53]

5:30 pm: **Nitride superluminescent diodes with broadened emission spectra**, Anna Kafar, Institute of High Pressure Physics (Poland); Marcin Sarzynski, Institute of High Pressure Physics (Poland) and TopGaN Ltd. (Poland); Szymon Sta?czyk, Institute of High Pressure Physics (Poland); Lucja Marona, Institute of High Pressure Physics (Poland) and TopGaN Ltd. (Poland); Grzegorz Targowski, Irina Makarowa, TopGaN Ltd. (Poland); Przemek Wi?niewski, Institute of High Pressure Physics (Poland) and TopGaN Ltd. (Poland); Tadek Suski, Institute of High Pressure Physics (Poland); Piotr Perlin, Institute of High Pressure Physics (Poland) and TopGaN Ltd. (Poland) . . . . . [9363-54]

OPTO

CONFERENCE 9363
LOCATION: ROOM 130 (EXHIBIT LEVEL)

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) ..... WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Impact of the stripe geometry on the relaxation behavior of InGaN/GaN MQW nanostripe arrays, Cory C. Lund, Stacia Keller, Tyler Wyland, Feng Wu, Silvia Chan, Carl Neufeld, Shuji Nakamura, Steven P. DenBaars, James S. Speck, Umesh K. Mishra, Univ. of California, Santa Barbara (USA) . . . . . [9363-76]

Analysis of the temperature-dependent current-voltage characteristics of light-emitting diodes based on (In,Ga)N/GaN nanowire ensembles, Mattia Musolino, Paul-Drude-Institut für Festkörperelektronik (Germany); Matteo Meneghini, Laerte Scarparo, Carlo De Santi, Univ. degli Studi di Padova (Italy); Abbes Tahraoui, Lutz Geelhaar, Paul-Drude-Institut für Festkörperelektronik (Germany); Enrico Zanoni, Univ. degli Studi di Padova (Italy); Henning Riechert, Paul-Drude-Institut für Festkörperelektronik (Germany) . . . . . [9363-77]

Band gaps and internal electric fields in short period nitride superlattices, Izabela Gorczyca, Kamila Skrobas, Tadek Suski, Institute of High Pressure Physics (Poland); Niels E. Christensen, Axel Svane, Aarhus Univ. (Denmark) . . . . . [9363-78]

Degradation of InGaN laser diode with negative characteristic temperature T_0, Agata Bojarska, Institute of High Pressure Physics (Poland); Irina Makarowa, TopGaN Ltd. (Poland); Przemek Wiśniewski, Robert Czernecki, Institute of High Pressure Physics (Poland), TopGaN Ltd. (Poland); Tadek Suski, Institute of High Pressure Physics (Poland); Piotr Perlin, Institute of High Pressure Physics (Poland), TopGaN Ltd. (Poland). . . . . [9363-79]

X-ray diffraction study of A- plane nonpolar InN epilayer grown by MOCVD, Matthieu Moret, Olivier Briot, Bernard Gil, Univ. Montpellier 2 (France) . [9363-80]

Metal organic vapour phase epitaxial growth of indium-rich InGaN alloys: continuous and time resolved photoluminescence properties, Olivier Briot, Matthieu Moret, Bernard Gil, Univ. Montpellier 2 (France) . . . . . [9363-81]

Lateral charge carrier transport in diffusion-injected multi-quantum well light-emitting diode structure, Lauri J. Riuttanen, Pyry Kivisaari, Olli Svensk, Jani Oksanen, Sami Suihkonen, Aalto Univ. School of Science and Technology (Finland). . . . . [9363-82]

Numerical analysis on the effect of electron blocking layer in 365-nm ultraviolet light-emitting diodes, Fang-Ming Chen, National Changhua Univ. of Education (Taiwan); Jih-Yuan Chang, Kuang-Ming Junior High School (Taiwan); Yen-Kuang Kuo, National Changhua Univ. of Education (Taiwan); Bing-Cheng Lin, Hao-Chung Kuo, National Chiao Tung Univ. (Taiwan) . . . . . [9363-83]

Carrier transport in the nonpolar and c-plane InGaN quantum well by considering the indium fluctuation effects, Chen-Kuo Wu, Tsung-Jui Yang, National Taiwan Univ. (Taiwan); Claude Weisbuch, Univ. of California, Santa Barbara (USA) and Ecole Polytechnique (France); James S. Speck, Univ. of California, Santa Barbara (USA); Yuh-Renn Wu, National Taiwan Univ. (Taiwan) . . . . . [9363-84]

Strain relaxation and In incorporation kinetics in high In-content InGaN layers synthesized by plasma-assisted molecular-beam epitaxy, Sirona Valdueza-Felip, Edith Bellet-Amalric, CEA Grenoble (France); Arantzazu Nuñez Cascajero, Univ. de Alcalá (Spain) and CEA-Grenoble (France); Yi Wang, Marie-Pierre Chauvat, Pierre Ruterana, Ecole Nationale Supérieure d'Ingenieurs de Caen et Ctr. de Recherche (France); Stephanie Pouget, CEA Grenoble (France); Katharina Lorenz, Eduardo Alves, Univ. Técnica de Lisboa (Portugal); Eva Monroy, CEA Grenoble (France). . . . . [9363-85]

Improved light extraction efficiency of GaN-based light-emitting diode by depositing novel optical layer with reflect index linear variation, Sheng-Wen Wang, Yu-Lin Tsai, Hao-Chung Kuo, Po-Tsung Lee, National Chiao Tung Univ. (Taiwan) . . . . . [9363-86]

Extracting carrier Injection Efficiency of InGaN Light Emitting Diode depending on current injection level, Kyu-Sang Kim, Sangji Univ. (Korea, Republic of); Dong-Pyo Han, Hyun-Sung Kim, Jong-In Shim, Hanyang Univ. (Korea, Republic of). . . . . [9363-87]

Hybrid MOCVD-MBE growth of high In-content laser structures on semipolar (20-21) GaN plane, Lucja Marona, Marcin Sarzynski, Institute of High Pressure Physics (Poland); Robert Czernecki, TopGaN Ltd. (Poland); Grzegorz Muziol, Czeslaw Skierbiszewski, Piotr Perlin, Institute of High Pressure Physics (Poland) . . . . . [9363-88]

Nonradiative recombination mechanisms in InGaN/GaN light-emitting diodes analyzed by various device characterization techniques, Dong-Soo Shin, Dong-Guang Zheng, Chan-Hyoung Oh, Hyun-Sung Kim, Hanyang Univ. (Korea, Republic of); Kyu-Sang Kim, Sangji Univ. (Korea, Republic of); Jong-In Shim, Hanyang Univ. (Korea, Republic of) . . . . . [9363-89]

Optical and structural properties of semipolar (11-22) GaN grown on m-plane sapphire using nanoporous SiN_x interlayers, Morteza Monavarian, Virginia Commonwealth Univ. (USA); Sebastian Metzner, Otto-von-Guericke-Univ. Magdeburg (Germany); Natalia Izyumskaya, Serdal Okur, Fan Zhang, Saikat Das, Vitaliy Avrutin, Ümit Özgür, Virginia Commonwealth Univ. (USA); Frank Bertram, Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); Hadis Morkoç, Virginia Commonwealth Univ. (USA) . . . . . [9363-91]

Enhancement of coherent acoustic phonons in InGaN nanocavities, Shopan D. Hafiz, Fan Zhang, Morteza Monavarian, Vitaliy Avrutin, Hadis Morkoç, Ümit Özgür, Virginia Commonwealth Univ. (USA) . . . . . [9363-92]

Fabrication and characterization of GaN-based p-i-n photodetectors on cone-shaped patterned sapphire substrates, Hsu-Hung Hsueh, Sin-Liang Ou, Chiun-Hao Lin, Dong-Sing Wuu, Ray-Hua Horng, National Chung Hsing Univ. (Taiwan) . . . . . [9363-93]

Time-resolved photoluminescence studies of GaN-nanowire based AlN/GaN heterostructures doped with Germanium, Nils Rosemann, Philipps-Univ. Marburg (Germany); Pascal Hille, Jan Müßener, Pascal Becker, Justus-Liebig-Univ. Giessen (Germany); Maria de la Mata, Institut de Ciència de Materials de Barcelona (Spain); César Magén Domínguez, Instituto de Nanociencia de Aragon (Spain); Jordi Arbiol, Institut de Ciència de Materials de Barcelona (Spain) and Institució Catalana de Recerca i Estudis Avançats (Spain); Jörg Teubert, Jörg Schörmann, Martin H. Eickhoff, Justus-Liebig-Univ. Giessen (Germany); Sangam Chatterjee, Philipps-Univ. Marburg (Germany) . . . . . [9363-94]

Widely-spectral tuning from GaN nanowire lasers using hydrostatic pressure, Sheng Liu, Sandia National Labs. (USA); Changyi Li, The Univ. of New Mexico (USA); Igal Brener, George Wang, Sandia National Labs. (USA) . . . . . [9363-95]

Strong carrier localization in basal plane and prismatic stacking faults in semipolar (11-22)GaN, Serdal Okur, Morteza Monavarian, Natalia Izyumskaya, Fan Zhang, Vitaliy Avrutin, Hadis Morkoç, Umit Özgür, Saikat Das, Virginia Commonwealth Univ. (USA) . . . . . [9363-96]

Strong exciton-photon coupling in hybrid InGaN-based microcavities on GaN substrates, Serdal Okur, Virginia Commonwealth Univ. (USA); Alexander Franke, Otto-von-Guericke-Univ. Magdeburg (Germany); Fan Zhang, Vitaliy Avrutin, Hadis Morkoç, Virginia Commonwealth Univ. (USA); Frank Bertram, Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); Umit Özgür, Virginia Commonwealth Univ. (USA) . . . . . [9363-97]

Indium-incorporation efficiency for semipolar (11-22) GaN as compared to polar c-plane in GaN-based light-emitting diodes, Morteza Monavarian, Virginia Commonwealth Univ. (USA); Sebastian Metzner, Otto-von-Guericke-Univ. Magdeburg (Germany); Natalia Izyumskaya, Serdal Okur, Fan Zhang, Saikat Das, Vitaliy Avrutin, Ümit Özgür, Virginia Commonwealth Univ. (USA); Frank Bertram, Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); Hadis Morkoç, Virginia Commonwealth Univ. (USA) . . . . . [9363-98]

Formation of reflective Ag ohmic contacts to semipolar GaN for high-power GaN-based light-emitting diodes, Jae-Seong Park, Sung-Ki Kim, Hwa-Seub Lee, Tae-Yeon Seong, Korea Univ. (Korea, Republic of) . . . [9363-99]

Monolithically-integrated RGB photonic crystal surface-emitting lasers, Chu-Hsiang Teng, Univ. of Michigan (USA); Kuo-Bin Hong, Yu-Hsun Chou, Chun-Chieh Yang, Tien-Chang Lu, National Chiao Tung Univ. (Taiwan); Pei-Cheng Ku, Univ. of Michigan (USA) . . . . . [9363-100]

Optimization of mode pattern and transmission analysis of GaN LED with ITO grating, Juliet Chico, Gabriela Aleman, Xiaomin Jin, California Polytechnic State Univ., San Luis Obispo (USA) . . . . . [9363-101]

Breakdown voltage improvement of AlGaN/GaN HEMTs grown on silicon substrate with an LT-AlN interlayer, Geng-Yen Lee, Chien-Yu Pao, Nien-Tze Yeh, National Central Univ. (Taiwan); Jen-Inn Chyi, National Central Univ. (Taiwan) and Research Ctr. for Applied Sciences (Taiwan) . . . . . [9363-102]

Active region dimensionality and quantum efficiencies of InGaN LEDs from temperature-dependent photoluminescence transients, Nuri Can, Virginia Commonwealth Univ. (USA) and Balikesir Üniv. (Turkey); Serdal Okur, Morteza Monavarian, Fan Zhang, Vitaliy Avrutin, Hadis Morkoç, Virginia Commonwealth Univ. (USA); Ali Teke, Balikesir Üniv. (Turkey); Umit Özgür, Virginia Commonwealth Univ. (USA) . . . . . [9363-103]

Thursday 12 February

SESSION 12

LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . . THU 8:00 AM TO 10:30 AM

LEDs I

Session Chair: **Jong-In Shim,** Hanyang Univ. (Korea, Republic of)

8:00 am: **High-power UV-B LEDs with long lifetime** *(Invited Paper)*, Jens Rass, Tim Kolbe, Neysha Lobo-Ploch, Ferdinand-Braun-Institut (Germany) and Leibniz-Institut für Höchstfrequenztechnik (Germany); Tim Wernicke, Frank Mehnke, Christian Kuhn, Johannes Enslin, Martin Guttmann, Christoph Reich, Technische Univ. Berlin (Germany); Johannes Glaab, Christoph Stölmacker, Mickael Lapeyrade, Sven Einfeldt, Markus Weyers, Ferdinand-Braun-Institut (Germany) and Leibniz-Institut für Höchstfrequenztechnik (Germany); Michael Kneissl, Ferdinand-Braun-Institut (Germany) and Technische Univ. Berlin (Germany). . . . . [9363-55]

8:30 am: **Progress of high-power deep-ultraviolet LEDs** *(Invited Paper)*, Akira Fujioka, Kohji Asada, Hiromi Yamada, Takumi Ohtsuka, Toshiaki Ogawa, Takao Kosugi, Daisuke Kishikawa, Takashi Mukai, Nichia Corp. (Japan). . . . . [9363-56]

9:00 am: **High-efficiency UV LEDs on sapphire** *(Invited Paper)*, Max Shatalov, Sensor Electronic Technology, Inc. (USA). . . . . [9363-57]

9:30 am: **UVC LEDs on bulk aluminum nitride** *(Invited Paper)*, Leo J. Schowalter, Crystal IS, Inc. (USA). . . . . [9363-58]

10:00 am: **Strong TE polarized emission from deep UV AlGaN quantum well LEDs**, Christoph Reich, Martin Guttmann, Tim Wernicke, Frank Mehnke, Technische Univ. Berlin (Germany); Jens Rass, Technische Univ. Berlin (Germany) and Ferdinand-Braun-Institut (Germany); Christian Kuhn, Technische Univ. Berlin (Germany); Mickael Lapeyrade, Sven Einfeldt, Arne Knauer, Viola Kueller, Markus Weyers, Ferdinand-Braun-Institut (Germany); Michael Kneissl, Technische Univ. Berlin (Germany) and Ferdinand-Braun-Institut (Germany) . . . . . [9363-59]

10:15 am: **Current spreading optimized UV-C LEDs emitting at 235 nm**, Mickael Lapeyrade, Florian Eberspach, Neysha Lobo-Ploch, Ferdinand-Braun-Institut (Germany); Christoph Reich, Martin Guttmann, Tim Wernicke, Frank Mehnke, Technische Univ. Berlin (Germany); Sven Einfeldt, Arne Knauer, Markus Weyers, Ferdinand-Braun-Institut (Germany); Michael Kneissl, Technische Univ. Berlin (Germany) . . . . . [9363-60]

Coffee Break . . . . . Thu 10:30 am to 11:00 am

SESSION 13

LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . .THU 11:00 AM TO 12:00 PM

LEDs II

Session Chair: **Leo J. Schowalter,** Crystal IS, Inc. (USA)

11:00 am: **Relationship between efficiency droop and V-shaped pits in InGaN/GaN light-emitting diodes** *(Invited Paper)*, Heng Li, Chiao-Yun Chang, Tien-Chang Lu, National Chiao Tung Univ. (Taiwan) . . . . . [9363-61]

11:30 am: **Efficiency droop in nitride LEDs revisited: Impact of excitonic recombination processes**, Andreas Hangleiter, Torsten Langer, Technische Univ. Braunschweig (Germany); Marina Gerhard, Dimitry Kalincev, Philipps-Univ. Marburg (Germany); Heiko Bremers, Uwe Rossow, Technische Univ. Braunschweig (Germany); Martin Koch, Philipps-Univ. Marburg (Germany) . . . . . [9363-62]

11:45 am: **Hot carrier transport and efficiency droop in III-N LEDs**, Pyry Kivisaari, Toufik Sadi, Jani Oksanen, Jukka J. Tulkki, Aalto Univ. School of Science and Technology (Finland) . . . . . [9363-63]

Lunch/Exhibition Break . . . . . Thu 12:00 pm to 1:15 pm

SESSION 14

LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . . THU 1:15 PM TO 3:00 PM

LEDs III

Session Chair: **Hiroshi Fujioka,** The Univ. of Tokyo (Japan)

1:15 pm: **Semi/non-polar nitride quantum wells for high-efficient light emitters** *(Invited Paper)*, Mitsuru Funato, Yoichi Kawakami, Kyoto Univ. (Japan). . . . . [9363-64]

1:45 pm: **Spatial variations of optical properties of semipolar InGaN quantum wells**, Saulius Marcinkevicius, Ruslan Ivanov, KTH Royal Institute of Technology (Sweden); Yuji Zhao, Shuji Nakamura, Steven P. DenBaars, James S. Speck, Univ. of California, Santa Barbara (USA). . . . . [9363-65]

2:00 pm: **Investigation of facet-dependent InGaN growth for core-shell LEDs**, Ionut Girgel, Univ. of Bath (United Kingdom); Paul R. Edwards, Univ. of Strathclyde (United Kingdom); Emmanuel Le Boulbar, Duncan W. E. Allsopp, Univ. of Bath (United Kingdom); Robert W. Martin, Univ. of Strathclyde (United Kingdom); Philip A. Shields, Univ. of Bath (United Kingdom) . . . . . [9363-66]

2:15 pm: **Tapering process of a multiple-section GaN nanorod**, Charng-Gan Tu, Che-Hao Liao, Ta-Wei Chang, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan). . . . . [9363-67]

2:30 pm: **Tunnel-junction-enhanced ultraviolet nanowire light-emitting diodes integrated on silicon**, A. T. M. G. Sarwar, Roberto C. Myers, The Ohio State Univ. (USA). . . . . [9363-68]

2:45 pm: **Performance of nitride-based blue LED fabricated on sapphire substrate with nanostructured SiO_2**, Shun Hanai, Motoaki Iwaya, Tetsuya Takeuchi, Satoshi Kamiyama, Meijo Univ. (Japan); Isamu Akasaki, Meijo Univ. (Japan) and Akasaki Research Ctr. (Japan); Tsukasa Kitano, Meijo Univ. (Japan). . . . . [9363-70]

Coffee Break . . . . . Thu 3:00 pm to 3:30 pm

SESSION 15

LOCATION: ROOM 130 (EXHIBIT LEVEL) . . . . . .THU 3:30 PM TO 5:30 PM

LEDs IV

Session Chair: **Hadis Morkoç,** Virginia Commonwealth Univ. (USA)

3:30 pm: **InGaN LEDs prepared on Ga_2O_3 substrates** *(Invited Paper)*, Kazuyuki Iizuka, Yoshikatsu Morishima, Akito Kuramata, Tamura Thermal Device Corp. (Japan); Yu-Jiun Shen, Chang-Yu Tsai, Ying-Yong Su, Gavin Liu, Ta-Cheng Hsu, J. H. Yeh, Epistar Corp. (Taiwan). . . . . [9363-71]

4:00 pm: **The novel design of white LED** *(Invited Paper)*, Chia Liang Hsu, Epistar Corp. (Taiwan) . . . . . [9363-72]

4:30 pm: **Light output power enhancements of green light-emitting diodes by digital InN/GaN growth thick InGaN wells** *(Invited Paper)*, Shoou-Jinn Chang, Wei-Chi Lai, National Cheng Kung Univ. (Taiwan) . . . . . [9363-73]

5:00 pm: **Enhancement of internal quantum efficiency in InGaN-based light-emitting diodes by additional growth of the p-ZnO layer**, Jong-In Shim, Dong-Soo Shin, Hanyang Univ. (Korea, Republic of); Junghyun Kim, Sungki Hong, Yungryel Ryu, MOX, Inc. (Korea, Republic of); Ja-kyung Lee, Sang Ho Oh, Pohang Univ. of Science and Technology (Korea, Republic of). . . . [9363-74]

5:15 pm: **Chemically-doped graphene films as a transparent conductive layer in GaN LEDs**, Jihyun Kim, Byung-Jae Kim, Sooyeoun Oh, Korea Univ. (Korea, Republic of). . . . . [9363-75]

CONFERENCE 9364
LOCATION: ROOM 110 (EXHIBIT LEVEL)

Sunday–Wednesday 8–11 February 2015 • Proceedings of SPIE Vol. 9364

Oxide-based Materials and Devices VI

Conference Chairs: **Ferechteh H. Teherani,** Nanovation (France); **David C. Look,** Wright State Univ. (USA); **David J. Rogers,** Nanovation (France)

Program Committee: **Ivan Bozovic,** Brookhaven National Lab. (USA); **Isabella Concina,** Univ. degli Studi di Brescia (Italy); **Jean-Jacques Delaunay,** The Univ. of Tokyo (Japan); **Aleksandra B. Djurišic,** The Univ. of Hong Kong (Hong Kong, China); **Guy Garry,** Thales Research & Technology (France); **Michael Gerhold,** U.S. Army Research Office (USA); **Hanns-Ulrich Habermeier,** Max-Planck-Institut für Festkörperforschung (Germany); **Michael A. Harper,** CIV USN ONR GLOBAL (USA); **Axel Hoffmann,** Technische Univ. Berlin (Germany); **Seref Kalem,** TÜBITAK UME (Turkey); **Ching-Ting Lee,** National Cheng Kung Univ. (Taiwan); **Katharina Lorenz,** Univ. Técnica de Lisboa (Portugal); **Tariq Manzur,** Naval Undersea Warfare Ctr. (USA); **Tatsuo Okada,** Kyushu Univ. (Japan); **Seong-Ju Park,** Gwangju Institute of Science and Technology (Korea, Republic of); **Thierry Pauporté,** Ecole Nationale Supérieure de Chimie de Paris (France); **Manijeh Razeghi,** Northwestern Univ. (USA); **Florian Ruske,** Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); **Vinod Eric Sandana,** Graphos (France); **Martin Seipenbusch,** Karlsruher Institut für Technologie (Germany); **Siemon Smid,** Tallinn Univ. of Technology (Estonia); **Bruno Viana,** Ecole Nationale Supérieure de Chimie de Paris (France); **Magnus Willander,** Linköping Univ. (Sweden); **Hideki Yamamoto,** NTT Basic Research Labs. (Japan); **Takafumi Yao,** Tohoku Univ. (Japan); **Jun Zhou,** Wuhan National Lab. for Optoelectronics (China)

Sunday 8 February

SESSION 1

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . SUN 8:15 AM TO 10:00 AM

Transparent Conducting Oxides and Transport Properties

Session Chairs: **David C. Look,** Wright State Univ. (USA); **Aline D. Rougier,** Institut de Chimie de la Matière Condensée de Bordeaux (France)

8:15 am: **Physical model of mobility thickness dependence in thin-film ZnO**, David C. Look, Wright State Univ. (USA); Kevin D. Leedy, Arnold M. Kiefer, Bruce B. Claflin, Air Force Research Lab. (USA). . . . . [9364-1]

8:30 am: **Influence of impurities and annealing procedures on optical and electrical properties of ZnO:Al**, Florian Ruske, Steffi Schönau, Sven Ring, Sebastian Neubert, Bernd Rech, Helmholtz-Zentrum Berlin (Germany). . [9364-2]

8:45 am: **Electron transport in ITO and In2O3 : limits, scattering mechanisms, and carrier systems** *(Invited Paper)*, Oliver Bierwagen, Paul-Drude-Institut für Festkörperelektronik (Germany) . . . . . [9364-3]

9:10 am: **Characterization of multilayered Molybdenum doped Indium Oxide/Zinc Oxide thin film stacks for optoelectronic applications** *(Invited Paper)*, Jaime Viegas, Elangovan Elamurugu, Raquel Flores, Ricardo Janeiro, Marcus S. Dahlem, Masdar Institute of Science & Technology (United Arab Emirates) . . . . . [9364-4]

9:35 am: **Progress in solution-based oxide devices** *(Invited Paper)*, Rebecca L. Peterson, Univ. of Michigan (USA) . . . . . [9364-5]

Coffee Break . . . . . Sun 10:00 am to 10:25 am

SESSION 2

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . SUN 10:25 AM TO 12:40 PM

Material Growth, Interfaces, and Properties

Session Chair: **Michael A. Harper,** US Navy CIV USN ONR GLOBAL (United Kingdom)

10:25 am: **Direct Visualization of Atomic and Electronic Structure on Perovskite Oxide Film Surface** *(Invited Paper)*, Yoshinori Okada, Ryota Shimizu, Susumu Shiraki, Taro Hitosugi, Tohoku Univ. (Japan) . . . . . [9364-6]

10:50 am: **Antimony doping and defects in ZnO nanowires** *(Invited Paper)*, Axel Hoffmann, Thomas Kure, Alexander Franke, Sarah Schlichting, Emanuele Poliani, Felix Nippert, Markus R. Wagner, Technische Univ. Berlin (Germany); Marcus Müller, Peter Veit, Sebastian Metzner, Frank Bertram, Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); Eswaran Senthil Kumar, Faezeh Mohammadbeigi, Simon Fraser Univ. (Canada); Janina Maultzsch, Technische Univ. Berlin (Germany); Simon Watkins, Simon Fraser Univ. (Canada) . . . . . [9364-7]

11:15 am: **Growth of GaZnO nanoneedles for low-threshold field emission**, Yu-Feng Yao, Charng-Gan Tu, Ta-Wei Chang, Hao-Tsung Chen, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) . . . . . [9364-8]

11:30 am: **Atmospheric pressure chemical-vapor deposition of ZnO crystal structure: effects of substrate temperatures and porous silicon surface**, Yousif M. Hassan, Shayda A. Kakil, Salahaddin Univ.-Hawler (Iraq) . . . . [9364-9]

11:45 am: **Optical and thermal properties of doped ZnO thin films and nanostructures** *(Invited Paper)*, Markus R. Wagner, Juan S. Reparaz, Institut Català de Nanociència i Nanotecnologia (Spain); Clivia M. Sotomayor Torres, Institut Català de Nanociència i Nanotecnologia (Spain) and ICREA (Spain); S. Dilger, D. Lehr, M. Gerigk, C. Lizandara-Pueyo, S. Polarz, Univ. Konstanz (Germany); S. Schlichting, Thomas Kure, Axel Hoffmann, Technische Univ. Berlin (Germany); Matthew R. Phillips, Univ. of Technology, Sydney (Australia); Jean-Michel Chauveau, Univ. de Nice Sophia Antipolis (France) and Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France); Bruno K. Meyer, Justus-Liebig-Univ. Giessen (Germany) . . . . . [9364-10]

12:10 pm: **Fabrication of ZnO crystals by UV-Laser Annealing on ZnO Nanoparticles prepared by Laser Ablation Method**, Tetsuya Shimogaki, Hirotaka Kawahara, Mitsuhiro Higashihata, Hiroshi Ikenoue, Daisuke Nakamura, Tatsuo Okada, Kyushu Univ. (Japan) . . . . . [9364-11]

12:25 pm: **ZnO growth at low temperature and application as a buffer layer for LT-GaN growth**, Nazmul Arefin, Preston Larson, Vince R. Whiteside, The Univ. of Oklahoma (USA); Khalid Hossain, Amethyst Research Inc. (USA); Jijun Qiu, The Univ. of Oklahoma (USA); Matthew H. Kane, Texas A&M Univ. at Galveston (USA); Brittany N. Pritchett, Matthew B. Johnson, Patrick J. McCann, The Univ. of Oklahoma (USA) . . . . . [9364-12]

Lunch Break . . . . . Sun 12:40 pm to 1:40 pm

SESSION 3

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . SUN 1:40 PM TO 3:35 PM

Vanadium Oxide and Related Devices

Session Chairs: **Aleksandra B. Djurisic,** The Univ. of Hong Kong (Hong Kong, China); **Bruno Viana,** Ecole Nationale Supérieure de Chimie de Paris (France)

1:40 pm: **Orbital control of metal-insulator transition in VO2**, Naga Phani B. Aetukuri, IBM Research - Almaden (USA) and Stanford Univ. (USA); Alexander X. Gray, SLAC National Accelerator Lab. (USA); Marc Drouard, Matteo Cossale, Li Gao, IBM Research - Almaden (USA); Alexander H. Reid, SLAC National Accelerator Lab. (USA); Roopali Kukreja, Stanford Univ. (USA) and SLAC National Accelerator Lab. (USA); Hendrik Ohldag, SLAC National Accelerator Lab. (USA); Catherine A. Jenkins, Elke Arenholz, Lawrence Berkeley National Lab. (USA); Kevin P. Roche, IBM Research - Almaden (USA); Hermann A. Durr, SLAC National Accelerator Lab. (USA); Mahesh G. Samant, Stuart S. P. Parkin, IBM Research - Almaden (USA) . . . . . [9364-13]

1:55 pm: **Dynamic tuning of refractive index profile over phase change regions in vanadium dioxide thin films**, Shuyan Zhang, Mikhail A. Kats, Yanjie Cui, Yu Yao, You Zhou, Shriram Ramanathan, Federico Capasso, Harvard Univ. (USA) . . . . . [9364-14]

2:10 pm: **Electronic control of germanium telluride (GeTe) phase transition for electronic memory applications**, Alex H. Gwin, Ronald A. Coutu Jr., Air Force Institute of Technology (USA) . . . . . [9364-15]

2:25 pm: **Real-space and nanoscopic observation of phase transition behaviors of VO2 thin films using Kelvin probe force microscopy**, Ahrum Sohn, Ewha Womans Univ. (Korea, Republic of); Teruo Kanki, Koutaro Sakai, Hidekazu Tanaka, The Institute of Scientific and Industrial Research (Japan); Dong-Wook Kim, Ewha Womans Univ. (Korea, Republic of) . . . . . [9364-16]

2:40 pm: **Thermal conductivity of VO2 thin film deposited by RF-sputtering**, Motohisa Kado, Toyota Research Institute North America (Japan); Jyothi S. Sanhu, Univ. of Illinois at Urbana-Champaign (USA); Gaohua Zhu, Debasish Banerjee, Toyota Research Institute North America (USA); David G. Cahill, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9364-17]

2:55 pm: **Electric field-assisted metal insulator transition in vanadium dioxide (VO2) thin films: optical switching behavior and anomalous far-infrared emissivity variation** *(Invited Paper)*, Aurelian Crunteanu-Stanescu, XLIM Institut de Recherche (France); Julie Cornette, Maggy Colas, Jean-Christophe Orlianges, Univ. de Limoges (France); Annie Bessaudou, Françoise Cosset, XLIM Institut de Recherche (France) . . . . . [9364-18]

3:20 pm: **Flexo printed sol-gel derived vanadium oxide films as an interfacial hole-transporting layer for organic solar cells**, Terho Kololuoma, National Research Council Canada (Canada) and VTT Technical Research Ctr. of Finland (Finland); Salima Alem, Jiangping Lu, Neil Graddage, Ye Tao, National Research Council Canada (Canada) . . . . . [9364-19]

Coffee Break . . . . . Sun 3:35 pm to 4:00 pm

SESSION 4

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . SUN 4:00 PM TO 5:15 PM

Oxide-based Energy Harvester and Solar Cells I

Session Chairs: **Florian Ruske,** Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); **Isabella Concina,** Univ. degli Studi di Brescia (Italy)

4:00 pm: **High-rate growth of high-crystallinity $LiCoO_2$ epitaxial thin films by pulsed laser deposition** *(Invited Paper)*, Tsuyoshi Ohnishi, National Institute for Materials Science (Japan) . . . . . [9364-20]

4:25 pm: **Metal oxides single-walled carbon nanotube macrofilms-based lithium-ion batteries** *(Invited Paper)*, Zeyuan Cao, Univ. of Delaware (USA); Bingqing Wei, Univ. of Delaware (USA) and Northwestern Polytechnical Univ. (China) . . . . . [9364-21]

4:50 pm: **Hybrid TiO_2-graphene and TiO_2-multi wall carbon nanotubes below the percolation threshold as high-efficiency electrode in excitonic solar cells** *(Invited Paper)*, Kadiatou Therese Dembele, Institut National de la Recherche Scientifique (Canada); Gurpreet S. Selopal, Riccardo Milan, Univ. degli Studi di Brescia (Italy); Charles Trudeau, ETS (Canada); Afsoon Soudi, Institut National de la Recherche Scientifique (Canada); Marta Maria Natile, Univ. degli Studi di Padova (Italy); Giorgio Sberveglieri, Univ. degli Studi di Brescia (Italy); Sylvain G. Cloutier, Ecole de Technologie Supérieure (Canada); Isabella Concina, Univ. degli Studi di Brescia (Italy); Federico Rosei, Univ. du Québec (Canada); Alberto Vomiero, Univ. degli Studi di Brescia (Italy) . [9364-22]

Monday 9 February

OPTO PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA) . . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA) . . . . . [9371-202]

Coffee Break . . . . . Mon 10:10 am to 10:30 am

SESSION 5

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . MON 10:30 AM TO 11:45 AM

Oxide-based Energy Harvester and Solar Cells II

Session Chair: **Vinod Eric Sandana,** Nanovation (France)

10:30 am: **Engineering metal oxide semiconductors for excitonic solar cells** *(Invited Paper)*, Alberto Vomiero, Univ. degli Studi di Brescia (Italy) . . . . [9364-23]

10:55 am: **ZnO-based semiconductors with tunable band gap for 3rd-generation solar cells** *(Invited Paper)*, Naho Itagaki, Kyushu Univ. (Japan) . . . . . [9364-24]

11:20 am: **Design of ZnO charge carrier layers for efficient solid-state perovskite-sensitized solar cells**, Thierry Pauporté, Jie Zhang, Ecole Nationale Supérieure de Chimie de Paris (France) . . . . . [9364-26]

Lunch Break . . . . . Mon 11:45 am to 1:10 pm

SESSION 6

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . MON 1:10 PM TO 3:35 PM

Optical Properties, Thermal Properties, and Doping

Session Chairs: **Ching-Ting Lee,** National Cheng Kung Univ. (Taiwan); **Maurizio Ferrari,** CNR-Istituto di Fotonica e Nanotecnologie (Italy)

1:10 pm: **Characterization of shallow traps in ZnO by charge-based deep level transient spectroscopy** *(Invited Paper)*, Cuong Ton-That, Laurent L. C. Lem, Matthew R. Phillips, Univ. of Technology, Sydney (Australia); Frédéric Reisdorffer, Thien-Phap Nguyen, Institut des Matériaux Jean Rouxel (France); Christian Nenstiel, Axel Hoffmann, Technische Univ. Berlin (Germany) . [9364-27]

1:35 pm: **Experimental observation of doping-induced defects in ZnO**, Norbert H. Nickel, Nicole Karpensky, Marc A. Gluba, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) . . . . . [9364-28]

1:50 pm: **High-temperature photoluminescence and absorption of undoped ZnO single crystals and thin films** *(Invited Paper)*, Samuel Margueron, Univ. de Lorraine (France); David R. Clarke, Harvard Univ. (USA) . . . . . [9364-29]

2:15 pm: **The impact of time-varying phosphorus doping on ZnMgO thin films and achievement of dominant acceptor-bound-exciton peak**, Shantanu Saha, Saurabh Nagar, Subhananda Chakrabarti, Indian Institute of Technology Bombay (India) . . . . . [9364-30]

2:30 pm: **Nitrogen dopants in ZnO nanowires** *(Invited Paper)*, Cuong Ton-That, Laurent L. C. Lem, Univ. of Technology, Sydney (Australia); Bruce Cowie, Australian Synchrotron (Australia); Matthew R. Phillips, Univ. of Technology, Sydney (Australia) . . . . . [9364-31]

2:55 pm: **Improvement of photoluminescence and lasing properties in ZnO submicron spheres by eliminating surface-trapped states**, Hsu-Cheng Hsu, Tsen-Fang Dai, Wei-Chih Hsu, National Cheng Kung Univ. (Taiwan) . . . [9364-32]

3:10 pm: **Pronounced mobility change in MBE-grown ZnO thin-films after illumination** *(Invited Paper)*, Adam R. Hyndman, Alana M. Hyland, Martin Allen, Roger J. Reeves, MacDiarmid Institute for Advanced Materials and Nanotechnology, Univ. of Canterbury (New Zealand) and Univ. of Canterbury (New Zealand) . . . . . [9364-79]

Coffee Break . . . . . Mon 3:35 pm to 4:00 pm

CONFERENCE 9364

LOCATION: ROOM 110 (EXHIBIT LEVEL)

SESSION 7

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . MON 4:00 PM TO 6:10 PM

Photonics/Waveguiding and Acoustics

Session Chairs: **Seref Kalem,** ÜBITAK UME (Turkey); **Bruno Viana,** Ecole Nationale Supérieure de Chimie de Paris (France)

4:00 pm: **Disorder in one-dimensional multilayer photonic structures** *(Invited Paper)*, Francesco Scotognella, Politecnico di Milano (Italy); Alessandro Chiasera, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Univ. degli Studi di Trento (Italy); Luigino Criante, Istituto Italiano di Tecnologia (Italy) and Politecnico di Milano (Italy); Stefano Varas, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Univ. degli Studi di Trento (Italy); Ilka Kriegel, Politecnico di Milano (Italy); Michele Bellingeri, Univ. degli Studi di Parma (Italy); Giancarlo C. Righini, Istituto di Fisica Applicata Nello Carrara (Italy); Roberta Ramponi, Politecnico di Milano (Italy); Maurizio Ferrari, CNR-Istituto di Fotonica e Nanotecnologie (Italy) . . . . . [9364-33]

4:25 pm: **Photonic glass-ceramics: consolidated outcomes and prospects** *(Invited Paper)*, Maurizio Ferrari, Istituto di Fotonica e Nanotecnologie (Italy); Brigitte Boulard, Univ. du Maine (France); Van T. T. Trân, Univ. of Natural Sciences (Viet Nam); Anna Lukowiak, Institute of Low Temperature and Structure Research (Poland); Adel Bouajaj, Ecole Nationale des Sciences Appliquées de Tanger (Morocco) and Univ. Abdelmalek Essaâdi (Morocco); Rogéria R. Goncalves, Univ. de São Paulo (Brazil); Andrea Chiappini, Istituto di Fotonica e Nanotecnologie (Italy); Alessandro Chiasera, Istituto di Fotonica e Nanotecnologie (Italy); Wilfried Blanc, Univ. de Nice Sophia Antipolis (France); Alicia Durán, Spanish National Research Council (Spain); Sylvia J. Turrell, Univ. des Sciences et Technologies de Lille (France); Francesco Prudenzano, Politecnico di Bari (Italy); Roberta Ramponi, Politecnico di Milano (Italy); Marian Marciniak, National Institute of Telecommunications (Poland); Giancarlo C. Righini, Centro di Studi e Ricerche "Enrico Fermi" (Italy) and MipLAB. IFAC - CNR (Italy) . . . . . [9364-34]

4:50 pm: **Enhanced ZnO-stimulated emission-based UV photonics and related applications** *(Invited Paper)*, Komla Dunyo Nomenyo, Roy Aad, A.-S. Gadalah, Christophe Couteau, Univ. de Technologie Troyes (France); David J. Rogers, Nanovation (France); Vincent Sallet, Univ. de Versailles Saint-Quentin-en Yvelines (France); Gilles Lerondel, Univ. de Technologie Troyes (France) . . . . . [9364-77]

5:15 pm: **Guiding properties of zinc oxide-on-silica nanowire array**, Igor V. Melnikov, Dmitry G. Gromov, Mikhail Y. Nazarkin, Andrey A. Machnev, Alexey S. Shuliatyev, National Research Univ. of Electronic Technology (Russian Federation); Andrey E. Mironov, J. Gary Eden, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9364-35]

5:30 pm: **Mechanisms of direct laser writing on a tailored silver-containing zinc phosphate glass: dual-color laser writing, UV post-illumination thermal influence, and sub-diffraction structures**, Yannick G. Petit, Institut de Chimie de la Matière Condensée de Bordeaux (France); Konstantin Mishchik, Lab. Ondes et Matière d'Aquitaine (France); Nadezda Varkentina, Univ. Bordeaux 1 (France); Arnaud Royon, Lab. Ondes et Matière d'Aquitaine (France); Nicolas Marquestaut, Etienne Brasselet, Univ. Bordeaux 1 (France); Thierry Cardinal, Institut de Chimie de la Matière Condensée de Bordeaux (France); Lionel S. Canioni, Univ. Bordeaux 1 (France). . . . . [9364-36]

5:45 pm: **Towards high-quality $LiNbO_3$ and $LiTaO_3$ thin films** *(Invited Paper)*, Ausrine Bartasyte, FEMTO-ST Institute, Univ. of Franche-Comté, CNRS (France); Valentina Plausinaitiene, Arturas Abrutis, Vilnius Univ. (Lithuania); Samuel Margueron, Lab. Matériaux Optiques, Photonique et Systèmes, Univ. Lorraine and Supelec (France); S. Huband, Pamela A. Thomas, The Univ. of Warwick (United Kingdom) . . . . . [9364-37]

Tuesday 10 February

SESSION 8

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . TUE 8:00 AM TO 10:25 AM

Oxides as Environmental Catalysts and Sensors

Session Chairs: **Thierry Pauporté,** Ecole Nationale Supérieure de Chimie de Paris (France); **Magnus Willander,** Linköping Univ. (Sweden)

8:00 am: **Metal oxide nanostructures as catalysts and chemical sensors on flexible and solid substrates** *(Invited Paper)*, Magnus Willander, Linköping Univ. (Sweden) . . . . . [9364-38]

8:25 am: **Surface modification, heterojunctions, and other structures: composing metal oxide nanocrystals for chemical sensors** *(Invited Paper)*, Mauro Epifani, Istituto per la Microelettronica e Microsistemi (Italy) . . . [9364-39]

8:50 am: **Luminescence of sensitive materials: towards new optical sensing** *(Invited Paper)*, Lucile Cornu, Manuel Gaudon, Evgeniy Ilin, Philippe Veber, Alain Garcia, Institut de Chimie de la Matière Condensée de Bordeaux (France); Myrtil Kahn, Yohan Champouret, Lab. de Chimie de Coordination (France); Van-Son Nguyen, Hélène Débéda, Univ. Bordeaux 1 (France); Veronique Jubera, Institut de Chimie de la Matière Condensée de Bordeaux (France) . . . . . [9364-40]

9:15 am: **Metal oxides nanowires chemical sensors** *(Invited Paper)*, Elisabetta Comini, A. Bertuna, Univ. degli Studi di Brescia (Italy) and Istituto Nazionale di Ottica (Italy); Dario Zappa, Guido Faglia, Giorgio Sberveglieri, Univ. degli Studi di Brescia (Italy) and Istituto Nazionale di Ottica (Italy) . . . . . [9364-78]

9:40 am: **Photocatalytic degradation of Rhodamine B by metal oxide nanocomposites**, Rajeswari Ponnusamy, Bharathidasan Univ. (India); Prabhu S., Jothi Venkatachalam K., Anna Univ. (India); Sivasubramanian Dhanuskodi, Bharathidasan Univ. (India) . . . . . [9364-41]

9:55 am: **Red persistent luminescence and magnetic properties of nanomaterials for multimodal imaging**, Celine Rosticher, Corinne Chaneac, Lab. Chimie de la Matière Condensée de Paris, Univ. Pierre et Marie Curie (France); Bruno Viana, Ecole Nationale Superieure de Chimie de Paris (France) . . . . . [9364-42]

10:10 am: **Strategy for introducing antibacterial activity under ambient illumination in titania nanoparticles**, Alexander Hsu, Fangzhou Liu, Yu Hang Leung, Angel P. Y. Ma, Aleksandra B. Djurisic, Frederick C. C. Leung, The Univ. of Hong Kong (Hong Kong, China) . . . . . [9364-43]

Coffee Break . . . . . Tue 10:25 am to 10:50 am

SESSION 9

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . TUE 10:50 AM TO 12:20 PM

Functional Oxides and Carbon-based Materials

Session Chairs: **David J. Rogers,** Nanovation (France); **Can Bayram,** Univ. of Illinois at Urbana-Champaign (USA)

10:50 am: **Monolithic integration of complex oxides on semiconductors for new functionalities** *(Invited Paper)*, Catherine Dubourdieu, Institut des Nanotechnologies de Lyon, CNRS (France) . . . . . [9364-44]

11:15 am: **GaN-on-graphene technology: grow, release, transfer of thin-film GaN devices** *(Invited Paper)*, Can Bayram, Univ. of Illinois at Urbana-Champaign (USA); Jeehwan Kim, Hongsik Park, Cheng-Wei Cheng, IBM Thomas J. Watson Research Ctr. (USA); Christos D. Dimitrakopoulos, Univ. of Massachusetts Amherst (USA); John Ott, Kathleen Reuters, Stephen W. Bedell, Devendra K. Sadana, IBM Thomas J. Watson Research Ctr. (USA). . . . [9364-45]

11:40 am: **Electrochromism: from oxide thin films to devices** *(Invited Paper)*, Aline D. Rougier, Institut de Chimie de la Matière Condensée de Bordeaux (France) . . . . . [9364-46]

12:05 pm: **Metal oxide based memristor: from homojunction diode to complementary 1D1R application and bias polarity-induced transformation of filamentary and homogeneous resistive switching with controllable multistate**, Yu-Lun Chueh, National Tsing Hua Univ. (Taiwan) . . . . . [9364-47]

Lunch/Exhibition Break . . . . . Tue 12:20 pm to 1:20 pm

SESSION 10

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . TUE 1:20 PM TO 3:15 PM

Band Gap Engineering and Related Effects

Session Chairs: **Aleksandra B. Djurisic,** The Univ. of Hong Kong (Hong Kong, China); **Thierry Pauporté,** Ecole Nationale Supérieure de Chimie de Paris (France)

1:20 pm: **Tuning the built-in electric field in ZnO-based quantum heterostructures with crystal orientation for optoelectronic applications** *(Invited Paper)*, Jean-Michel Chauveau, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications (France) . . . . . [9364-49]

1:45 pm: **Progress in $Nix Mg_{1-x} O$ thin films for optoelectronic applications** *(Invited Paper)*, Jeremy W. Mares, Vanderbilt Univ. (USA); Ryan C. Boutwell, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Sharon M. Weiss, Vanderbilt Univ. (USA); Winston V. Schoenfeld, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9364-50]

2:10 pm: **ZnO/ZnMgO multiple quantum well light polarization sensitive photodetectors** *(Invited Paper)*, Adrian Hierro, Gema Tabares, Elias Muñoz, Univ. Politécnica de Madrid (Spain); Borge Vinter, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications, CNRS (France) and Univ. de Nice Sophia Antipolis (France); Jean-Michel Chauveau, Ctr. de Recherche sur l'Hétéro-Epitaxie et ses Applications, CNRS (France) and Univ. de Nice Sophia Antipolis (France) . . . . . [9364-80]

2:35 pm: **Optical and electrical properties of ZnMgBeO and ZnMgBeGaO thin films sputtered at various growth conditions**, Ba Cuong Hoang, Sang-Hun Jeong, Byung-Teak Lee, Chonnam National Univ. (Korea, Republic of) . . . . . [9364-51]

2:50 pm: **MOVPE growth of InGaN alloys with high In content on ZnO template substrates** *(Invited Paper)*, Suresh Sundaram, Renaud Puybaret, Georgia Tech-Lorraine (France); David J. Rogers, Ferechteh H. Teherani, Vinod Eric Sandana, Philippe Bove, Nanovation (France); Youssef El Gmili, Georgia Tech-Lorraine (France); David Troadec, Univ. des Sciences et Technologies de Lille (France); Gilles Patriache, Lab. de Photonique et de Nanostructures (France); Paul L. Voss, Georgia Tech-Lorraine (France); Jean Paul Salvestrini, Georgia Tech-Lorraine (France) and Lab. Matériauy Optiques, Photonique et Systèmes (LMOPS) (France); Abdallah Ougazzaden, Georgia Tech-Lorraine (France); Ryan McClintock, Manijeh Razeghi, Northwestern Univ. (USA) . . . . . [9364-52]

Coffee Break . . . . . Tue 3:15 pm to 3:40 pm

SESSION 11

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . TUE 3:40 PM TO 5:50 PM

Novel/Emerging Oxide Materials and Functionalities

Session Chairs: **David J. Rogers,** Nanovation (France); **David C. Look,** Wright State Univ. (USA)

3:40 pm: **(–201) β-$Ga2O_3$ substrate for high optical and structural quality GaN materials** *(Invited Paper)*, Iman S. Roqan, Mufasila M. Muhammed, King Abdullah Univ. of Science and Technology (Saudi Arabia); Marco Peres, Univ. Técnica de Lisboa (Portugal); Y. Yamashita, Y. Morishima, S. Sato, Tamura Thermal Device Corp. (Japan); N. Franco, K. Lorenz, Instituto de Plasmas e Fusão Nuclear (Portugal) and Instituto Superior Técnico (Portugal); A. Kuramata, Tamura Thermal Device Corp. (Japan) . . . . . [9364-53]

4:05 pm: **Ternary and quaternary wurtzite-type oxide semiconductors: new materials and their properties** *(Invited Paper)*, Takahisa Omata, Osaka Univ. (Japan) . . . . . [9364-54]

4:30 pm: **Piezoelectric microelectromechanical systems (MEMS) across length scales** *(Invited Paper)*, Derek Wilke, Margeaux L. Wallace, Chris D. Rahn, Thomas N. Jackson, Susan E. Trolier-McKinstry, The Pennsylvania State Univ. (USA); Vincenzo Cotroneo, Harvard-Smithsonian Ctr. for Astrophysics (USA); Dennis M. Newns, Glenn J. Martyna, Thomas N. Theis, IBM Thomas J. Watson Research Ctr. (USA) . . . . . [9364-55]

4:55 pm: **Theoretical investigations of Ni- and Cu-doped TiO_2**, Esakkimuthuraju Murugan, Mahesh Rajendran, Venugopal Reddy Paduru, Vidya Jyothi Institute of Technology (India); Sreekanth Tirumala, Jawaharlal Nehru Technological Univ. (India) . . . . . [9364-56]

5:10 pm: **Investigations of p-NiO/n-ZnO heterojunctions grown by pulsed laser deposition**, Vinod Eric Sandana, David J. Rogers, Ferechteh H. Teherani, Philippe Bove, Nanovation (France) . . . . . [9364-57]

5:25 pm: **Controlling photon emission from Si/SiO_x quantum structures for photonic applications** *(Invited Paper)*, Seref Kalem, TUBITAK-BILGEM (Turkey) . . . . . [9364-76]

Wednesday 11 February

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Photocatalytic degradation of Rrodamine B by C-N-S tridoped TiO_2 nanoparticles, Amreetha Seetharaman, Sivasubramanian Dhanuskodi, Bharathidasan Univ. (India); Nithya A., Jothi Venkatachalam K, Anna Univ. (India) . . . . . [9364-58]

Zinc oxide nanoparticles with controlled properties for application in dye-sensitized solar cells, Thierry Pauporté, Mongia Hosni, Yuly Kusumawati, Ecole Nationale Supérieure de Chimie de Paris (France); Samir Farhat, Noureddine Jouini, Univ. Paris-Nord (France). . . . . [9364-59]

Silicon-based heterojunction thin film phototransistor with porous layer for short-wavelength detection at bio-sensing application, Yao-Chin Wang, Bor-Shyn Lin, Ming-Che Chan, National Chiao Tung Univ. (Taiwan). . . [9364-60]

Graphene nanosheets supported Ag/ZnO hybrid for effective acetylene sensor, A. S. M. Iftekhar Uddin, Gwiy-Sang Chung, Univ. of Ulsan (Korea, Republic of) . . . . . [9364-62]

Hydrogen sensor based on Pd nanocube-graphene hybrid, Duy-Thach Phan, Faisal Iqbal, Univ. of Ulsan (Korea, Republic of) . . . . . [9364-63]

PbO_x/Au-Pd core-shell structures for Schottky junction solar cells, Dipal B. Patel, Indrajit Mukhopadhyay, Pandit Deendayal Petroleum Univ. (India) . . . . . [9364-64]

Zinc oxide tetrapods as efficient photocatalysts for organic pollutant degradation, Fangzhou Liu, Yu Hang Leung, Aleksandra B. Djurisic, Changzhong Liao, Kaimin Shih, The Univ. of Hong Kong (Hong Kong, China) . . . . . [9364-65]

White-light luminescence of Dy^{3+}:bismuth borate glasses, Udaya Kumar K., Sri Venkateswara Univ. (India); C. R. Kesavulu, Univ. de São Paulo (Brazil); Patarawagee Yasaka, Keerati Kirdsiri, Ctr. of Excellence in Glass Technology and Materials Sciences (Thailand); Parnuwat Chimalawong, Chandrakasem Rajabhat Univ. (Thailand); Jakrapong Kaewkhao, Ctr. of Excellence in Glass Technology and Materials Sciences (Thailand); Chalicheemalapalli K. Jayasankar, Sri Venkateswara Univ. (India). . . . . [9364-66]

Effects of Low Energy H- ion implantation on the optical properties of ZnMgO Thin Films, Shantanu Saha, Saurabh Nagar, Indian Institute of Technology Bombay (India); Shree K. Gupta, Bhabha Atomic Research Ctr. (India); Subhananda Chakrabarti, Indian Institute of Technology Bombay (India) . . . . . [9364-67]

Structural, optical, and electrical properties of ZnMgBeGaO/Ag/ZnMgBeGaO transparent conductive multilayer films with UV range bandgap, Ba Cuong Hoang, Byung-Teak Lee, Chonnam National Univ. (Korea, Republic of) [9364-68]

Anomalous transmission of Ag/ZnO nanocomposites prepared by a magneto-sputtering, Igor V. Melnikov, National Research Univ. of Electronic Technology (Russian Federation) and Univ. of Illinois at Urbana-Champaign (USA); Dmitry G. Gromov, National Research Univ. of Electronic Technology (Russian Federation); Joseph W. Haus, Univ. of Dayton (USA); Andrey A. Machnev, National Research Univ. of Electronic Technology (Russian Federation); Andrey E. Mironov, Univ. of Illinois at Urbana-Champaign (USA); Mikhail Y. Nazarkin, Alexey S. Shuliatjev, National Research Univ. of Electronic Technology (Russian Federation) . . . . . [9364-69]

Highly-flexible, robust, and conductive ZnO nanowire arrays with superhydrophobic property, Yuanzhi Cao, Jun Zhou, Huazhong Univ. of Science and Technology (China). . . . . [9364-70]

Extremely low temperature growth of high-optoelectronic quality one- and two-dimensional ZnO nanostructures, Matthew Erdman, Tito L. Busani, The Univ. of New Mexico Ctr. for High Technology Materials (USA); Julio Martinez, The Univ. of New Mexico (USA); Olga Lavrova, The Univ. of New Mexico Ctr. for High Technology Materials (USA) . . . . . [9364-71]

Deep red radioluminescence from a divalent bismuth-doped strontium pyrophosphate $Sr_2P_2O_7$:Bi^{2+}, Liyi Li, China-Germany Research Ctr. for Photonic Materials and Devices, State Key Lab. of Luminescent Mat. (China); Bruno Viana, Ecole Nationale Superieure de Chimie de Paris (France); Mingying Peng, China-Germany Research Ctr. for Photonic Materials and Devices (China) . . . . . [9364-72]

Wafer-scale chemical lift-off of GaN thin films from sapphire substrates using ZnO sacrificial layers, David J. Rogers, Nanovation (France); A. Rajan, Heriot-Watt Univ. (United Kingdom); Ferechteh H. Teherani, Vinod Eric Sandana, Philippe Bove, Nanovation (France); Suresh Sundaram, Youssef El Gmili, Paul L. Voss, Abdallah Ougazzaden, Georgia Tech-Lorraine (France); K. A. Prior, Heriot-Watt Univ. (United Kingdom); Ryan McClintock, Manijeh Razeghi, Northwestern Univ. (USA) . . . . . [9364-73]

Electrochemical deposition and characterizations of adherent NiO porous films for photovoltaic applications, Sana Koussi, Thierry Pauporté, Ecole Nationale Supérieure de Chimie de Paris (France) . . . . . [9364-74]

Optical studies of nickel oxide growth on Si (111), c-Al_2O_3, and FTO/glass by pulsed laser deposition, Vinod Eric Sandana, David J. Rogers, Ferechteh H. Teherani, Philippe Bove, Nanovation (France); Teresa Monteiro, N. Ben Sedrine, Maria R. Correia, Univ. de Aveiro (Portugal); Ryan McClintock, Manijeh Razeghi, Northwestern Univ. (USA) . . . . . [9364-75]

CONFERENCE 9365
LOCATION: ROOM 220 (MEZZANINE)

Monday–Wednesday 9–11 February 2015 • Proceedings of SPIE Vol. 9365

Integrated Optics: Devices, Materials, and Technologies XIX

Conference Chairs: **Jean-Emmanuel Broquin,** IMEP-LAHC (France); **Gualtiero Nunzi Conti,** Istituto di Fisica Applicata Nello Carrara (Italy)

Conference Co-Chairs: **Christoph M. Greiner,** LightSmyth Technologies, Inc. (USA); **Sonia M. García-Blanco,** Univ. Twente (Netherlands)

Program Committee: **Pierre Berini,** Univ. of Ottawa (Canada); **Romeo Bernini,** Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); **Pavel Cheben,** National Research Council Canada (Canada); **Xudong Fan,** Univ. of Michigan (USA); **Robert A. Norwood,** College of Optical Sciences, The Univ. of Arizona (USA); **Min-Cheol Oh,** Pusan National Univ. (Korea, Republic of); **François Royer,** Univ. Jean Monnet Saint-Etienne (France); **Jens H. Schmid,** National Research Council Canada (Canada); **Yakov Sidorin,** Quarles & Brady LLP (USA); **Christoph A. Wächter,** Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

Monday 9 February

OPTO PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA) . . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA) . . . . . [9371-202]

Coffee Break . . . . . Mon 10:10 am to 10:30 am

SESSION 1

LOCATION: ROOM 220 (MEZZANINE) . . . . . MON 10:30 AM TO 12:30 PM

Photonics Integration I

Session Chair: **Jean-Emmanuel Broquin,** IMEP-LAHC (France)

10:30 am: **Active and Passive Silicon Photonic Structures for Optical Communications** *(Invited Paper)*, David V. Plant, McGill Univ. (Canada) [9365-1]

11:00 am: **Hybrid and heterogeneous photonic integrated circuits for high-performance applications** *(Invited Paper)*, Martijn J. R. Heck, Aarhus Univ. (Denmark) . . . . . [9365-2]

11:30 am: **Extremely small electro-optic polymer/silicon hybrid modulator with low operational power**, Shin-ichiro Inoue, Akira Otomo, National Institute of Information and Communications Technology (Japan) . . . . . [9365-3]

11:50 am: **Reflection type optical voltage sensors incorporating polymeric photonic ICs.**, Woo-Sung Chu, Min-Cheol Oh, Sung-Moon Kim, Pusan National Univ. (Korea, Republic of) . . . . . [9365-4]

12:10 pm: **Heterointegrated III-V/Si distributed feedback lasers**, Hélène Duprez, Antoine Descos, CEA-LETI (France); Thomas Ferrotti, STMicroelectronics (France); Chistophe Jany, Julie Harduin, André Myko, Corrado Sciancalepore, CEA-LETI (France); Christian Seassal, INL - Institut des Nanotechnologies de Lyon (France) and INSA (France); Badhise Ben Bakir, CEA-LETI (France) . . . . . [9365-5]

Lunch Break . . . . . Mon 12:30 pm to 1:40 pm

SESSION 2

LOCATION: ROOM 220 (MEZZANINE) . . . . . MON 1:40 PM TO 3:10 PM

Diffractive Photonics

Session Chair: **Christoph M. Greiner,** LightSmyth Technologies, Inc. (USA)

1:40 pm: **Ultra-wide bandwidth and low insertion loss bi-level grating couplers on silicon** *(Invited Paper)*, Joyce K. Poon, Wesley D. Sacher, Univ. of Toronto (Canada); Ying Huang, Guo-Qiang Lo, A*STAR Institute of Microelectronics (Singapore) . . . . . [9365-6]

2:10 pm: **Low-crosstalk fabrication-insensitive echelle grating multiplexers and passives for the silicon photonics toolbox**, Corrado Sciancalepore, CEA-Leti (France); Lycett J. Richard, Photon Design (United Kingdom); Jacques-Alexandre Dallery, Vistec Electron Beam GmbH (Germany); Sébastien Pauliac, Karim Hassan, Julie Harduin, Hélène Duprez, CEA-LETI (France); Ulf Weidenmueller, Vistec Electron Beam GmbH (Germany); Dominic F. G. Gallagher, Photon Design (United Kingdom); Sylvie Menezo, Badhise Ben-Bakir, CEA-LETI (France) . . . . . [9365-7]

2:30 pm: **Experimental design and homogenization properties of a double zero refractive index metamaterial**, Daryl I. Vulis, Yang Li, Shota Kita, Philip Munoz, Orad Reshef, Marko Loncar, Eric Mazur, Harvard School of Engineering and Applied Sciences (USA) . . . . . [9365-8]

2:50 pm: **A new surface plasmon resonance spectral sensor using plasmon photonic crystal grating**, Hong Guo, Xueli Tian, Junpeng Guo, The Univ. of Alabama in Huntsville (USA) . . . . . [9365-9]

Coffee Break . . . . . Mon 3:10 pm to 3:40 pm

SESSION 3

LOCATION: ROOM 220 (MEZZANINE) . . . . . MON 3:40 PM TO 6:00 PM

Plasmonics

Session Chair: **Pierre Berini,** Univ. of Ottawa (Canada)

3:40 pm: **Short-range plasmons and nanofocusing below 100 nm in atomically flat metal films** *(Invited Paper)*, Harald Giessen, Univ. Stuttgart (Germany) . . . . . [9365-10]

4:10 pm: **Hyberbolic plasmonic metamaterials for nanophotonic applications: active functionalities** *(Invited Paper)*, Wayne Dickson, Greg A. Wurtz, Anatoly V. Zayats, King's College London (United Kingdom) . . . [9365-11]

4:40 pm: **Hybrid metallic-ion exchanged waveguides for SPR biological sensing**, Sandie de Bonnault, Davide Bucci, IMEP-LAHC (France) and Univ. Grenoble Alpes (France); Pierre-Jean Zermatten, Paul G. Charette, Univ. de Sherbrooke (Canada); Jean-Emmanuel Broquin, IMEP-LAHC (France) and Univ. Grenoble Alpes (France) . . . . . [9365-18]

5:00 pm: **Plasmonic waveguide modulator based on bismuth ferrite as low-loss switchable material**, Viktoriia E. Babicheva, DTU Fotonik (Denmark); Sergei V. Zhukovsky, DTU Fotonik (Denmark) and ITMO Univ. (Russian Federation); Andrei V. Lavrinenko, DTU Fotonik (Denmark) . . . . . [9365-13]

5:20 pm: **Direct on-chip optical plasmon detection with an atomically thin semiconductor**, Chitraleema Chakraborty, Kenneth M. Goodfellow, Ryan Beams, Univ. of Rochester (USA); Lukas Novotny, ETH Zürich (Switzerland); Nick Vamivakas, Univ. of Rochester (USA) . . . . . [9365-14]

5:40 pm: **Analytical model of the modal characteristics of plasmonic slot waveguide**, Rehab K. Abd-Allah, The American Univ. in Cairo (Egypt); Yehea Ismail, The American Univ. in Cairo (Egypt) and Zewail City of Science and Technology (Egypt); Mohamed A. Swillam, The American Univ. in Cairo (Egypt) . . . . . [9365-15]

Tuesday 10 February

SESSION 4

LOCATION: ROOM 220 (MEZZANINE) . . . . . TUE 8:00 AM TO 10:00 AM

Waveguide Engineering

Session Chair: **Yakov Sidorin,** Quarles & Brady LLP (USA)

8:00 am: **Silicon photonics non-resonant wavelength filters: comparison between AWGs, echelle gratings, and cascaded Mach-Zehnder filters** *(Invited Paper)*, Wim Bogaerts, Univ. Gent (Belgium) and IMEC (Belgium) and Luceda Photonics (Belgium); Shibnath Pathak, Alfonso Ruocco, Sarvagya Dwivedi, Univ. Gent (Belgium) and IMEC (Belgium); Peter De Heyn, IMEC (Belgium) and Univ. Gent (Belgium); Pieter Dumon, Univ. Gent (Belgium) and IMEC (Belgium) and Luceda Photonics (Belgium); Dries Van Thourhout, Univ. Gent (Belgium) and IMEC (Belgium); Joris Van Campenhout, Philippe P. Absil, IMEC (Belgium) . . . . . [9365-16]

8:30 am: **Microtube optical ring resonators for integrated photonic and optofluidic applications** *(Invited Paper)*, Oliver G. Schmidt, Leibniz-Institut für Festkörper- und Werkstoffforschung Dresden (Germany) . . . . . [9365-37]

9:00 am: **Polarization independent electro-optical waveguides with liquid crystals in isotropic phase**, Florenta A. Costache, Martin Blasl, Kirstin Bornhorst, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) . . . . . [9365-17]

9:20 am: **Integrated impedance-matched photonic Dirac-cone metamaterials**, Yang Li, Shota Kita, Philip A. Muñoz, Orad Reshef, Daryl I. Vulis, Marko Loncar, Eric Mazur, Harvard School of Engineering and Applied Sciences (USA). . . . . [9365-19]

9:40 am: **Nanoparticles generation inside Ag-doped LBG glass by annealing or femtosecond direct laser writing**, Marie Vangheluwe, Univ. Laval (Canada); Yannick G. Petit, Institut de Chimie de la Matière Condensée de Bordeaux (France); Nicolas Marquestaut, Evelyne Fargin, Alexia Corcoran, Univ. Bordeaux 1 (France); Feng Liang, Réal Vallée, Ctr. d'Optique, Photonique et Laser (Canada) and Univ. Laval (Canada); Thierry Cardinal, Institut de Chimie de la Matière Condensée de Bordeaux (France) and Univ. de Bordeaux (Canada); Lionel S. Canioni, Univ. Bordeaux 1 (France) . . . . . [9365-20]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 5

LOCATION: ROOM 220 (MEZZANINE) . . . . . TUE 10:30 AM TO 12:10 PM

On Chip Active Devices

Session Chair: **Jean-Emmanuel Broquin,** IMEP-LAHC (France)

10:30 am: **Spiral amplifiers in a-Al_2O_3:Er on a silicon chip with 20 dB internal net gain**, Sergio A. Vázquez-Córdova, Edward H. Bernhardi, Kerstin Wörhoff, Jennifer L. Herek, Sonia M. García-Blanco, Markus Pollnau, Univ. Twente (Netherlands) . . . . . [9365-21]

10:50 am: **Liquid crystal clad waveguide laser scanner and waveguide amplifier for LADAR and sensing applications**, Scott R. Davis, Scott D. Rommel, Seth T. Johnson, Michael H. Anderson, Vescent Photonics Inc. (USA); Anthony W. Yu, NASA Goddard Space Flight Ctr. (USA) . . . . . [9365-22]

11:10 am: **Advances in planar photonic integration with a novel ultrafast laser plasma fabrication process**, Jayakrishnan Chandrappan, Matthew Murray, Tarun Kakkar, Univ. of Leeds (United Kingdom); Kenneth L. Kennedy, EPSRC - National Ctr. of III-V Technologies (United Kingdom) and Univ. of Sheffield (United Kingdom); Richard A. Hogg, The Univ. of Sheffield (United Kingdom); David P. Steenson, Gin Jose, Animesh Jha, Univ. of Leeds (United Kingdom) . . . . . [9365-23]

11:30 am: **High-index contrast potassium double tungstate waveguides towards efficient rare-earth ion amplification on-chip**, Mustafa A. Sefunc, Frans B. Segerink, Sonia M. García-Blanco, Univ. Twente (Netherlands) . . . . . [9365-24]

11:50 am: **Polymer optical waveguide composed of europium-aluminum-acrylate composite core for compact optical amplifier and laser**, Marina Mitani, Keio Univ. (Japan); Kenichi Yamashita, Kyoto Institute of Technology (Japan); Toshimi Fukui, KRI, Inc. (Japan); Takaaki Ishigure, Keio Univ. (Japan) . . . . . [9365-25]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 1:40 pm

SESSION 6

LOCATION: ROOM 220 (MEZZANINE) . . . . . TUE 1:40 PM TO 3:30 PM

Polymer Technology

Session Chair: **Robert A. Norwood,** College of Optical Sciences, The Univ. of Arizona (USA)

1:40 pm: **Recent progress in InP/polymer-based devices for telecom and data center applications** *(Invited Paper)*, Norbert Keil, David de Felipe, Moritz Kleinert, Martin Möhrle, Crispin Zawadzki, Walter Brinker, Ziyang Zhang, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany) . . . . . [9365-26]

2:10 pm: **Determination of thermo-optic characteristics in electro-optic polymer materials based on polymeric Bragg grating waveguides**, Kyung-Jo Kim, Oscar D. Herrera, Soha Namnabat, Roland Himmelhuber, Robert A. Norwood, The Univ. of Arizona (USA); Jingdong Luo, Alex K. Y. Jen, Univ. of Washington (USA) . . . . . [9365-27]

2:30 pm: **Air suspended polymer rib waveguides**, Christoph Prokop, Univ. of Applied Sciences Karlsruhe (Germany) and RMIT Univ. (Australia); Arnan Mitchell, RMIT Univ. (Australia); Christian Karnutsch, Fachhochschule Karlsruhe Technik und Wirtschaft (Germany) . . . . . [9365-28]

2:50 pm: **Waveguide collimators for integrating free-space components with waveguide devices**, Jin Soo Shin, KAIST (Korea, Republic of); Min-Cheol Oh, Pusan National Univ. (Korea, Republic of); Chang-Hee Lee, Korea Advanced Institute of Science and Technology (Korea, Republic of); Sang-Yung Shin, KAIST (Korea, Republic of); Guang-Hao Huang, Woo-Sung Chu, Pusan National Univ. (Korea, Republic of); Young-Ouk Noh, Hyung-Jong Lee, ChemOptics Inc. (Korea, Republic of). . . . . [9365-29]

3:10 pm: **Low-loss sharp bends in low contrast polymer hybrid metallic waveguides**, Mustafa A. Sefunc, Willemijn van de Meent, Ashley R. Coenen, Meindert Dijkstra, Antonio Pace, Sonia M. García-Blanco, Univ. Twente (Netherlands) . . . . . [9365-30]

Coffee Break . . . . . Tue 3:30 pm to 4:00 pm

SESSION 7

LOCATION: ROOM 220 (MEZZANINE) . . . . . TUE 4:00 PM TO 5:30 PM

Photonics Integration II

Session Chair: **Gualtiero Nunzi Conti,** Istituto di Fisica Applicata Nello Carrara (Italy)

4:00 pm: **Toward building-block-based approach for generic integration photonic technologies** *(Invited Paper)*, Andrea I. Melloni, Daniele Melati, Politecnico di Milano (Italy); Emanuele Parrinello, Filarete s.r.l. (Italy); Francesco Morichetti, Politecnico di Milano (Italy) . . . . . [9365-31]

4:30 pm: **A fully static OCT sensor using a glass integrated optic chip bonded to a CCD linear camera**, Alain Morand, Adriana Warzecha, IMEP-LAHC (France); Fabrice Thomas, IPAG (France); Pierre Benech, IMEP-LAHC (France); Etienne P. Le Coarer, Institut de Planétologie et d'Astrophysique de Grenoble (France); Renaud Puget, Christophe Bonneville, Bruno Martin, Resolution Spectra Systems (France); Cédric Cassagnettes, Denis Barbier, Teem Photonics S.A. (France). . . . . [9365-32]

4:50 pm: **Using photo-sensitive glass ceramics for advanced optoelectronic IC packages**, Jeb H. Flemming, Kevin Dunn, James Gouker, Carrie F. Schmidt, 3D Glass Solutions (USA) . . . . . [9365-34]

5:10 pm: **Inductively-coupled plasmas (ICP) etching of PZT thin films for fabricating optical waveguide with photoresist/aluminum bilayer masking**, Zhipeng Qi, Guohua Hu, Yiping Cui, Qin Zhu, Lixing Zhang, Manqing Li, Southeast Univ. (China). . . . . [9365-35]

CONFERENCE 9365
LOCATION: ROOM 220 (MEZZANINE)

Wednesday 11 February

SESSION 8
LOCATION: ROOM 220 (MEZZANINE) . . . . . WED 8:20 AM TO 10:10 AM

On Chip Resonators
Session Chair: **Gualtiero Nunzi Conti,**
Istituto di Fisica Applicata Nello Carrara (Italy)

8:20 am: **Mid-IR frequency comb generation based on crystalline microresonators** *(Invited Paper)*, Caroline Lecaplain, Erwan Lucas, Clément Javerzac-Galy, Victor Brasch, Martin H. P. Pfeiffer, Tobias Herr, John J. Jost, Arne Kordts, Michael Geiselmann, Tobias J. Kippenberg, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9365-36]

8:50 am: **Nanoscale devices based on plasmonic coaxial waveguide resonators**, Amirreza Mahigir, Pouya Dastmalchi, Louisiana State Univ. (USA); Wonseok Shin, Shanhui Fan, Stanford Univ. (USA); Georgios Veronis, Louisiana State Univ. (USA). . . . . [9365-12]

9:10 am: **Design and performance analysis of a hybrid optofluidic ring resonator**, Romeo Bernini, Genni Testa, Gianluca Persichetti, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy) . . . . . [9365-38]

9:30 am: **Slot waveguide ring resonators for visible wavelengths in ALD titanium dioxide**, Markus Häyrinen, Matthieu Roussey, Markku Kuittinen, Seppo K. Honkanen, Univ. of Eastern Finland (Finland) . . . . . [9365-39]

9:50 am: **Resonant enhanced low-power nonlinear tuning capability using an As_2S_3 waveguide on $LiNbO_3$**, Yifeng Zhou, Christi K. Madsen, Texas A&M Univ. (USA) . . . . . [9365-40]

Coffee Break . . . . . Wed 10:10 am to 10:40 am

SESSION 9
LOCATION: ROOM 220 (MEZZANINE) . . . . . WED 10:40 AM TO 12:20 PM

Optofluidics
Session Chair: **Romeo Bernini,** Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy)

10:40 am: **Femtosecond laser micromachining for the realization of fully-integrated photonic and microfluidic devices** *(Invited Paper)*, Roberta Ramponi, Istituto di Fotonica e Nanotecnologie (Italy) . . . . . [9365-41]

11:10 am: **Optofluidics: manipulation and sorting of nanoparticles and cells** *(Invited Paper)*, Ai Qun Liu, Nanyang Technological Univ. (Singapore). . [9365-42]

11:40 am: **Integrated opto-microfluidics platforms in lithium niobate crystals for sensing applications**, Cinzia Sada, Annamaria Zaltron, Giacomo Bettella, Gianluca Pozza, Univ. degli Studi di Padova (Italy) . . [9365-43]

12:00 pm: **Optofluidic waveguides written in hydrophobic silica aerogels with a femtosecond laser**, Berna Yalizay, Yagiz Morova, Istanbul Technical Univ. (Turkey); Yagmur Ozbakir, Koç Univ. (Turkey); Alexandr Jonas, Istanbul Technical Univ. (Turkey); Can Erkay, Alper Kiraz, Koç Univ. (Turkey); Selcuk Akturk, Istanbul Technical Univ. (Turkey) . . . . . [9365-44]

POSTERS-WEDNESDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Multi-functional optical signal processing using optical spectrum control circuit, Shuhei Hayashi, Tatsuhiko Ikeda, Keio Univ. (Japan); Takayuki Mizuno, NTT Photonics Labs. (Japan); Hiroshi Takahashi, Sophia Univ. (Japan); Hiroyuki Tsuda, Keio Univ. (Japan) . . . . . [9365-45]

Homogenization of two-dimensional Dirac-cone metamaterial, Yang Li, Shota Kita, Philip A. Muñoz, Orad Reshef, Daryl I. Vulis, Marko Loncar, Eric Mazur, Harvard School of Engineering and Applied Sciences (USA) . . . [9365-46]

Tunable wavelength filters based on thermo-optic polymer waveguide device, Tae-Hyun Park, Min-Cheol Oh, Won-Jun Lee, Pusan National Univ. (Korea, Republic of); Jin Soo Shin, KAIST (Korea, Republic of); Woo-Sung Chu, Pusan National Univ. (Korea, Republic of) . . . . . [9365-47]

Low-loss segmented joint structure between a slab waveguide and arrayed waveguides designed by simple optimization method, Kosuke Shibuya, Bin Idris Nazirul Afham, Hideaki Asakura, Hiroyuki Tsuda, Keio Univ. (Japan). . . . . [9365-48]

Total internal reflection mirror-based ultra-sensitive triangular ring resonator sensor on the surface plasmon resonance condition, Hong-Seung Kim, Tae-Ryong Kim, Chung-Ang Univ. (Korea, Republic of); Doo-Gun Kim, Korea Photonics Technology Institute (Korea, Republic of); Young Wan Choi, Chung-Ang Univ. (Korea, Republic of). . . . . [9365-49]

Silica-on-silicon based 650/1550nm wavelength mux/demux for swept source OCT, Zhongwei Wu, Hui Zhou, Suiren Wan, Xiaohan Sun, Southeast Univ. (China) . . . . . [9365-50]

Design and characterization of integrated optical interferometers fabricated in polymer foils, Yanfen Xiao, Univ. of Freiburg (Germany); Yixiao Wang, Leibniz Univ. Hannover (Germany); Meike Hofmann, Hans Zappe, Univ. of Freiburg (Germany) . . . . . [9365-51]

Characterization of mid-infrared sidewall gratings in As_2S_3-on-Ti:$LiNbO_3$ waveguides with optical low-coherence interferometry, Xin Wang, Chen Zhang, Christi K. Madsen, Texas A&M Univ. (USA). . . . . [9365-52]

A quantitative method to measure the carbon particles density in an electroactive layer of a polymer-based supercapacitor, Mohamad Rezaei, Jasbir N. Patel, Bozena Kaminska, Simon Fraser Univ. (Canada) . . . . . [9365-53]

External cavity laser using a InGaAs quantum dot gain chip and an arrayed-waveguide grating for T-band optical communication, Hideki Shibutani, Keio Univ. (Japan); Yasunori Tomomatsu, Koshin Kogaku Co., Ltd. (Japan); Yoshinori Sawado, Katsumi Yoshizawa, Pioneer Micro Technology Corp. (Japan); Hideaki Asakura, Bin Idris Nazirul Afham, Hiroyuki Tsuda, Keio Univ. (Japan). . . . . [9365-54]

LED absorption sensor system for the detection of organics in water, Chi Hoon Kim, Chonnam National Univ. (Korea, Republic of) and Korea Photonics Technology Institute (Korea, Republic of); Taeksoo Ji, Chonnam National Univ. (Korea, Republic of) . . . . . [9365-55]

Experimental demonstration of directive Si_3N_4 optical leaky wave antennas with semiconductor perturbations, Qiancheng Zhao, Caner Guclu, Yuwang Huang, Salvatore Campione, Filippo Capolino, Ozdal Boyraz, Univ. of California, Irvine (USA). . . . . [9365-56]

CONFERENCE 9366
LOCATION: ROOM 306 (ESPLANADE)

Wednesday–Thursday 11–12 February 2015 • Proceedings of SPIE Vol. 9366

Smart Photonic and Optoelectronic Integrated Circuits XVII

Conference Chairs: **Louay A. Eldada,** Quanergy Systems, Inc. (USA); **El-Hang Lee,** Inha Univ. (Korea, Republic of); **Sailing He,** KTH Royal Institute of Technology (Sweden)

Program Committee: **Ray T. Chen,** The Univ. of Texas at Austin (USA); **Shanhui Fan,** Stanford Univ. (USA); **Chennupati Jagadish,** The Australian National Univ. (Australia); **Jürgen Jahns,** FernUniv. Hagen (Germany); **Joachim Piprek,** NUSOD Institute LLC (USA); **David V. Plant,** McGill Univ. (Canada); **Andrew W. Poon,** Hong Kong Univ. of Science and Technology (Hong Kong, China); **Ali Serpengüzel,** Koç Univ. (Turkey); **Qian Wang,** A*STAR - Data Storage Institute (Singapore); **Michael R. Watts,** Massachusetts Institute of Technology (USA); **Dan-Xia Xu,** National Research Council Canada (Canada); **Lin Yang,** Institute of Semiconductors (China)

Wednesday 11 February

SESSION 1

LOCATION: ROOM 306 (ESPLANADE) . . . . . WED 1:30 PM TO 2:40 PM

Smart Nanophotonic Systems

Session Chair: **Louay A. Eldada,** Quanergy Systems, Inc. (USA)

1:30 pm: **Devices and system measurements of mode- and wavelength-division-multiplexing in the Si wire platform** *(Invited Paper)*, Richard M. Osgood Jr., Jeffrey B. Driscoll, Christine P. Chen, Richard R. Grote, Brian B. Souhan, Jerry I. Dadap, Columbia Univ. (USA); Aaron Stein, Ming Lu, Brookhaven National Lab. (USA); Keren Bergman, Columbia Univ. (USA) . . . . . [9366-1]

2:00 pm: **Two probe writing and electrical measurements of oriented carbon nanotubes**, Aaron Lewis, Talia Yeshua, The Hebrew Univ. of Jerusalem (Israel); Christian Lehmann, Stephanie Reich, Freie Univ. Berlin (Germany); Kristin Strain, Eleanor Campbell, The Univ. of Edinburgh (United Kingdom) . . . . . [9366-2]

2:20 pm: **Optical routers for photonic networks-on-chip**, Lin Yang, Qiaoshan Chen, Fanfan Zhang, Ruiqiang Ji, Rui Min, Institute of Semiconductors (China) . . . . . [9366-3]

SESSION 2

LOCATION: ROOM 306 (ESPLANADE) . . . . . WED 2:40 PM TO 3:30 PM

Advances in Silicon Photonics

Session Chair: **Richard M. Osgood Jr.,** Columbia Univ. (USA)

2:40 pm: **Monolithic electro-optic CMOS Mach-Zehnder transmitters** *(Invited Paper)*, Douglas M. Gill, Jonathan E. Proesel, Chi Xiong, Jessie C. Rosenberg, Yurii Vlasov, Marwan Khater, Jason S. Orcutt, IBM Thomas J. Watson Research Ctr. (USA); Steven M. Shank, Carol Reinholm, John J. Ellis-Monaghan, Edward Kiewra, IBM Microelectronics Div. (USA); Wilfried Haensch, William M. J. Green, IBM Thomas J. Watson Research Ctr. (USA) . . . . . [9366-4]

3:10 pm: **Multi-parameter extraction from SOI photonic-integrated circuits using circuit simulation and evolutionary algorithms**, Alfonso Ruocco, Univ. Gent (Belgium); Wim Bogaerts, Univ. Gent (Belgium) and Luceda Photonics (Belgium) . . . . . [9366-5]

Coffee Break . . . . . Wed 3:30 pm to 4:00 pm

SESSION 3

LOCATION: ROOM 306 (ESPLANADE) . . . . . WED 4:00 PM TO 5:20 PM

Smart Photon Manipulation Systems

Session Chair: **Ali Serpengüzel,** Koç Univ. (Turkey)

4:00 pm: **Quantum and ultrafast precision measurements in mesoscopic mode-locked architectures** *(Invited Paper)*, Chee Wei Wong, Columbia Univ. (USA) . . . . . [9366-6]

4:30 pm: **Controlling light at the exceptional points with whispering gallery microresonators** *(Invited Paper)*, Sahin K. Ozdemir, Lan Yang, Washington Univ. in St. Louis (USA) . . . . . [9366-7]

5:00 pm: **Optodic bonding of optoelectronic components in transparent polymer substrates-based flexible circuit systems**, Yixiao Wang, Meriem Akin, Lisa Jogschies, Ludger Overmeyer, Lutz Rissing, Leibniz Univ. Hannover (Germany) . . . . . [9366-8]

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Photoluminescence properties of β-$FeSi_2$ on treated Si surface by metals, Kensuke Akiyama, Kanagawa Industrial Technology Ctr. (Japan); Hiroshi Funakubo, Tokyo Institute of Technology (Japan) . . . . . [9366-25]

Microphotonic filter applications of silicon microspheres, Ulas S. Gökay, Muhammad Zakwan, Ali Serpengüzel, Koç Univ. (Turkey) . . . . . [9366-26]

Thursday 12 February

SESSION 4

LOCATION: ROOM 306 (ESPLANADE) . . . . . THU 8:00 AM TO 9:20 AM

Novel Photonic Integrated Circuits

Session Chair: **Sailing He,** KTH Royal Institute of Technology (Sweden)

8:00 am: **Novel distributed feedback lightwave circuit elements**, Ceren B. Dag, Istanbul Teknik Üniv. (Turkey); Mehmet A. Anil, Istanbul Technical Univ. (Turkey) and Univ. of Colorado (USA); Ali Serpengüzel, Koç Univ. (Turkey) . . . . . [9366-9]

8:20 am: **Heterogeneous 2D and 3D integrated circuits for temporal, spectral, and spatial information processing** *(Invited Paper)*, S. J. Ben Yoo, Univ. of California, Davis (USA) . . . . . [9366-10]

8:50 am: **Simple and compact tunable semiconductor lasers based on novel half-wave coupler** *(Invited Paper)*, Jian-Jun He, Zhejiang Univ. (China) . . . . . [9366-11]

SESSION 5

LOCATION: ROOM 306 (ESPLANADE) . . . . . THU 9:20 AM TO 10:40 AM

Optofluidic Sensing Systems

Session Chair: **Dan-Xia Xu,** National Research Council Canada (Canada)

9:20 am: **Undisturbed interferometric sensing through a fluid interface by electrically-tunable lenses and micro mirrors** *(Invited Paper)*, Jürgen W. Czarske, Hannes Radner, Christoph Leithold, Lars Büttner, Technische Univ. Dresden (Germany); Moritz Stürmer, Ulricke Wallrabe, Univ. of Freiburg (Germany) . . . . . [9366-12]

9:50 am: **Integrated optofluidics chips for efficient on-chip infectious disease detection** *(Invited Paper)*, Hong Cai, Joshua W. Park, Univ. of California, Santa Cruz (USA); Tomas Wall, Brigham Young Univ. (USA); Ricardo Carrion Jr., Jean L. Patterson, Texas Biomedical Research Institute (USA); Richard A. Mathies, Univ. of California, Berkeley (USA); Aaron R. Hawkins, Brigham Young Univ. (USA); Holger Schmidt, Univ. of California, Santa Cruz (USA). . . . . [9366-13]

10:20 am: **Nanophotonic sensor for optofluidic detection of gas/water/oil fluids**, Huub W. Salemink, Radboud Univ. Nijmegen (Netherlands); Yazhao Liu, Technische Univ. Delft (Netherlands) . . . . . [9366-14]

Coffee Break . . . . . Thu 10:40 am to 11:00 am

OPTO

CONFERENCE 9366
LOCATION: ROOM 306 (ESPLANADE)

SESSION 6
LOCATION: ROOM 306 (ESPLANADE) . . . . . THU 11:00 AM TO 12:30 PM

Advanced Hybrid PICs

Session Chair: **Lin Yang,** Institute of Semiconductors (China)

11:00 am: **Design, fabrication and demonstration of heterogeneously III-V/Si laser with a compact optical vertical interconnect access** *(Invited Paper)*, Jing Pu, Kim Peng Lim, Doris Keh Ting Ng, Vivek Krishnamurthy, Chee Wei Lee, Kun Tang, Anthony, Yew Seng Kay, Ter Hoe Loh, Qian Wang, A*STAR - Data Storage Institute (Singapore). . . . . [9366-15]

11:30 am: **Heterogenous integration: the more than Moore path to silicon photonic microsystems** *(Invited Paper)*, Gregory A. Fish, Alexander W. Fang, Aurrion, Inc. (USA). . . . . [9366-16]

12:00 pm: **IIIV/Si hybrid integrated devices for optical interconnect** *(Invited Paper)*, Liu Liu, Jin Liu, South China Normal Univ. (China). . . . . [9366-17]

Lunch/Exhibition Break . . . . . Thu 12:30 pm to 1:50 pm

SESSION 7
LOCATION: ROOM 306 (ESPLANADE) . . . . . THU 1:50 PM TO 3:00 PM

PICs for Optical Interconnects

Session Chair: **S. J. Ben Yoo,** Univ. of California, Davis (USA)

1:50 pm: **Fan-in/out polymer optical waveguide for a multicore fiber fabricated using the Mosquito method**, Daisuke Suganuma, Takaaki Ishigure, Keio Univ. (Japan) . . . . . [9366-18]

2:10 pm: **Graded refractive index optics based on dual-layer ultrathin films: theory, design and applications in integrated photonics** *(Invited Paper)*, Qian Wang, Kim Peng Lim, Doris K. Ng, A*STAR - Data Storage Institute (Singapore) . . . . . [9366-19]

2:40 pm: **Bend insensitive graded index multimode polymer optical waveguides fabricated using the Mosquito method**, Asami Takahashi, Takaaki Ishigure, Keio Univ. (Japan) . . . . . [9366-20]

Coffee Break . . . . . Thu 3:00 pm to 3:30 pm

SESSION 8
LOCATION: ROOM 306 (ESPLANADE) . . . . . THU 3:30 PM TO 4:40 PM

Smart Photonic Remote Sensing Systems

Session Chair: **Qian Wang,** A*STAR - Data Storage Institute (Singapore)

3:30 pm: **SPADAS: a high-speed 3D single-photon camera for advanced driver assistance systems**, Danilo Bronzi, Yu Zou, Federica A. Villa, Politecnico di Milano (Italy); Simone Tisa, Micro Photon Devices S.r.l. (Italy); Alberto Tosi, Franco Zappa, Politecnico di Milano (Italy) . . . . . [9366-21]

3:50 pm: **Smart optoelectronic 3D sensing systems** *(Invited Paper)*, Junichiro Fujita, Tomoyuki Izuhara, Louay A. Eldada, Quanergy Systems, Inc. (USA) . . . . . [9366-22]

4:20 pm: **Image sensor innovations for low light levels with active imaging features,** Gareth H. Powell, e2v semiconductors SAS (France). . . . . [9366-27]

SESSION 9
LOCATION: ROOM 306 (ESPLANADE) . . . . . THU 4:40 PM TO 5:20 PM

Photonic Logic Devices

Session Chair: **Louay A. Eldada,** Quanergy Systems, Inc. (USA)

4:40 pm: **Photonic-crystal-based all-optical NOT gate**, Brahm R. Singh, Swati Rawal, Jaypee Institute of Information Technology (India) . . . . . [9366-23]

5:00 pm: **Topological spin-polarized states in photonic metacrystals waveguide**, Jian-Wen Dong, Yabin Chen, Jiarong Wang, Sun Yat-Sen Univ. (China) . . . . . [9366-24]

CONFERENCE 9367
LOCATION: ROOM 301 (ESPLANADE)

Monday–Thursday 9–12 February 2015 • Proceedings of SPIE Vol. 9367

Silicon Photonics X

Conference Chairs: **Graham T. Reed,** Univ. of Southampton (United Kingdom); **Michael R. Watts,** Massachusetts Institute of Technology (USA)

Program Committee: **Laurence W. Cahill,** La Trobe Univ. (Australia); **Philippe M. Fauchet,** Vanderbilt Univ. (USA); **L. Cary Gunn,** Genalyte, Inc. (USA); **Siegfried Janz,** National Research Council Canada (Canada); **Andrew P. Knights,** McMaster Univ. (Canada); **Joel Kubby,** Univ. of California, Santa Cruz (USA); **Laura Maria Lechuga,** CIN2 (Spain); **Sebania Libertino,** Istituto per la Microelettronica e Microsistemi (Italy); **Goran Z. Mashanovich,** Univ. of Southampton (United Kingdom); **Ching Eng Jason Png,** A*STAR Institute of High Performance Computing (Singapore); **Andrew W. Poon,** Hong Kong Univ. of Science and Technology (Hong Kong, China); **Haisheng Rong,** Intel Corp. (USA); **Holger Schmidt,** Univ. of California, Santa Cruz (USA); **Dan-Xia Xu,** National Research Council Canada (Canada); **Zhiping Zhou,** Peking Univ. (China)

Monday 9 February

OPTO PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA) . . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA) . . . . . [9371-202]

Coffee Break . . . . . Mon 10:10 am to 10:30 am

SESSION 1
LOCATION: ROOM 301 (ESPLANADE) . . . . . MON 10:30 AM TO 12:00 PM

Waveguide-based Devices I
Session Chair: **Ching Eng Jason Png,**
A*STAR Institute of High Performance Computing (Singapore)

10:30 am: **High-speed detection at and above the telecommunication windows with monolithic silicon avalanche photodiodes** *(Invited Paper)*, Andrew P. Knights, Jason J. Ackert, McMaster Univ. (Canada); David J. Thomson, Li Shen, Anna C. Peacock, Univ. of Southampton (United Kingdom); Paul E. Jessop, Wilfrid Laurier Univ. (Canada); Graham T. Reed, Goran Z. Mashanovich, Univ. of Southampton (United Kingdom); Abdullah S. Karar, Queen's Univ. (Canada); Dixon J. Paez, McMaster Univ. (Canada); John C. Cartledge, Queen's Univ. (Canada) . . . . . [9367-1]

11:00 am: **Improvements in the angled MMI multiplexer**, Graham T. Reed, Youfang Hu, David J. Thomson, Frederic Y. Gardes, Goran Z. Mashanovich, Univ. of Southampton (United Kingdom) . . . . . [9367-2]

11:20 am: **Improved performance of a silicon arrayed waveguide grating by suppression of multimode generation near the boundary of a star coupler**, Jaegyu Park, Jiho Joo, Hyundai Park, Myung-Joon Kwack, Gyungock Kim, Electronics and Telecommunications Research Institute (Korea, Republic of) . . . . . [9367-3]

11:40 am: **Architectures for evanescent frequency tuning of microring resonators in micro-opto-electro-mechanical SOI platforms**, Hossam Shoman, Marcus S. Dahlem, Masdar Institute of Science & Technology (United Arab Emirates) . . . . . [9367-4]

Lunch Break . . . . . Mon 12:00 pm to 1:20 pm

SESSION 2
LOCATION: ROOM 301 (ESPLANADE) . . . . . MON 1:20 PM TO 3:20 PM

Waveguide-based Devices II
Session Chair: **Graham T. Reed,**
Univ. of Southampton (United Kingdom)

1:20 pm: **Feedback and control in integrated optics enabled by contactLess integrated photonic probe** *(Invited Paper)*, Andrea I. Melloni, Francesco Morichetti, Stefano Grillanda, Andrea Annoni, Marco Sampietro, Marco Carminati, Politecnico di Milano (Italy) . . . . . [9367-5]

1:50 pm: **Suspended silicon slotted microring resonators with ultra-high optical quality**, Wei C. Jiang, Qiang Lin, Univ. of Rochester (USA) . . . . . [9367-6]

2:10 pm: **Ge quantum well photonic platform on bulk silicon** *(Invited Paper)*, Papichaya Chaisakul, Delphine Marris-Morini, Institut d'Électronique Fondamentale (France); Jacopo Frigerio, Daniel Chrastina, Politecnico di Milano (Italy); Mohamed-Said Rouifed, Institut d'Électronique Fondamentale (France); Stefano C. Cecchi, Politecnico di Milano (Italy); Paul Crozat, Institut d'Électronique Fondamentale (France); Giovanni Isella, Politecnico di Milano (Italy); Laurent Vivien, Institut d'Électronique Fondamentale (France) . . . . . [9367-7]

2:40 pm: **Low-loss delay lines with small footprint on a micron-scale SOI platform**, Matteo Cherchi, Mikko Harjanne, VTT Technical Research Ctr. of Finland (Finland); Konstantinos Vyrsokinos, Aristotle Univ. of Thessaloniki (Greece); Sami Ylinen, Markku Kapulainen, Tapani Vehmas, Timo Aalto, VTT Technical Research Ctr. of Finland (Finland). . . . . [9367-8]

3:00 pm: **Total internal reflection mirrors with ultra-low losses in 3 µm thick SOI waveguides**, Timo Aalto, Mikko Harjanne, Sami Ylinen, Markku Kapulainen, Tapani Vehmas, Matteo Cherchi, VTT Technical Research Ctr. of Finland (Finland) . . . . . [9367-9]

Coffee Break . . . . . Mon 3:20 pm to 3:50 pm

SESSION 3
LOCATION: ROOM 301 (ESPLANADE) . . . . . MON 3:50 PM TO 5:40 PM

Modulators I
Session Chair: **Michael R. Watts,**
Massachusetts Institute of Technology (USA)

3:50 pm: **Design and characterisation of high-speed monolithic silicon modulators for digital coherent communication** *(Invited Paper)*, Kensuke Ogawa, Kazuhiro Goi, Akira Oka, Yasuhiro Mashiko, Fujikura Ltd. (Japan); Tsung-Yang Liow, Xiaoguang Tu, Guo-Qiang Lo, Dim-Lee Kwong, A*STAR Institute of Microelectronics (Singapore); Soon Thor Lim, A*STAR Institute of High Performance Computing (Singapore) and Optic2Connect Pte Ltd. (Singapore); Min Jie Sun, Optic2Connect Pte Ltd. (Singapore); Ching Eng Png, A*STAR Institute of High Performance Computing (Singapore) and Optic2Connect Pte Ltd. (Singapore) . . . . . [9367-10]

4:20 pm: **Power-efficient carrier-depletion SOI Mach-Zehnder modulators for 4x25Gbit/s operation in the O-band**, Thomas Ferrotti, STMicroelectronics (France) and CEA-LETI (France); Alain Chantre, STMicroelectronics (France); Hélène Duprez, Benjamin Blampey, Frédéric Milesi, André Myko, Corrado Sciancalepore, Karim Hassan, Julie Harduin, CEA-LETI (France); Charles Baudot, STMicroelectronics (France); Sylvie Menezo, CEA-LETI (France); Frédéric Boeuf, STMicroelectronics (France); Badhise Ben Bakir, CEA-LETI (France) . . . . . [9367-11]

4:40 pm: **Strain tuning of Ge bandgap by selective epigrowth for electro-absorption modulators**, Yasutaka Mizuno, Motoki Yako, Luan M. Nguyen, Kazumi Wada, The Univ. of Tokyo (Japan) . . . . . [9367-12]

OPTO

5:00 pm: **Accurate modelling and simulation of silicon optical modulators in QPSK**, Ching Eng Jason Png, A*STAR Institute of High Performance Computing (Singapore) and Optic2Connect Pte Ltd. (Singapore); Min Jie Sun, Optic2Connect Pte Ltd. (Singapore); Soon Thor LIM, A*STAR Institute of High Performance Computing (Singapore) and Optic2Connect Pte Ltd. (Singapore); Kensuke Ogawa, Fujikura Ltd. (Japan) . . . . . [9367-13]

5:20 pm: **Silicon photonics cloud (SiCloud)**, Peter T. S. DeVore, Yunshan Jiang, Michael Lynch, Univ. of California, Los Angeles (USA); Taira Miyatake, Univ. of Tokyo (Japan); Christopher Carmona, Andrew C. Chan, Kuhan Muniam, Bahram Jalali, Univ. of California, Los Angeles (USA) . . . . . [9367-15]

Tuesday 10 February

SESSION 4

LOCATION: ROOM 301 (ESPLANADE) . . . . . TUE 8:00 AM TO 10:10 AM

Slow-Light Modulators I

Session Chair: **Andrew P. Knights,** McMaster Univ. (Canada)

8:00 am: **Slow-light modulators** *(Invited Paper)*, Toshihiko Baba, Yosuke Terada, Hong C. Nguyen, Yokohama National Univ. (Japan) . . . . . [9367-16]

8:30 am: **Modulation efficiency enhancement of an optical phase modulator using one-dimensional photonic crystal structures**, Seyedreza Hosseini, Kambiz Jamshidi, Technische Univ. Dresden (Germany) . . . . . [9367-17]

8:50 am: **Silicon-based optical matrix processor for parallel computing** *(Invited Paper)*, Lin Yang, Jianfeng Ding, Qiaoshan Chen, Lei Zhang, Ruiqiang Ji, Institute of Semiconductors (China) . . . . . [9367-18]

9:20 am: **25 Gb/s photoreceiver based on vertical-illumination type Ge-on-Si photodetector and CMOS amplifier circuit for optical interconnects**, Jiho Joo, Ki-Seok Jang, Sang Hoon Kim, In Gyoo Kim, Jin Hyuk Oh, Sun Ae Kim, Gyungock Kim, Electronics and Telecommunications Research Institute (Korea, Republic of); Gyu-Seob Jeong, Hankyu Chi, Deog-Kyoon Jeong, Seoul National Univ. (Korea, Republic of) . . . . . [9367-19]

9:40 am: **A hybrid photonic-electronic switching architecture for next-generation data centers** *(Invited Paper)*, Hamid Mehrvar, Alan F. Graves, Dominic J. Goodwill, Nortel Networks (Canada); Eric Bernier, Huawei Technologies Co., Ltd. (Canada) . . . . . [9367-20]

Coffee Break . . . . . Tue 10:10 am to 10:40 am

SESSION 5

LOCATION: ROOM 301 (ESPLANADE) . . . . . TUE 10:40 AM TO 12:20 PM

Slow-Light Modulators II

Session Chair: **Andrew P. Knights,** McMaster Univ. (Canada)

10:40 am: **Monolithic silicon photonics in a sub-100nm SOI CMOS microprocessor foundry: progress from devices to systems** *(Invited Paper)*, Milos A. Popovic, Mark T. Wade, Univ. of Colorado at Boulder (USA); Jason S. Orcutt, Massachusetts Institute of Technology (USA); Jeffrey M. Shainline, National Institute of Standards and Technology (USA); Sun Chen, Univ. of California, Berkeley (USA); Michael S. Georgas, Benjamin Moss, Massachusetts Institute of Technology (USA); Rajesh Kumar, Univ. of Colorado at Boulder (USA); Luca Alloatti, Massachusetts Institute of Technology (USA); Fabio Pavanello, Univ. of Colorado at Boulder (USA); Yu-Hsin Chen, Massachusetts Institute of Technology (USA); Kareem Nammari, Jelena Notaros, Univ. of Colorado at Boulder (USA); Amir Atabaki, Jonathan Leu, Massachusetts Institute of Technology (USA); Vladimir Stojanovic, Univ. of California, Berkeley (USA); Rajeev J. Ram, Massachusetts Institute of Technology (USA) . . [9367-21]

11:10 am: **Photonic-electronic integration with polysilicon photonics in bulk CMOS** *(Invited Paper)*, Rajeev Jagga Ram, Massachusetts Institute of Technology (USA) . . . . . [9367-22]

11:40 am: **Interferometric microscopy of silicon photonic devices**, William S. Rabinovich, Rita Mahon, Peter Goetz, Doewon Park, Marcel W. Pruessner, Fredrik K. Fatemi, Michael J. DePrenger, U.S. Naval Research Lab. (USA) . . . . . [9367-23]

12:00 pm: **hybrid silicon mode-locked laser with improved RF power by impedance matching**, Bassem M. Tossoun, Dennis J. Derickson, California Polytechnic State Univ., San Luis Obispo (USA); Sudharsanan Srinivasan, John E. Bowers, Univ. of California, Santa Barbara (USA) . . . . . [9367-24]

Lunch/Exhibition Break . . . . . Tue 12:20 pm to 2:00 pm

INDUSTRY EVENT

LOCATION: ROOM 134 (EXHIBIT LEVEL) . . . . . 2:00 PM TO 3:00 PM

Silicon Photonics and Photonic Integrated Circuits: An Industry Perspective

Demand for smaller and cheaper optical interconnections inside networks and computers will create a new market of miniaturized, low-cost photonic components that can leverage the scale of CMOS manufacturing. Learn what industry leaders have developed at the frontier of the silicon photonics market.

Intended Audience: Technology and business development professionals who would like to gain insight to the new markets enabled by silicon photonics and PICs.

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 6

LOCATION: ROOM 301 (ESPLANADE) . . . . . TUE 3:30 PM TO 5:30 PM

MIR Silicon Photonics and GeSn Devices

Session Chairs: **Graham T. Reed,** Univ. of Southampton (United Kingdom); **Goran Z. Mashanovich,** Univ. of Southampton (United Kingdom)

3:30 pm: **Group IV mid-infrared photonics** *(Invited Paper)*, Goran Z. Mashanovich, Milos Nedeljkovic, Jordi Soler Penades, Colin J. Mitchell, A. Z. Khokhar, Callum Littlejohns, Stevan Stankovic, Univ. of Southampton (United Kingdom); Benedetto Troia, Politecnico di Bari (Italy); Scott Reynolds, Univ. of Southampton (United Kingdom); Vittorio M. N. Passaro, Politecnico di Bari (Italy); Li Shen, Noel Healy, Anna C. Peacock, Univ. of Southampton (United Kingdom); Carlos A. Alonso Ramos, Alejandro Ortega-Moñux, Juan Gonzalo Wangüemert-Pérez, Iñigo Molina-Fernández, Univ. de Málaga (Spain); David J. Rowe, James S. Wilkinson, Univ. of Southampton (United Kingdom); Pavel Cheben, National Research Council Canada (Canada); Jason J. Ackert, Andrew P. Knights, McMaster Univ. (Canada); David J. Thomson, Frederic Y. Gardes, Univ. of Southampton (United Kingdom). . . . . [9367-25]

4:00 pm: **GeSn photodetector and light emitter: mid-infrared devices in silicon photonics** *(Invited Paper)*, Shui-Qing Yu, Wei Du, Benjamin R. Conley, Seyed A. Ghetmiri, Aboozar Mosleh, Thach Pham, Yiyin Zhou, Univ. of Arkansas (USA); Amjad Nazzal, Wilkes Univ. (USA); Greg Sun, Richard A. Soref, Univ. of Massachusetts Boston (USA); Joe Margetis, John Tolle, ASM America Inc. (USA); Baohua Li, Arktonics, LLC (USA); Hameed A. Naseem, Univ. of Arkansas (USA) . . . . . [9367-26]

4:30 pm: **Enhanced gain of GeSn photoconductors by interdigitated electrodes for mid-infrared detection**, Benjamin R. Conley, Wei Du, Univ. of Arkansas (USA); Richard A. Soref, Greg Sun, Univ. of Massachusetts Boston (USA); Joe Margetis, John Tolle, ASM America Inc. (USA); Baohua Li, Arktronics, LLC (USA); Shui-Qing Yu, Univ. of Arkansas (USA) . . . . . [9367-27]

4:50 pm: **Integrated photonic crystal waveguides on silicon-on-sapphire for volatile organic compounds detection in mid infrared**, Yi Zou, The Univ. of Texas at Austin (USA); Swapnajit Chakravarty, Xiaochuan Xu, Omega Optics, Inc. (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) . . . . . [9367-28]

5:10 pm: **Strain engineering to create direct-bandgap GeSn films for monolithic Si integration**, Birendra R. Dutt, APIC Corp. (USA); Elizabeth H. Edwards, PhotonIC Corp. (USA); Gerald M. Miller, APIC Corp. (USA); Colleen K. Shang, Stanford Univ. (USA); Milam Pender, John Borland, Advanced Integrated Photonics (USA); Yi-Chiau Huang, Yihwan Kim, Applied Materials, Inc. (USA). . . . . [9367-29]

Wednesday 11 February

SESSION 7

LOCATION: ROOM 301 (ESPLANADE) . . . . . WED 8:00 AM TO 10:30 AM

PICs for Optical Interconnects

Joint Session with Conferences 9367 and 9368

Session Chairs: **Henning Schröder,** Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany);
Graham T. Reed, Univ. of Southampton (United Kingdom)

8:00 am: **Imec ISIPP25G silicon photonics: a robust CMOS-based photonics technology platform**, Philippe P. Absil, IMEC (Belgium) . . . . . [9367-35]

8:20 am: **Optimization of beam expansion characteristics in a silicon planar guided-wave structure**, Siamak Abaslou, Robert Gatdula, Wei Jiang, Rutgers, The State Univ. of New Jersey (USA) . . . . . [9368-33]

8:40 am: **Design, fabrication, and characterisation of nano-imprinted single-mode waveguide structures for intra-chip optical communications**, John Justice, Umar Khan, Tyndall National Institute (Ireland); Tia Korhonen, VTT Technical Research Ctr. of Finland (Finland); Arjen Boersma, Sjoukje Wiegersma, TNO (Netherlands); Mikko Karppinen, VTT Technical Research Ctr. of Finland (Finland); Brian Corbett, Tyndall National Institute (Ireland) . . [9368-34]

9:00 am: **Mode-converting coupler for silicon-on-sapphire devices**, Sanja Zlatanovic, Space and Naval Warfare Systems Command (USA); Bruce W. Offord, Space and Naval Warfare Systems Ctr Pacific (USA); Randy L. Shimabukuro, Space and Naval Warfare Systems Command (USA); Everett W. Jacobs, Space and Naval Warfare Systems Ctr. Pacific (USA); Michael W. Owen, Defense Microelectronics Activity (USA). . . . . [9367-36]

9:20 am: **Topology-optimized silicon photonic wire mode-multiplexer**, Louise F. Frellsen, Technical Univ. of Denmark (Denmark); Lars H. Frandsen, Yunhong Ding, Technical Univ. of Denmark (Denmark) and DTU Fotonik (Denmark); Yuriy Elesin, Topsoe Fuel Cell (Denmark); Ole Sigmund, Technical Univ. of Denmark (Denmark); Kresten Yvind, Technical Univ. of Denmark (Denmark) and DTU Fotonik (Denmark). . . . . [9367-37]

9:40 am: **25 Gbps silicon photonics multi-mode fiber link with highly alignment tolerant vertically-illuminated germanium photodiode**, Tadashi Okumura, Yuki Wakayama, Yasunobu Matsuoka, Katsuya Oda, Misuzu Sagawa, Takashi Takemoto, Etsuko Nomoto, Hideo Arimoto, Shigehisa Tanaka, Hitachi, Ltd. (Japan) . . . . . [9367-38]

10:00 am: **Silicon-based tunable optical delay lines and switches for next-generation optical telecommunications** *(Invited Paper)*, Linjie Zhou, Shanghai Jiao Tong Univ. (China) . . . . . [9367-39]

Coffee Break . . . . . .Wed 10:30 am to 11:00 am

SESSION 8

LOCATION: ROOM 301 (ESPLANADE) . . . . . WED 11:00 AM TO 12:50 PM

Device Coupling Approaches for Silicon Photonics Chips

Joint Session with Conferences 9367 and 9368

Session Chairs: **Graham T. Reed,** Univ. of Southampton (United Kingdom); **Henning Schröder,** Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany)

11:00 am: **Silicon photonic devices based on SOI/bulk-silicon platforms for chip-level optical interconnects** *(Invited Paper)*, Gyungock Kim, In Gyoo Kim, Sanghoon Kim, Jiho Joo, Ki-Seok Jang, Sun Ae Kim, Jin Hyuk Oh, Jeong-Woo Park, Myung-Joon Kwack, Jaegyu Park, Hyundai Park, Gun Sik Park, Sanggi Kim, Electronics and Telecommunications Research Institute (Korea, Republic of) . . . . . [9368-35]

11:30 am: **Symmetric cavity modes in parallel-coupled waveguides with tapered distributed Bragg reflectors**, Robert Gatdula, Siamak Abaslou, Wei Jiang, Rutgers, The State Univ. of New Jersey (USA). . . . . [9368-36]

11:50 am: **Si-wire grating couplers for integrated optical transceivers based on single-mode fiber connection**, Yohei Sobu, Fujitsu Labs., Ltd. (Japan) and Photonics Electronics Technology Research Association (Japan); Seok–Hwan Jeong, Photonics Electronics Technology Research Association (Japan); Shigeaki Sekiguchi, Fujitsu Labs., Ltd. (Japan) and Photonics Electronics Technology Research Association (Japan); Yu Tanaka, Photonics Electronics Technology Research Association (Japan); Ken Morito, Fujitsu Labs., Ltd. (Japan) and Photonics Electronics Technology Research Association (Japan). . . . . [9367-40]

12:10 pm: **Low back-reflection CMOS-compatible grating coupler for perfectly vertical coupling**, George Dabos, Aristotle Univ. of Thessaloniki (Greece); Nikos Pleros, Aristotle Univ. of Thessaloniki (Greece) and Informatics and Telematics Institute,Centre for Research and Technology Hellas (Greece); Dimitris M. Tsiokos, Aristotle Univ. of Thessaloniki (Greece) and Informatics and Telematics Institute (Greece). . . . . [9367-41]

12:30 pm: **Mode conversion based on the acousto-optical interaction in hybrid photonic-phononic waveguide**, Guodong Chen, Ruiwen Zhang, Xiong Huang, Heng Xie, Ya Gao, Danqi Feng, Junqiang Sun, Huazhong Univ. of Science and Technology (China). . . . . [9367-42]

Lunch/Exhibition Break . . . . . .Wed 12:50 pm to 1:50 pm

SESSION 9

LOCATION: ROOM 301 (ESPLANADE) . . . . . WED 1:50 PM TO 3:30 PM

Waveguide-based Devices III

Session Chair: **Graham T. Reed,**
Univ. of Southampton (United Kingdom)

1:50 pm: **Comparison of different types of MMI-resonators fabricated on a micron-scale SOI platform**, Matteo Cherchi, Sami Ylinen, Mikko Harjanne, Markku Kapulainen, Tapani Vehmas, Timo Aalto, VTT Technical Research Ctr. of Finland (Finland) . . . . . [9367-43]

2:10 pm: **Structural and optical properties of 200-mm optical germanium-on-insulator (GeOI) substrates for silicon photonics applications**, Vincent Reboud, Julie Widiez, Jean Michel Hartmann, CEA-LETI (France); Alexei Chelnokov, MINATEC (France); Alban Gassenq, CEA-LETI (France); Kevin Guilloy, Nicolas Pauc, Vincent Calvo, CEA-INAC (France); Richard Geiger, Hadi Rabbani, Paul Scherrer Institut (Switzerland); Jérôme Faist, ETH Zürich (Switzerland); Hans C. Sigg, Paul Scherrer Institut (Switzerland) . . . . . [9367-44]

2:30 pm: **Silicon photonics athermal Mach-Zehnder interferometer with wide thermal and spectral operating range**, Jaime Viegas, Peng Xing, Masdar Institute of Science & Technology (United Arab Emirates) . . . . [9367-45]

2:50 pm: **Bending behavior of a flexible single crystal nanomembrane photonic crystal cavity**, Xiaochuan Xu, Harish Subbaraman, Omega Optics, Inc. (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) . . . . . [9367-46]

3:10 pm: **Compact 4X4 1250GHz silicon arrayed waveguide grating router for optical interconnects**, Guanting Chen, Jun Zou, Zhejiang Univ. (China); Tingting Lang, China Jiliang Univ. (China); Jian-Jun He, Zhejiang Univ. (China) . . . . . [9367-47]

Coffee Break . . . . . .Wed 3:30 pm to 4:00 pm

SESSION 10

LOCATION: ROOM 301 (ESPLANADE) . . . . . WED 4:00 PM TO 6:10 PM

Lab-on-a-Chip, Optofluidics, and Sensing

Session Chair: **Goran Z. Mashanovich,**
Univ. of Southampton (United Kingdom)

4:00 pm: **Silicon-PDMS optofluidic integration** *(Invited Paper)*, Romeo Bernini, Testa Genni, Gianluca Persichetti, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy); Pasqualina M. Sarro, Technische Univ. Delft (Netherlands). . . . . [9367-30]

4:30 pm: **Optofluidic metasurfaces: from physical fundamentals to lab-on-chip systems** *(Invited Paper)*, Ahmet A. Yanik, Univ. of California, Santa Cruz (USA). . . . . [9367-31]

5:00 pm: **Index of refraction sensors and biosensors using 2D photonic crystal slab devices** *(Invited Paper)*, Ofer Levi, Univ. of Toronto (Canada) . . . . . [9367-32]

5:30 pm: **4H-SiC detectors for ultraviolet light monitoring**, Massimo C. Mazzillo, STMicroelectronics (Italy); Antonella Sciuto, Consiglio Nazionale delle Ricerche (Italy); Paolo Badala, Beatrice Carbone, Alfio Russo, Salvo Coffa, STMicroelectronics (Italy) . . . . . [9367-33]

5:50 pm: **Enhanced light-matter interaction in cascaded cavities within a slotted photonic crystal slab on silicon-inorganic hybrid platform**, Arijit Bera, Petri Stenberg, Matthieu Roussey, Markku Kuittinen, Seppo K. Honkanen, Univ. of Eastern Finland (Finland) . . . . . [9367-34]

CONFERENCE 9367
LOCATION: ROOM 301 (ESPLANADE)

POSTERS-WEDNESDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

High-quality slot waveguide ring resonator based on atomic layer deposition, Anton Autere, Aalto Univ. School of Electrical Engineering (Finland); Lasse Karvonen, Antti Säynätjoki, Aalto Univ. (Finland); Matthieu Roussey, Univ. of Eastern Finland (Finland); Elina Färm, Marianna Kemell, Univ. of Helsinki (Finland); Xiaoguang Tu, Tsung-Yang Liow, Guo-Qiang Lo, A*STAR Institute of Microelectronics (Singapore); Mikko Ritala, Markku Leskela, Univ. of Helsinki (Finland); Seppo K. Honkanen, Univ. of Eastern Finland (Finland); Zhipei Sun, Aalto Univ. School of Science and Technology (Finland) . . . . . [9367-54]

Toward new design rule check of silicon photonics for automated layout physical verifications, Mohamed Ismail, Raghi S. El Shamy, The American Univ. in Cairo (Egypt); Kareem Madkour, Sherif Hammouda, Mentor Graphics Egypt (Egypt); Mohamed A. Swillam, The American Univ. in Cairo (Egypt) . . . . . [9367-55]

Strain analysis in silicon-based waveguides and couplers, Giovanni Battista Montanari, Lab. MIST E-R (Italy); Fulvio Mancarella, Roberto Balboni, Diego Marini, Franco Corticelli, Michele Sanmartin, Matteo Ferri, Gabriele Bolognini, Consiglio Nazionale delle Ricerche (Italy) . . . . . [9367-56]

Enhanced multiband photodetection in blocked impurity band detectors with antenna-coupled microcavities, Kaisheng Liao, Shanghai Institute of Technical Physics (China) . . . . . [9367-57]

Large scale silicon photonic MEMS switch using moving couplers, Sangyoon Han, Tae Joon Seok, Ming C. Wu, Univ. of California, Berkeley (USA). . . . . [9367-58]

Solar cell enhancement using metallic nanoparticle arrays embedded in titanium dioxide, Max A. Burnett, Michael A. Fiddy, The Univ. of North Carolina at Charlotte (USA) . . . . . [9367-59]

Strained germanium-tin multiple quantum well microdisk resonators towards a light source on silicon, Colleen K. Shang, Robert Chen, Suyog Gupta, Stanford Univ. (USA); Yi-Chiau Huang, Applied Materials, Inc. (USA); Yijie Huo, Stanford Univ. (USA); Errol Sanchez, Yihwan Kim, Applied Materials, Inc. (USA); Theodore I. Kamins, Krishna C. Saraswat, James S. Harris, Stanford Univ. (USA) . . . . . [9367-60]

Thursday 12 February

SESSION 11
LOCATION: ROOM 301 (ESPLANADE) . . . . . THU 8:30 AM TO 10:40 AM

Light Emission and Detection
Session Chair: **Michael R. Watts,** Massachusetts Institute of Technology (USA)

8:30 am: **Title to be determined** *(Invited Paper)*, Juergen Michel, Technische Univ. Muenchen (Germany) . . . . . [9367-48]

9:00 am: **Photoluminescence quenching effect by Si cap in n+ Ge on Si**, Han Pan, Ryohei Takahashi, Koki Takinai, Kazumi Wada, The Univ. of Tokyo (Japan) . . . . . [9367-49]

9:20 am: **Comparison of large photovoltaic power plants with conventional ones and prospects for photovoltaic plants use in Israel**, Michael A. Slonim, Ben-Gurion Univ. of the Negev (Israel); Lev Pregerman, Boris Medres, Israeli Independent Academy for Development of Sciences (Israel) . . . . . [9367-50]

9:40 am: **GeSn waveguide structures for efficient light detection and emission**, You-Long Lin, Yu-Hui Huang, Shao-Wei Chen, Guo-En Chang, National Chung Cheng Univ. (Taiwan). . . . . [9367-51]

10:00 am: **Comparison of EL emitted by LEDs on Si substrates containing Ge and Ge/GeSn MQW as active layers**, Bernhard Schwartz, Tzanimir Arguirov, Brandenburgische Technische Univ. Cottbus (Germany); Martin Kittler, Brandenburgische Technische Univ. Cottbus (Germany) and IHP GmbH (Germany); Michael Oehme, Erich Kasper, Jörg Schulze, Univ. Stuttgart (Germany) . . . . . [9367-52]

10:20 am: **Ultra-low-cost near-infrared photodetectors on silicon**, Mohammad Amin Nazirzadeh, Fatih Bilge Atar, Berk Berkan Turgut, Ali K. Okyay, Bilkent Univ. (Turkey) . . . . . [9367-53]

CONFERENCE 9368
LOCATION: ROOM 202 (MEZZANINE)

Monday–Wednesday 9–11 February 2015 • Proceedings of SPIE Vol. 9368

Optical Interconnects XV

Conference Chairs: **Henning Schröder,** Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); **Ray T. Chen,** The Univ. of Texas at Austin (USA)

Program Committee: **Bill Blubaugh,** US Conec Ltd. (USA); **Swapnajit Chakravarty,** Omega Optics, Inc. (USA); **Patrick B. Chu,** Sandia National Labs. (USA); **Alexei L. Glebov,** OptiGrate Corp. (USA); **Michael W. Haney,** Univ. of Delaware (USA); **Ruth Houbertz,** Multiphoton Optics GmbH (Germany); **Yidong Huang,** Tsinghua Univ. (China); **Wei Jiang,** Rutgers, The State Univ. of New Jersey (USA); **Mikko Karppinen,** VTT Technical Research Ctr. of Finland (Finland); **Christian Koos,** Karlsruher Institut für Technologie (Germany); **Ashok V. Krishnamoorthy,** Oracle (USA); **Bert-Jan Offrein,** IBM Research – Zürich (Switzerland); **Hyo-Hoon Park,** KAIST (Korea, Republic of); **Richard C. Pitwon,** Xyratex Technology Ltd. (United Kingdom); **Richard Soref,** Univ. of Massachusetts Boston (USA); **Peter Van Daele,** Univ. Gent (Belgium); **Michael R. Wang,** Univ. of Miami (USA); **Ian H. White,** Univ. of Cambridge (United Kingdom)

Monday 9 February

OPTO PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA). . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA). . . . . [9371-202]

Coffee Break . . . . . Mon 10:10 am to 10:30 am

SESSION 1
LOCATION: ROOM 202 (MEZZANINE) . . . . . MON 10:30 AM TO 12:10 PM

Optical Waveguide Technologies
Session Chair: **Henning Schröder,** Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany)

10:30 am: **Multimode/single-mode polymer optical waveguide circuit for high-bandwidth-density on-board interconnects** *(Invited Paper)*, Takaaki Ishigure, Keio Univ. (Japan) . . . . . [9368-1]

11:00 am: **Bandwidth studies on multimode polymer waveguides for high-speed board-level optical interconnects** *(Invited Paper)*, Richard V. Penty, Nikos Bamiedakis, Jian Chen, Ian H. White, Univ. of Cambridge (United Kingdom) . . . . . [9368-2]

11:30 am: **Semi-analytic ray tracing method for time-efficient computing of transmission behavior of PCB level optical multipoint interconnects**, Oliver Stübbe, Ostwestfalen-Lippe Univ. of Applied Sciences (Germany) [9368-3]

11:50 am: **Silicone polymer waveguide bridge for Si to glass optical fibers**, Kevin L. Kruse, Nick Riegel, Christopher T. Middlebrook, Michigan Technological Univ. (USA) . . . . . [9368-5]

Lunch Break . . . . . Mon 12:10 pm to 1:40 pm

SESSION 2
LOCATION: ROOM 202 (MEZZANINE) . . . . . MON 1:40 PM TO 3:10 PM

Nanophotonics for Optical Interconnects
Chair: **Ruth Houbertz,** Multiphoton Optics GmbH (Germany)

1:40 pm: **Nanophotonics and VCSEL arrays for optical interconnects** *(Invited Paper)*, Werner H. Hofmann, Technische Univ. Berlin (Germany) [9368-6]

2:10 pm: **Low-loss mode converter for coupling light into slotted photonic crystal waveguide**, Xingyu Zhang, The Univ. of Texas at Austin (USA); Harish Subbaraman, Amir Hosseini, Omega Optics, Inc. (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) . . . . . [9368-7]

2:30 pm: **High-optical coupling efficient quasi-vertical tapers for polymer waveguide devices**, Zeyu Pan, The Univ. of Texas at Austin (USA); Harish Subbaraman, Omega Optics, Inc. (USA); Xingyu Zhang, The Univ. of Texas at Austin (USA); Qiaochu Li, Cheng Zhang, L. Jay Guo, Univ. Of Michigan (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) . . . . . [9368-8]

2:50 pm: **High efficiency silicon strip waveguide to plasmonic slot waveguide mode converter**, Chin-Ta Chen, National Central Univ. (Taiwan); Xiaochuan Xu, Amir Hosseini, Omega Optics, Inc. (USA); Zeyu Pan, Ray T. Chen, The Univ. of Texas at Austin (USA). . . . . [9368-9]

Coffee Break . . . . . Mon 3:10 pm to 3:40 pm

SESSION 3
LOCATION: ROOM 202 (MEZZANINE) . . . . . MON 3:40 PM TO 5:20 PM

Hybrid Integrated Optical Link Modules
Chair: **Mikko Karppinen,**
VTT Technical Research Ctr. of Finland Ltd. (Finland)

3:40 pm: **1060-nm VCSEL-based parallel-optical modules for optical interconnects** *(Invited Paper)*, Naoya Nishimura, Kazuya Nagashima, Agyl F. Rizky, Yoshinobu Nekado, Toshinori Uemura, Yozo Ishikawa, Hideyuki Nasu, Furukawa Electric Co., Ltd. (Japan) . . . . . [9368-10]

4:10 pm: **Multi-wavelength transceiver integration on SOI for high-performance computing system applications**, Timo Aalto, Mikko Harjanne, Sami Ylinen, Maarkku Kapulainen, Tapani Vehmas, Matteo Cherchi, VTT Technical Research Ctr. of Finland (Finland). . . . . [9368-11]

4:30 pm: **A CWDM photoreceiver module for 10 Gb/s x 4ch interconnection based on a vertical-illumination-type Ge-on-Si photodetectors and a silica-based AWG**, Ki-Seok Jang, Jiho Joo, Taeyong Kim, Sanghoon Kim, Jin Hyuk Oh, In Gyoo Kim, Sun Ae Kim, Gyungock Kim, Electronics and Telecommunications Research Institute (Korea, Republic of) . . . . . [9368-12]

4:50 pm: **Hybrid-Integrated WDM silicon photonics for inter-chip communications** *(Invited Paper)*, Hiren D. Thacker, Oracle (USA) . . . . [9368-13]

CONFERENCE 9368
LOCATION: ROOM 202 (MEZZANINE)

Tuesday 10 February

SESSION 4
LOCATION: ROOM 202 (MEZZANINE) . . . . . TUE 8:10 AM TO 10:00 AM

Manufacturing Technologies
Chair: **Peter Van Daele,** Univ. Gent (Belgium)

8:10 am: **Towards high-precision manufacturing of 3D optical components using UV-curable hybrid polymers** *(Invited Paper)*, Arne Schleunitz, Jan J. Klein, micro resist technology GmbH (Germany); Ruth Houbertz, Multiphoton Optics GmbH (Germany); Marko Vogler, Gabi Gruetzner, micro resist technology GmbH (Germany). . . . . [9368-14]

8:40 am: **Building blocks for actively-aligned micro-optical systems in rapid prototyping and small series production**, Gunnar Böttger, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); Marco Queisser, Norbert Arndt-Staufenbiel, Technische Univ. Berlin (Germany); Henning Schröder, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); Klaus-Dieter Lang, Technische Univ. Berlin (Germany) . . . . . [9368-15]

9:00 am: **Manufacturability and optical functionality of multimode optical interconnections developed with fast processable and reliable polymer waveguide silicones**, Joe Liu, Allen Lee, Mike Hu, Lisa Chan, Sean Huang, Foxconn Electronics, Inc. (Taiwan); Brandon W. Swatowski, W. Ken Weidner, Joseph Han, Dow Corning Corp. (USA) . . . . . [9368-16]

9:20 am: **Optical coupling structure made by imprinting between single-mode polymer waveguide and embedded VCSEL**, Mikko Karppinen, Noora Salminen, Tia Korhonen, Teemu Alajoki, VTT Technical Research Ctr. of Finland (Finland); Erwin Bosman, Geert Van Steenberge, IMEC (Belgium); John Justice, Umar Khan, Brian Corbett, Tyndall National Institute (Ireland); Arjen Boersma, TNO (Netherlands) . . . . . [9368-17]

9:40 am: **Optical printed circuit board with vertical waveguide structure for high-speed data link and high-efficient optical coupling**, Sung Hwan Hwang, Woo-Jin Lee, Jong-Bae An, Nam-Won Moon, Gye Won Kim, Myoung Jin Kim, Eun Joo Jung, Korea Photonics Technology Institute (Korea, Republic of); Ki Young Jung, NewFlex Technology Co., Ltd. (Korea, Republic of); Ik-Bu Sohn, Gwangju Institute of Science and Technology (Korea, Republic of); Byung Sup Rho, Korea Photonics Technology Institute (Korea, Republic of) . . . . . [9368-18]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 5
LOCATION: ROOM 202 (MEZZANINE) . . . . . TUE 10:30 AM TO 12:10 PM

Optical Interconnect Devices and Modulators
Chair: **Michael R. Wang,** Univ. of Miami (USA)

10:30 am: **VCSEL scaling for very low bit energy** *(Invited Paper)*, Dennis Deppe, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Guowei Zhao, sdPhotonics, LLC (USA); Xu Yang, Mingxin Li, Yu Zhang, Sabine Freisem, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA). . . . . [9368-19]

11:00 am: **Broadband energy-efficient optical modulation by hybrid integration of silicon nanophotonics and organic electro-optic polymer**, Xingyu Zhang, The Univ. of Texas at Austin (USA); Amir Hosseini, Harish Subbaraman, Omega Optics, Inc. (USA); Jingdong Luo, Alex K. Y. Jen, Univ. of Washington (USA); Robert L. Nelson, Air Force Research Lab. (USA); Ray T. Chen, The Univ. of Texas at Austin (USA) . . . . . [9368-20]

11:20 am: **Hybrid titanium dioxide strip-line/electro-optic polymer waveguide optical modulators**, Shiyoshi Yokoyama, Feng Qiu, Andrew M. Spring, Kyushu Univ. (Japan) . . . . . [9368-21]

11:40 am: **Comb laser and ring modulator resonator based optical interconnects** *(Invited Paper)*, Jeremy Witzens, Juliana Müller, Johannes Hauck, Saeed Sharif Azadeh, Alvaro Mártir, Bin Shen, Sebastian Romero-García, Florian Merget, RWTH Aachen (Germany) . [9368-22]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 1:30 pm

SESSION 6
LOCATION: ROOM 202 (MEZZANINE) . . . . . TUE 1:30 PM TO 3:10 PM

Fiber Optics and Micro-Optics Integration
Chair: **Ian H. White,** Univ. of Cambridge (United Kingdom)

1:30 pm: **Equilibrium modal power distribution measurement of step-index hard plastic cladding and graded-index silica multimode fibers**, Ruichen Tao, Univ. College London (United Kingdom); Takehiro Hayashi, HAT Lab Inc. (Japan); Manabu Kagami, Toyota Central R&D Labs., Inc. (Japan); Shigeru Kobayashi, TE Connectivity Ltd. (Japan); Manabu Yasukawa, Synergy Optosystems Co., Ltd. (Japan); Hui Yang, David Robinson, Arden Photonics Ltd. (United Kingdom); Hadi Baghsiahi, F. Aníbal Fernández, David R. Selviah, Univ. College London (United Kingdom) . . . . . [9368-23]

1:50 pm: **Analytical predictive modeling in fiber optics structural analysis: review and extension**, Ephraim Suhir, ERS Co. (USA) . . . . . [9368-24]

2:10 pm: **Theoretical and empirical qualification of a mechanical-optical interface for parallel optics links**, Dirk Schoellner, Steven Chuang, Alan Ugolini, Jillcha Wakjira, Griffin Wolf, US Conec Ltd. (USA); Prashant Gandhi, Amphenol TCS (USA); Alex Persaud, Amphenol High Speed Products (USA) . . . . . [9368-25]

2:30 pm: **Polymeric demultiplexer component for wavelength division multiplex communication systems using polymer fibers**, Ulrich H. Fischer-Hirchert, Matthias Haupt, Sebastian Höll, Mladen Joncic, Hochschule Harz (Germany) . . . . . [9368-26]

2:50 pm: **Planar concave grating with flattened spectral response for wavelength demultiplexing optical interconnection**, Guomin Jiang, Sarfaraz Baig, Hui Lu, Kai Shen, Michael R. Wang, Univ. of Miami (USA) . . . . . [9368-27]

Coffee Break . . . . . Tue 3:10 pm to 3:40 pm

SESSION 7
LOCATION: ROOM 202 (MEZZANINE) . . . . . TUE 3:40 PM TO 5:20 PM

Optical Interconnect Systems
Chair: **Ray T. Chen,** The Univ. of Texas at Austin (USA)

3:40 pm: **Electrical interconnect scaling and the transition to optical**, Bryan K. Casper, Intel Corp. (USA) . . . . . [9368-28]

4:00 pm: **Towards energy-efficient photonic interconnects**, Yigit Demir, Nikos Hardavellas, Northwestern Univ. (USA). . . . . [9368-29]

4:20 pm: **Electro-optical backplane demonstrator with integrated multimode gradient-index thin glass waveguide panel**, Henning Schröder, Lars Brusberg, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); Richard Pitwon, Seagate Technology LLC (United Kingdom); Simon Whalley, ILFA Feinstleitertechnik GmbH (Germany); Kai Wang, Allen Miller, Seagate Technology LLC (United Kingdom); Christian Herbst, Technische Univ. Berlin (Germany); Daniel Weber, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); Klaus-Dieter Lang, Technische Univ. Berlin (Germany) . . . . . [9368-30]

4:40 pm: **8 Gb/s single-wavelength bi-directional PAM-16 SI-POF link using blue µLEDs and avalanche photodiodes**, Xin Li, Nikos Bamiedakis, Jinlong Wei, Univ. of Cambridge (United Kingdom); Jonathan D. McKendry, Enyuan Xie, Ricardo Ferreira, Erdan Gu, Martin D. Dawson, Univ. of Strathclyde (United Kingdom); Richard V. Penty, Ian H. White, Univ. of Cambridge (United Kingdom). . . . . [9368-31]

5:00 pm: **International standardisation of optical circuit board measurement and fabrication procedures**, Richard C. Pitwon, Seagate Technology LLC (United Kingdom); Marika Immonen, TTM Technologies, Inc. (Finland); Jinhua Wu, TTM Technologies, Inc. (China); Kai Wang, Seagate Technology LLC (United Kingdom); Long Xiu Zhu, Hui Juan Yan, TTM Technologies, Inc. (China) . . . . . [9368-32]

Wednesday 11 February

SESSION 8

LOCATION: ROOM 301 (ESPLANADE) . . . . . WED 8:00 AM TO 10:30 AM

NOTE ROOM CHANGE

PICs for Optical Interconnects

Joint Session with Conferences 9367 and 9368

Session Chairs: **Henning Schröder,** Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany); **Graham T. Reed,** Univ. of Southampton (United Kingdom)

8:00 am: **Imec ISIPP25G silicon photonics: a robust CMOS-based photonics technology platform**, Philippe P. Absil, IMEC (Belgium) . . . . . [9367-35]

8:20 am: **Optimization of beam expansion characteristics in a silicon planar guided-wave structure**, Siamak Abaslou, Robert Gatdula, Wei Jiang, Rutgers, The State Univ. of New Jersey (USA) . . . . . [9368-33]

8:40 am: **Design, fabrication, and characterisation of nano-imprinted single-mode waveguide structures for intra-chip optical communications**, John Justice, Umar Khan, Tyndall National Institute (Ireland); Tia Korhonen, VTT Technical Research Ctr. of Finland (Finland); Arjen Boersma, Sjoukje Wiegersma, TNO (Netherlands); Mikko Karppinen, VTT Technical Research Ctr. of Finland (Finland); Brian Corbett, Tyndall National Institute (Ireland) . . [9368-34]

9:00 am: **Mode-converting coupler for silicon-on-sapphire devices**, Sanja Zlatanovic, Space and Naval Warfare Systems Command (USA); Bruce W. Offord, Space and Naval Warfare Systems Ctr Pacific (USA); Randy L. Shimabukuro, Space and Naval Warfare Systems Command (USA); Everett W. Jacobs, Space and Naval Warfare Systems Ctr. Pacific (USA); Michael W. Owen, Defense Microelectronics Activity (USA). . . . . [9367-36]

9:20 am: **Topology-optimized silicon photonic wire mode-multiplexer**, Louise F. Frellsen, Technical Univ. of Denmark (Denmark); Lars H. Frandsen, Yunhong Ding, Technical Univ. of Denmark (Denmark) and DTU Fotonik (Denmark); Yuriy Elesin, Topsoe Fuel Cell (Denmark); Ole Sigmund, Technical Univ. of Denmark (Denmark); Kresten Yvind, Technical Univ. of Denmark (Denmark) and DTU Fotonik (Denmark). . . . . [9367-37]

9:40 am: **25 Gbps silicon photonics multi-mode fiber link with highly alignment tolerant vertically-illuminated germanium photodiode**, Tadashi Okumura, Yuki Wakayama, Yasunobu Matsuoka, Katsuya Oda, Misuzu Sagawa, Takashi Takemoto, Etsuko Nomoto, Hideo Arimoto, Shigehisa Tanaka, Hitachi, Ltd. (Japan) . . . . . [9367-38]

10:00 am: **Silicon-based tunable optical delay lines and switches for next-generation optical telecommunications** *(Invited Paper)*, Linjie Zhou, Shanghai Jiao Tong Univ. (China) . . . . . [9367-39]

Coffee Break . . . . . Wed 10:30 am to 11:00 am

SESSION 9

LOCATION: ROOM 301 (ESPLANADE) . . . . . WED 11:00 AM TO 12:50 PM

Device Coupling Approaches for Silicon Photonics Chips

Joint Session with Conferences 9367 and 9368

Session Chairs: **Graham T. Reed,** Univ. of Southampton (United Kingdom); **Henning Schröder,** Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany)

11:00 am: **Silicon photonic devices based on SOI/bulk-silicon platforms for chip-level optical interconnects** *(Invited Paper)*, Gyungock Kim, In Gyoo Kim, Sanghoon Kim, Jiho Joo, Ki-Seok Jang, Sun Ae Kim, Jin Hyuk Oh, Jeong-Woo Park, Myung-Joon Kwack, Jaegyu Park, Hyundai Park, Gun Sik Park, Sanggi Kim, Electronics and Telecommunications Research Institute (Korea, Republic of) . . . . . [9368-35]

11:30 am: **Symmetric cavity modes in parallel-coupled waveguides with tapered distributed Bragg reflectors**, Robert Gatdula, Siamak Abaslou, Wei Jiang, Rutgers, The State Univ. of New Jersey (USA) . . . . . [9368-36]

11:50 am: **Si-wire grating couplers for integrated optical transceivers based on single-mode fiber connection**, Yohei Sobu, Fujitsu Labs., Ltd. (Japan) and Photonics Electronics Technology Research Association (Japan); Seok–Hwan Jeong, Photonics Electronics Technology Research Association (Japan); Shigeaki Sekiguchi, Fujitsu Labs., Ltd. (Japan) and Photonics Electronics Technology Research Association (Japan); Yu Tanaka, Photonics Electronics Technology Research Association (Japan); Ken Morito, Fujitsu Labs., Ltd. (Japan) and Photonics Electronics Technology Research Association (Japan). . . . . [9367-40]

12:10 pm: **Low back-reflection CMOS-compatible grating coupler for perfectly vertical coupling**, George Dabos, Aristotle Univ. of Thessaloniki (Greece); Nikos Pleros, Aristotle Univ. of Thessaloniki (Greece) and Informatics and Telematics Institute,Centre for Research and Technology Hellas (Greece); Dimitris M. Tsiokos, Aristotle Univ. of Thessaloniki (Greece) and Informatics and Telematics Institute (Greece). . . . . [9367-41]

12:30 pm: **Mode conversion based on the acousto-optical interaction in hybrid photonic-phononic waveguide**, Guodong Chen, Ruiwen Zhang, Xiong Huang, Heng Xie, Ya Gao, Danqi Feng, Junqiang Sun, Huazhong Univ. of Science and Technology (China). . . . . [9367-42]

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Development and qualification of a mechanical-optical interface for parallel optics links, Dirk Schoellner, Steven Chuang, Alan Ugolini, Jillcha Wakjira, Griffin Wolf, US Conec Ltd. (USA). . . . . [9368-37]

Multiple-input multiple-output based high-density on-chip optical interconnect, Po-Kuan Shen, National Central Univ. (Taiwan); Xiaochuan Xu, Amir Hosseini, Omega Optics, Inc. (USA); Zeyu Pan, Ray T. T. Chen, The Univ. of Texas at Austin (USA) . . . . . [9368-38]

CONFERENCE 9369
LOCATION: ROOM 226 (MEZZANINE)

Wednesday–Thursday 11–12 February 2015 • Proceedings of SPIE Vol. 9369

Photonic Instrumentation Engineering II

Conference Chairs: **Yakov G. Soskind,** DHPC Technologies (USA); **Craig Olson,** L-3 Communications (USA)

Program Committee: **James B. Breckinridge,** California Institute of Technology (USA); **Lynda E. Busse,** U.S. Naval Research Lab. (USA); **James T. A. Carriere,** Ondax, Inc. (USA); **John D. Corless,** Verity Instruments, Inc. (USA); **David G. Fischer,** NASA Glenn Research Ctr. (USA); **Filipp V. Ignatovich,** Lumetrics, Inc. (USA); **Jacob B. Khurgin,** Johns Hopkins Univ. (USA); **Antti Johannes Makinen,** U.S. Naval Research Lab. (USA); **Nada A. O'Brien,** JDSU (USA); **Alain Villeneuve,** Genia Photonics Inc. (Canada)

Wednesday 11 February

SESSION 1

LOCATION: ROOM 226 (MEZZANINE) . . . . . WED 8:30 AM TO 10:00 AM

Photonic Instrumentation Design I

Chair: **Yakov G. Soskind,** DHPC Technologies (USA)

8:30 am: **Terahertz octave-spanning semiconductor laser for comb applications** *(Invited Paper)*, Giacomo Scalari, Markus Roesch, Mattias Beck, Jérôme Faist, ETH Zürich (Switzerland) . . . . . [9369-1]

9:00 am: **The spatially-heterodyned spectrometer: an ideal tool for Raman work?**, Christopher N. Pannell, Bill G. Zhang, Gooch & Housego, Orlando (USA); Murray K. Reed, Gooch & Housego (Torquay) Ltd. (United Kingdom) . . . . . [9369-2]

9:20 am: **A compact LIBS system for industrial applications**, Bertrand Noharet, Acreo Swedish ICT AB (Sweden); Tania Irebo, Jonas Gurell, Rein Vainik, Swerea KIMAB (Sweden); Håkan Karlsson, Elizabeth K. Illy, Cobolt AB (Sweden) . . . . . [9369-3]

9:40 am: **Hartmannometer vs Fizeau interferometer: advantages and drawbacks**, Alexander N. Nikitin, Alexis V. Kudryashov, Julia Sheldakova, Active Optics Night N Ltd. (Russian Federation); Dmitrii Denisov, Valerii Karasik, Alexey Sakharov, Bauman Moscow State Technical Univ. (Russian Federation) . . . . . [9369-5]

Coffee Break . . . . . .Wed 10:00 am to 10:30 am

SESSION 2

LOCATION: ROOM 226 (MEZZANINE) . . . . . WED 10:30 AM TO 12:10 PM

Photonic Instrumentation Design II

Chair: **James T. A. Carriere,** Ondax, Inc. (USA)

10:30 am: **A high-performance passband-agile hyperspectral imager using a large aperture acousto-optic tuneable filter**, Christopher N. Pannell, Gooch & Housego, Orlando (United Kingdom); Jon D. Ward, Gooch & Housego plc (United Kingdom); Elliot S. Wachman, ChromoDynamics Inc. (USA); Bill G. Zhang, Gooch & Housego, Orlando (USA); Murray K. Reed, Gooch & Housego (Torquay) Ltd. (United Kingdom) . . . . . [9369-6]

10:50 am: **Planarized fiber-FHD optical composite**, Christopher Holmes, Lewis G. Carpenter, James C. Gates, Corin B. E. Gawith, Peter G. R. Smith, Univ. of Southampton (United Kingdom) . . . . . [9369-7]

11:10 am: **Surface plasmon polariton generation using acousto-optic effect in fiber**, Hao Li, Ying Zhang, Singapore Institute of Manufacturing Technology (Singapore); Wei Tao Yang, Nanyang Technological Univ. (Singapore) . . [9369-8]

11:30 am: **Interferometric characterization of few-mode fibers for mode-division multiplexing**, Olena Muliar, Mario A. Usuga Castaneda, Jesper Lægsgaard, Karsten Rottwitt, DTU Fotonik (Denmark) . . . . . [9369-9]

11:50 am: **Quantum tunneling photoacoustic spectroscopy for the characterization of thin films**, Benjamin S. Goldschmidt, Univ. of Missouri-Columbia (USA); Anna M. Rudy, Swarnasri Mandal, Charissa A. Nowak, Univ. of Missouri, Columbia (USA); John A. Viator, Duquesne Univ. (USA); Heather K. Hunt, Univ. of Missouri-Columbia (USA) . . . . . [9369-10]

Lunch/Exhibition Break . . . . . .Wed 12:10 pm to 1:40 pm

SESSION 3

LOCATION: ROOM 226 (MEZZANINE) . . . . . WED 1:40 PM TO 3:05 PM

Sensors and Ruggedized Systems I

Chair: **Nada A. O'Brien,** JDSU (USA)

1:40 pm: **Plasmonic-enhanced sensors: figures of merit and practical limitations** *(Keynote Presentation)*, Jacob B. Khurgin, Johns Hopkins Univ. (USA) . . . . . [9369-11]

2:25 pm: **Realization of high-sensitivity surface plasmon resonance (SPR) sensor applying 2ω harmonic lock-in detection**, Chang-In Park, Kwang-Jin Kim, Chang-Gun Kim, Nam-Pyo Hong, Young-Wan Choi, Chung-Ang Univ. (Korea, Republic of) . . . . . [9369-12]

2:45 pm: **A fuel level sensor for aeronautical applications**, Romeo Bernini, Luigi Petrazzuoli, Gianluca Persichetti, Immacolata A. Grimaldi, Genni Testa, Giovanni Onorato, Istituto per il Rilevamento Elettromagnetico dell'Ambiente (Italy) . . . . . [9369-15]

Coffee Break . . . . . .Wed 3:05 pm to 3:40 pm

SESSION 4

LOCATION: ROOM 226 (MEZZANINE) . . . . . WED 3:40 PM TO 5:20 PM

Sensors and Ruggedized Systems II

Chair: **Filipp V. Ignatovich,** Lumetrics, Inc. (USA)

3:40 pm: **Detection of carbon monoxide based on an asymmetric microfiber with a Rhodium complex overlay**, Min-Seok Yoon, Young-Geun Han, Hanyang Univ. (Korea, Republic of) . . . . . [9369-14]

4:00 pm: **Surface plasmon resonance based fiber optic ammonia gas sensor using Ag/ZnO thin films**, Banshi D. Gupta, Sruthi P. Usha, Satyendra K. Mishra, Indian Institute of Technology Delhi (India). . . . . [9369-16]

4:20 pm: **Localized surface-plasmon-resonance-based fiber-optic chlorine gas sensor using zinc-oxide nanoparticles**, Sruthi P. Usha, Satyendra K. Mishra, Banshi D. Gupta, Indian Institute of Technology Delhi (India) . . [9369-17]

4:40 pm: **Detection of melamine using a molecular-imprinted surface-plasmon-resonance-based optical fiber sensor**, Anand M. Shrivastav, Satyendra K. Mishra, Banshi D. Gupta, Indian Institute of Technology Delhi (India). . . . . [9369-18]

5:00 pm: **High spatial resolution distributed optical fiber magnetic field sensor based on magnetostriction by optical frequency-domain reflectometry**, Yang Du, Tiegen Liu, Zhenyang Ding, Bowen Feng, Kun Liu, Junfeng Jiang, Tianjin Univ. (China) . . . . . [9369-13]

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Optical accelerometer design based on laser self-mixing interference, Ying Yang, Tianjin Univ. of Science and Technology (China); Xingfei Li, Ke Kou, Tianjin Univ. (China) . . . . . [9369-28]

Miniaturized fiber inline Fabry-Perot interferometer based on fiber optic ferrule for refractive index measurement, Eun Joo Jung, Woo-Jin Lee, Myoung Jin Kim, Sung Hwan Hwang, Byung Sup Rho, Korea Photonics Technology Institute (Korea, Republic of) . . . . . [9369-29]

Thickness measurement of thin film using wavelength-tuning interferometer, Yangjin Kim, The Univ. of Tokyo (Japan); Kenichi Hibino, National Institute of Advanced Industrial Science and Technology (Japan); Naohiko Sugita, Mamoru Mitsuishi, The Univ. of Tokyo (Japan) . . . . . [9369-30]

A new real-time polarimetric method for determining the distribution of stressed state in different constructions, George Kakauridze, Barbara N. Kilosanidze, Institute of Cybernetics (Georgia); Teimuraz Kvernadze, Georgi Kurkhuli, E. Kharadze Abastumani Astrophysical Observatory (Georgia) . . . . . [9369-31]

Optimizing experimental conditions for stimulated emission depletion microscopy in biophotonics, Karl Beeson, Mary J. Potasek, Evgueni Parilov, Simphotek Inc. (USA) . . . . . [9369-32]

Triple-illumination phase imaging, Behnam Tayebi, Yonsei Univ. (Korea, Republic of); Farnaz Sharif, Yonsei Univ. (Korea, Republic of) . . . . . [9369-33]

Apparatus for analyzing the spectral characteristics of reflection, albedo, and color parameters of flat objects, Elena V. Gorbunova, Aleksandr N. Chertov, Vladimir S. Peretyagin, Elena Lastovskaia, Valery V. Korotaev, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9369-34]

The possibilities analysis of the optical non-invasive diagnostics method for the blood sugar control, Elena A. Lastovskaia, Elena V. Gorbunova, Aleksandr N. Chertov, Valery V. Korotaev, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) [9369-35]

Research of principles for estimating the freshness of meat products by color analysis method, Aleksandr N. Chertov, Elena V. Gorbunova, Daria B. Petukhova, Artem A. Alekhin, Valery V. Korotaev, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9369-36]

Thursday 12 February

SESSION 5

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . THU 8:00 AM TO 10:30 AM

NOTE ROOM CHANGE

Structured Light in Photonics Instrumentation

Joint Session with Conferences 9369 and 9379

Chairs: Y**akov G. Soskind,** DHPC Technologies (USA); **Enrique J. Galvez,** Colgate Univ. (USA)

8:00 am: **Structured light from lasers by dynamic and geometric phase control** *(Invited Paper)*, Andrew Forbes, CSIR National Laser Ctr. (South Africa) . . . . . [9369-19]

8:30 am: **Synthesis and characterization of complex partially-coherent beams** *(Invited Paper)*, Tatiana Alieva, Alejandro Cámara, José A. Rodrigo, Univ. Complutense de Madrid (Spain) . . . . . [9369-20]

9:00 am: **Formation of propagation-invariant laser beams with anamorphic optical systems** *(Invited Paper)*, Yakov G. Soskind, DHPC Technologies (USA) . . . . . [9369-21]

9:30 am: **Mode-division multiplexing using the basis of vector modes over free space and optical fibers**, Giovanni Milione, The City College of New York (USA); Martin P. J. Lavery, Univ. of Glasgow (United Kingdom); Hao Huang, Yongxiong Ren, Yan Yan, The Univ. of Southern California (USA); Ebrahim Karimi, Univ. of Ottawa (Canada); Thien An Nguyen, The City College of New York (USA); Ming-Jun Li, Dan A. Nolan, Corning Incorporated (USA); Robert R. Alfano, The City College of New York (USA); Alan E. Willner, The Univ. of Southern California (USA) . . . . . [9379-18]

9:50 am: **Optical vortex position detection with a Shack-Hartmann wavefront sensor using extended closed-contour**, Hongxin Huang, Hamamatsu Photonics K.K. (Japan); Jia Luo, Zhejiang Univ. (China); Yoshinori Matsui, Haruyoshi Toyota, Takashi Inoue, Hamamatsu Photonics K.K. (Japan) . . . . . [9379-19]

10:10 am: **Characterization of OAM carrying beams by means of holographic correlation filters**, Robert Brüning, Christian Schulze, Daniel Flamm, Friedrich-Schiller-Univ. Jena (Germany); Andrew Forbes, CSIR National Laser Ctr. (South Africa); Michael Duparré, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9379-20]

Coffee Break . . . . . Thu 10:30 am to 11:00 am

SESSION 6

LOCATION: ROOM 226 (MEZZANINE) . . . . . THU 11:00 AM TO 12:50 PM

Metrology and Applications of Photonic Instruments

Chair: **Craig Olson,** L-3 Communications (USA)

11:00 am: **Thermal signature identification system (TheSIS): a spread spectrum temperature cycling method** *(Invited Paper)*, Scott Merritt, NASA Goddard Space Flight Ctr. (USA) . . . . . [9369-22]

11:30 am: **Measurement of polarization assemblies for the Daniel K. Inouye Solar Telescope**, William H. Schubert, Erika Petrak, Thomas G. Baur, Meadowlark Optics, Inc. (USA) . . . . . [9369-23]

11:50 am: **Ellipsometry-like analysis of polarization state for latent flaws using stress-induced light scattering method**, Yoshitaro Sakata, Kazufumi Sakai, Kazuhiro Nonaka, National Institute of Advanced Industrial Science and Technology (Japan) . . . . . [9369-24]

12:10 pm: **In-line temperature-insensitive refractometer based on a thin core fiber in-line Mach-Zehnder interferometer**, Jung-Koo Kim, Min-Seok Yoon, Young-Guen Han, Hanyang Univ. (Korea, Republic of) [9369-25]

12:30 pm: **Time-to-digital converter card for multichannel time-resolved single-photon counting applications**, Davide Tamborini, Davide Portaluppi, Politecnico di Milano (Italy); Simone Tisa, Micro Photon Devices S.r.l. (Italy); Alberto Tosi, Politecnico di Milano (Italy) . . . . . [9369-26]

CONFERENCE 9370
LOCATION: ROOM 124 (EXHIBIT LEVEL)

Sunday–Thursday 8–12 February 2015 • Proceedings of SPIE Vol. 9370

Quantum Sensing and Nanophotonic Devices XII

Conference Chair: **Manijeh Razeghi,** Northwestern Univ. (USA)

Conference Co-Chairs: **Eric Tournié,** Univ. Montpellier 2 (France); **Gail J. Brown,** Air Force Research Lab. (USA)

Program Committee: **Jong Hyeob Baek,** Korea Photonics Technology Institute (Korea, Republic of); **Can Bayram,** Univ. of Illinois at Urbana-Champaign (USA); **David A. Cardimona,** Air Force Research Lab. (USA); **Jérôme Faist,** ETH Zürich (Switzerland); **Siamak Forouhar,** Jet Propulsion Lab. (USA); **Michael D. Gerhold,** U.S. Army Research Office (USA); **Frédéric Grillot,** Télécom ParisTech (France); **Yasar Gurbuz,** Sabanci Univ. (Turkey); **Sven Höfling,** Univ. of St. Andrews (United Kingdom); **Jean-Pierre Huignard,** Jphopto (France); **Woo-Gwang Jung,** Kookmin Univ. (Korea, Republic of); **Tsukuru Katsuyama,** Sumitomo Electric Industries, Ltd. (Japan); **Jean F. Kelly,** Pacific Northwest National Lab. (USA); **Michel Krakowski,** Thales Research & Technology (France); **Kwok Keung Law,** Naval Air Warfare Ctr. Weapons Div. (USA); **Giuseppe Leo,** Univ. Paris 7-Denis Diderot (France); **Amy W. K. Liu,** IQE Inc. (USA); **Jerry R. Meyer,** U.S. Naval Research Lab. (USA); **Maya Mikhaliova,** Ioffe Physico-Technical Institute (Russian Federation); **Jan Misiewicz,** Wroclaw Univ. of Technology (Poland); **Oleg Mitrofanov,** Univ. College London (United Kingdom); **Ekmel Özbay,** Bilkent Univ. (Turkey); **Dimitris Pavlidis,** Boston Univ. (USA); **Mark C. Phillips,** Pacific Northwest National Lab. (USA); **Divyang Shah,** National Reconnaissance Office (USA); **Carlo Sirtori,** Univ. Paris 7-Denis Diderot (France); **Marija Strojnik Scholl,** Ctr. de Investigaciones en Óptica, A.C. (Mexico); **Meimei Tidrow,** U.S. Army Night Vision & Electronic Sensors Directorate (USA); **Alberto Tosi,** Politecnico di Milano (Italy); **Alessandro Tredicucci,** Lab. NEST (Italy); **Sheng Wu,** California Institute of Technology (USA); **Rui Q. Yang,** The Univ. of Oklahoma (USA); **John M. Zavada,** National Science Foundation (USA)

Sunday 8 February

SESSION 1
LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . SUN 8:30 AM TO 9:00 AM

Keynote Session
Session Chair: **Gail J. Brown,** Air Force Research Lab. (USA)

8:30 am: **Plasmonic terahertz optoelectronics** *(Keynote Presentation)*, Mona Jarrahi, Univ. of California, Los Angeles (USA) . . . . . [9370-1]

SESSION 2
LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . SUN 9:00 AM TO 10:35 AM

IR Emitters and Near-field Characterization
Session Chairs: **Meimei Tidrow,**
U.S. Army Night Vision & Electronic Sensors Directorate (USA);
Andrea Fiore, Technische Univ. Eindhoven (Netherlands)

9:00 am: **Superradiant optoelectronic devices** *(Invited Paper)*, Yanko Todorov, Thibault Laurent, Angela Vasanelli, Univ. Paris 7-Denis Diderot (France); Isabelle Sagnes, Lab. de Photonique et de Nanostructures (France); Carlo Sirtori, Univ. Paris 7-Denis Diderot (France) . . . . . [9370-2]

9:20 am: **Metallic metasurface as a directional and monochromatic thermal emitter** *(Invited Paper)*, François Marquier, Daniele Costantini, Institut d'Optique Graduate School (France); Anthony Lefebvre, CEA-LETI (France); Anne-Lise Coutrot, Ioana Moldovan-Doyen, Jean-Paul Hugonin, Institut d'Optique Graduate School (France); Salim Boutami, CEA-LETI (France); Henri Benisty, Jean-Jacques Greffet, Institut d'Optique Graduate School (France) . . . . [9370-3]

9:40 am: **Magnetic dipole and electric dipole resonances in TiO_2 microspheres at terahertz frequencies**, Oleg Mitrofanov, Univ. College London (United Kingdom); Filip Domenic, Petr Kuzel, Institute of Physics of the ASCR, v.v.i. (Czech Republic); John Reno, Igal Brener, Sandia National Labs. (USA); Seu Chung, Cathy Elissald, Mario Maglione, Institut de Chimie de la Matière Condensée de Bordeaux (France); Patrick Mounaix, Univ. Bordeaux 1 (France) . . . . . [9370-4]

9:55 am: **Sub-wavelength infrared investigations of complex metallic surfaces and doped semiconductors** *(Invited Paper)*, Yannick De Wilde, Institut Langevin (France) . . . . . [9370-5]

10:15 am: **Characterization techniques for semiconductors and nanostructures: a review of recent advances** *(Invited Paper)*, Olivier Acher, HORIBA Jobin Yvon S.A.S. (France) . . . . . [9370-6]

Coffee Break . . . . . Sun 10:35 am to 11:00 am

SESSION 3
LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . SUN 11:00 AM TO 12:35 PM

THz Sources
Session Chairs: **Pascale Senellart,**
Lab. de Photonique et de Nanostructures (France);
Miriam S. Vitiello, Consiglio Nazionale delle Ricerche (Italy)

11:00 am: **Optically-pumped continuous-wave terahertz sources** *(Invited Paper)*, Philipp Latzel, Univ. des Sciences et Technologies de Lille (France) and Institut d'Electronique de Microélectronique et de Nanotechnologie (France); Fabio Pavanello, Emilien Peytavit, Mohammed Zaknoune, Institut d'Electronique de Microélectronique et de Nanotechnologie (France) and Univ. des Sciences et Technologies de Lille (France); Guillaume Ducournau, Xavier Wallart, Jean-François Lampin, Univ. des Sciences et Technologies de Lille (France) and Institut d'Electronique de Microélectronique et de Nanotechnologie (France) . . . . . [9370-7]

11:20 am: **Opening new territory in THz using coherent synchrotron radiation** *(Invited Paper)*, Pascale Roy, Synchrotron SOLEIL (France). . . [9370-8]

11:40 am: **THz quantum cascade lasers based on a hyperuniform disordered design** *(Invited Paper)*, Riccardo Degl'Innocenti, Yash D. Shah, Univ. of Cambridge (United Kingdom); Luca Masini, Istituto Nanoscienze, CNR (Italy) and Scuola Normale Superiore (Italy); Alberto Ronzani, Istituto Nanoscienze, CNR (Italy) and Scuola Normale Superiore (Italy); Alessandro Pitanti, Istituto Nanoscienze, CNR and Scuola Normale Superiore (Italy); Yuan Ren, David S. Jessop, Univ. of Cambridge (United Kingdom); Alessandro Tredicucci, Univ. di Pisa (Italy); Harvey E. Beere, David A. Ritchie, Univ. of Cambridge (United Kingdom) . . . . . [9370-9]

12:00 pm: **Uni-travelling carrier photodetectors as THz detectors and emitters**, Cyril C. Renaud, Martyn J. Fice, Lalitha Ponnampalam, Michele Natrella, Chris Graham, Alwyn J. Seeds, Univ. College London (United Kingdom) . . . . . [9370-10]

12:15 pm: **THz generation by optical rectification in graphene at room temperature: beyond the linear carrier dispersion** *(Invited Paper)*, Juliette Mangeney, Jean Maysonnave, Simon Huppert, Feihu Wang, Simon Maëro, Ecole Normale Supérieure (France); Claire Berger, Walter A. de Heer, Georgia Institute of Technology (USA); Theodore B. Norris, Univ. of Michigan (USA); Louis-Anne de Vaulchier, Sukhdeep S. Dhillon, Jérôme Tignon, Robson Ferreira, Ecole Normale Supérieure (France). . . . . [9370-11]

Lunch Break . . . . . Sun 12:35 pm to 1:45 pm

SESSION 4

LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . SUN 1:45 PM TO 3:00 PM

Mid-IR QCL Structures

Session Chairs: **Jerry R. Meyer,** U.S. Naval Research Lab. (USA); **Christian Grillet,** Ecole Centrale de Lyon (France)

1:45 pm: **Hydride vapour phase epitaxy assisted buried heterostructure quantum cascade lasers for sensing applications** *(Invited Paper)*, Sebastian Lourdudoss, Wondwosen Metaferia, KTH Royal Institute of Technology (Sweden); Carl Junesand, KTH Royal Institute of Technology (Sweden) and Epiclarus AB (Sweden); Balaji Manavaimaran, KTH Royal Institute of Technology (Sweden); Simon Ferré, Bouzid Simozrag, Matheiu Carras, Alcatel-Thales III-V Lab. (France); Romain Peretti, Valeria Liverini, Mattias Beck, Jérôme Faist, ETH Zürich (Switzerland) . . . . . [9370-12]

2:05 pm: **Quantum-cascade-laser active regions on metamorphic buffer layers** *(Invited Paper)*, Luke J. Mawst, Ayushi Rajeev, Jeremy D. Kirch, Tae Wan Kim, Dan Botez, Brian Zutter, Phillip Buelow, Kevin Schulte, Thomas F. Kuech, Adam Wood, Susan E. Babcock, Univ. of Wisconsin-Madison (USA); Thomas Earles, Intraband, LLC (USA). . . . . [9370-13]

2:25 pm: **Low-power-consumption quantum cascade lasers**, Tsukuru Katsuyama, Jun-ichi Hashimoto, Hiroyuki Yoshinaga, Hiroki Mori, Yukihiro Tsuji, Makoto Murata, Mitsuru Ekawa, Toshiyuki Tanahashi, Sumitomo Electric Industries, Ltd. (Japan) . . . . . [9370-14]

2:40 pm: **Novel techniques for electrical tuning in quantum cascade lasers** *(Invited Paper)*, Alfredo Bismuto, Yves Bidaux, Camille Tardy, Stéphane Blaser, Romain Terazzi, Tobias Gresch, Antoine Müller, Alpes Lasers SA (Switzerland) . . . . . [9370-15]

Coffee Break . . . . . Sun 3:00 pm to 3:30 pm

SESSION 5

LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . SUN 3:30 PM TO 4:50 PM

IR Photodetector Materials

Session Chair: **Martin Kamp,** Julius-Maximilians-Univ. Würzburg (Germany

3:30 pm: **Impact of MBE deposition conditions on InAs/GaInSb superlattices for very long wavelength infrared detection**, Gail J. Brown, Heather J. Haugan, Krishnamurthy Mahalingam, Lawrence Grazulis, Air Force Research Lab. (USA); Said Elhamri, Univ. of Dayton (USA) . . . . . [9370-16]

3:45 pm: **Progress in development of direct bandgap III-V LWIR detectors**, Stefan P. Svensson, Wendy L. Sarney, Harry S. Hier, U.S. Army Research Lab. (USA); Ding Wang, Dimitri Donetsky, Gela Kipshidze, Leon Shterengas, Youxi Lin, Gregory Belenky, Stony Brook Univ. (USA) . . . . . [9370-17]

4:00 pm: **Temperature dependent carrier lifetime measurements of InAs/InAsSb T_2SLs**, Yigit Aytac, The Univ. of Iowa (USA); Benjamin V. Olson, Jin K. Kim, Eric A. Shaner, Sam D. Hawkins, John F. Klem, Sandia National Labs. (USA); Michael E. Flatté, Thomas F. Boggess, The Univ. of Iowa (USA) . . . . . [9370-18]

4:15 pm: **Ideal performance of and defect-assisted carrier recombination in MWIR and LWIR InAs/InAsSb superlattice detectors**, Michael E. Flatté, The Univ. of Iowa (USA); Christoph H. Grein, Univ. of Illinois at Chicago (USA) . . . . . [9370-19]

4:30 pm: **Magnetotransport potentials for anisotropic thin films with stripline and ground plane contacts** *(Invited Paper)*, Yang Tang, Matthew Grayson, Northwestern Univ. (USA). . . . . [9370-20]

SESSION 6

LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . SUN 4:50 PM TO 5:55 PM

Sb-based IR Photodetectors

Session Chairs: **Philippe Christol,** Institut d'Electronique du Sud (France); **Gary W. Wicks,** Univ. of Rochester (USA)

4:50 pm: **MWIR InSb detector with nBn architecture for high operating temperature**, Jean-Philippe Perez, IES Institut d Electronique et des Systèmes (France); Axel Evirgen, Johan Abautret, Philippe Christol, IES Institut d'Electronique et des Systèmes (France); Arnaud Cordat, Alexandru Nedelcu, SOFRADIR (France). . . . . [9370-22]

5:05 pm: **MTF performance: measurements, modelisation, and optimization for Sofradir II-VI IR photodetectors**, Jocelyn Berthoz, Laurent Rubaldo, Magalie Maillard, Rachid Taalat, Romain Grille, Nicolas Péré-Laperne, Alexandre Kerlain, SOFRADIR (France); Olivier Gravrand, CEA-LETI (France); Alexandre Ferron, CEA - LETI (France) . . . . . [9370-23]

5:20 pm: **New development of the Sb-based III-V infrared detector material** *(Invited Paper)*, Meimei Tidrow, U.S. Army Night Vision & Electronic Sensors Directorate (USA). . . . . [9370-24]

5:40 pm: **Room temperature performance of mid-wavelength infrared InAsSb nBn detectors**, Alexander Soibel, Cory J. Hill, Sam A. Keo, Linda Hoglund, David Z. Ting, Sarath D. Gunapala, Jet Propulsion Lab. (USA) . . . . . [9370-21]

Monday 9 February

OPTO PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA). . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA). . . . . [9371-202]

Coffee Break . . . . . Mon 10:10 am to 10:30 am

SESSION 7

LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . MON 10:30 AM TO 12:05 PM

Optomechanics/Micro-Resonators

Session Chairs: **Giuseppe Leo,** Univ. Paris 7-Denis Diderot (France); **Quentin C. Glorieux,** National Institute of Standards and Technology (USA)

10:30 am: **High-frequency gallium arsenide nano-optomechanical systems** *(Invited Paper)*, Ivan Favero, William Hease, Biswarup Guha, Dac Trung Nguyen, Eduardo Gil Santos, Univ. Paris 7-Denis Diderot (France); Pascale Senellart, Aristide Lemaitre, Lab. de Photonique et de Nanostructures (France); Sara Ducci, Giuseppe Leo, Univ. Paris 7-Denis Diderot (France) . . . . . [9370-25]

10:50 am: **Chaotic behaviour of photonic crystals resonators** *(Invited Paper)*, Andrea Di Falco, Univ. of St. Andrews (United Kingdom); Changxu Liu, King Abdullah Univ. of Science and Technology (Saudi Arabia); Thomas F. Krauss, The Univ. of York (United Kingdom); Andrea Fratalocchi, King Abdullah Univ. of Science and Technology (Saudi Arabia) . . . . . [9370-26]

11:10 am: **Solitons and coherent dispersive wave emission in SiN microresonators** *(Invited Paper)*, Victor Brasch, Tobias Herr, Michael Geiselmann, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Michael L. Gorodetsky, Lomonosov Moscow State Univ. (Russian Federation); Tobias J. Kippenberg, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9370-27]

11:30 am: **Converting mid-infrared signals to near-infrared through optomechanical transduction**, Alexandros Kapsalis, Charis Mesaritakis, National and Kapodistrian Univ. of Athens (Greece); Adonis Bogris, Technological Educational Institute of Athens (Greece); Dimitris Syvridis, National and Kapodistrian Univ. of Athens (Greece) . . . . . [9370-28]

11:45 am: **Electric and magnetic dipoles in the Lorentz and Einstein-Laub formulations of classical electrodynamics** *(Invited Paper)*, Masud Mansuripur, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9370-29]

Lunch Break . . . . . Mon 12:05 pm to 1:40 pm

CONFERENCE 9370
LOCATION: ROOM 124 (EXHIBIT LEVEL)

SESSION 8
LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . .MON 1:40 PM TO 3:15 PM

IR Sensing

Session Chairs: **Joachim Wagner,** Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); **Francesco De Angelis,** Istituto Italiano di Tecnologia (Italy)

1:40 pm: **Quantum cascade laser-based sensor system for nitric oxide detection** *(Invited Paper)*, Frank K. Tittel, J. J. Allred, Yingchun Cao, Nancy Sanchez, Rice Univ. (USA); Wei Ren, Chinese Univ. of Hong Kong (Hong Kong, China); Wenzhe Jiang, D. Jiang, Robert Griffin, Rice Univ. (USA) . . . . . [9370-30]

2:00 pm: **Quantum cascade laser-based multipass absorption system for hydrogen peroxide detection**, Yingchun Cao, Nancy Sanchez, Wenzhe Jiang, Rice Univ. (USA); Wei Ren, Chinese Univ. of Hong Kong (Hong Kong, China); Rafal Lewicki, D. Jiang, Robert Griffin, Frank K. Tittel, Rice Univ. (USA) [9370-32]

2:15 pm: **New approaches in quartz-enhanced photoacoustic sensing**, Angelo Sampaolo, Univ. degli Studi di Bari Aldo Moro (Italy) and Rice Univ. (USA); Pietro Patimisco, Riccardo Pennetta, Gaetano Scamarcio, Univ. degli Studi di Bari Aldo Moro (Italy); Frank K. Tittel, Rice Univ. (USA); Vincenzo Spagnolo, Univ. degli Studi di Bari Aldo Moro (Italy) . . . . . [9370-33]

2:30 pm: **Quartz-enhanced photoacoustic sensors for H_2S trace gas detection**, Vincenzo Spagnolo, Politecnico di Bari (Italy) and CNR-Istituto di Fotonica e Nanotecnologie (Italy); Pietro Patimisco, Angelo Sampaolo, Univ. degli Studi di Bari Aldo Moro (Italy) and CNR-Istituto di Fotonica e Nanotecnologie (Italy); Riccardo Pennetta, Univ. degli Studi di Bari (Italy); Mario Siciliani de Cumis, Istituto Nazionale di Ottica (Italy) and European Lab. for Nonlinear Spectroscopy (Italy); Silvia Viciani, Simone Borri, Paolo De Natale, Istituto Nazionale di Ottica (Italy) and European Lab. for Nonlinear Spectroscopy (Italy); Francesco D'Amato, Istituto Nazionale di Ottica (Italy); Miriam S. Vitiello, Consiglio Nazionale delle Ricerche (Italy); Gaetano Scamarcio, Univ. degli Studi di Bari Aldo Moro (Italy) and CNR-Istituto di Fotonica e Nanotecnologie (Italy) . . . . . [9370-34]

2:45 pm: **Use of external cavity quantum cascade laser compliance voltage in real-time trace gas sensing of multiple chemicals**, Mark C. Phillips, Matthew S. Taubman, Pacific Northwest National Lab. (USA); Jason M. Kriesel, Opto-Knowledge Systems, Inc. (USA) . . . . . [9370-35]

3:00 pm: **Field test results of compound specific isotope analyzer based on quantum cascade lasers and hollow waveguide**, Sheng Wu, Andrei Deev, California Institute of Technology (USA) . . . . . [9370-36]

Coffee Break . . . . . .Mon 3:15 pm to 3:45 pm

SESSION 9
LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . MON 3:45 PM TO 5:30 PM

QCLs and Applications I

Session Chairs: **Paolo De Natale,** Istituto Nazionale di Ottica (Italy); **Paul M. Petersen,** Technical Univ. of Denmark (Denmark)

3:45 pm: **Quantum cascade laser stabilization at sub-Hz-level by use of a frequency comb and an optical link** *(Invited Paper)*, Bérengère Argence, Bruno Chanteau, Univ. Paris 13 (France); Olivier Lopez, Univ. Paris 13 (France) and Ctr. National de la Recherche Scientifique (France); Daniele Nicolodi, Michel Abgrall, Lab. National de Metrologie et d'Essais (France); Christian Chardonnet, Univ. Paris 13 (France) and Ctr. National de la Recherche Scientifique (France); Christophe Daussy, Univ. Paris 13 (France); Benoit Darquie, Univ. Paris 13 (France) and Ctr. National de la Recherche Scientifique (France); Yann Le Coq, Lab. National de Metrologie et d'Essais (France); Anne Amy-Klein, Univ. Paris 13 (France) . . . . . [9370-37]

4:05 pm: **Widely tunable quantum cascade lasers for spectroscopic sensing** *(Invited Paper)*, Joachim Wagner, Ralf Ostendorf, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Jan Grahmann, André Merten, Fraunhofer Institute for Photonic Microsystems (Germany); Stefan Hugger, Jan Philip Jarvis, Frank Fuchs, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Dusan Boskovic, Fraunhofer Institute for Chemical Technology (Germany); Harald Schenk, Fraunhofer Institute for Photonic Microsystems (Germany). . . . . [9370-38]

4:25 pm: **Quantum cascade lasers with optical feedback: regular multimode dynamics** *(Invited Paper)*, Lorenzo L. Columbo, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Politecnico di Bari (Italy); Massimo Brambilla, CNR-IFN UOS Bari (Italy) and Politecnico di Bari (Italy); Francesco P. Mezzapesa, Maurizio Dabbicco, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Politecnico di Bari (Italy); Gaetano Scamarcio, CNR-IFN UOS Bari (Italy) and Politecnico di Bari (Italy) . . . . . [9370-39]

4:45 pm: **Nonlinear dynamics of quantum cascade lasers with optical feedback**, Louise Jumpertz, Télécom ParisTech (France) and III-V Lab. (France); Simon Ferré, III-V Lab. (France); Kevin Schires, Télécom ParisTech (France); Mathieu Carras, III-V Lab. (France); Frédéric Grillot, Télécom ParisTech (France) . . . . . [9370-40]

5:00 pm: **Nonlinear frequency mixing in QCL-based interferometry: beyond the intrinsic resolution**, Francesco P. Mezzapesa, Lorenzo L. Columbo, Massimo Brambilla, Maurizio Dabbicco, Gaetano Scamarcio, Politecnico di Bari (Italy) and CNR-Istituto di Fotonica e Nanotecnologie (Italy) . . . . . [9370-41]

5:15 pm: **Mid-IR quantum cascade laser mode coupling in hollow-core fiber-optic waveguides with single-mode beam delivery**, Pietro Patimisco, Angelo Sampaolo, Univ. degli Studi di Bari Aldo Moro (Italy) and CNR-Istituto di Fotonica e Nanotecnologie (Italy); Jason M. Kriesel, Opto-Knowledge Systems, Inc. (USA); Gaetano Scamarcio, Univ. degli Studi di Bari Aldo Moro (Italy) and CNR-Istituto di Fotonica e Nanotecnologie (Italy); Vincenzo Spagnolo, Politecnico di Bari (Italy) and CNR-Istituto di Fotonica e Nanotecnologie (Italy) . . . . . [9370-42]

Tuesday 10 February

SESSION 10
LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . TUE 8:00 AM TO 8:30 AM

Keynote Session

Session Chair: **Aizhen Li,** Shanghai Institute of Microsystem and Information Technology (China)

8:00 am: **Selective area growth of III-nitride nanorods on polar, semi-polar, and non-polar orientations: device applications**, Steven Albert, Ana Maria Bengoechea-Encabo, David Lopez-Romero, Univ. Politécnica de Madrid (Spain); Philippe De Mierry, Jesús Zúñiga-Pérez, CRHEA-CNRS (France); Xiang Kong, Achim Trampert, Paul-Drude Institut (Germany); Miguel Ángel Sánchez-Garcia, Enrique Calleja, Univ. Politécnica de Madrid (Spain) . . . . . [9370-43]

SESSION 11
LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . TUE 8:30 AM TO 10:00 AM

Plasmonic Detection and Sensing

Session Chairs: **Frank K. Tittel,** Rice Univ. (USA); **Vincenzo Spagnolo,** Politecnico di Bari (Italy)

8:30 am: **Enhanced two-photon-absorption using sub-wavelength antennas** *(Invited Paper)*, Benjamin Vest, ONERA (France); Benjamin Portier, Lab. de Photonique et de Nanostructures, CNRS (France); Fabrice Pardo, Lab. de Photonique et de Nanostructures (France); Nicolas Péré-Laperne, Emilie Steveler, Lab. de Photonique et de Nanostructures, CNRS (France); Julien Jaeck, ONERA (France); Christophe Dupuis, Nathalie Bardou, Aristide Lemaitre, Lab. de Photonique et de Nanostructures (France); Emmanuel Rosencher, ONERA (France); Riad Haïdar, ONERA (France) and Ecole Polyechnique (France); Jean-Luc Pelouard, Lab. de Photonique et de Nanostructures (France) . . . . . [9370-44]

8:50 am: **Investigation of plasmonic enhancement in a quantum dot -in-a-well structure**, Alireza Kazemi, Mohsen Nami, Jun Oh Kim, The Univ. of New Mexico (USA); Monica S. Allen, Jeffery W. Allen, Brett R. Wenner, Air Force Research Lab. (USA); Dean P. Brown, Air Force Research Lab. (USA) and UES, Inc. (USA); Augustine M. Urbas, Air Force Research Lab. (USA); Daniel Feezell, The Univ. of New Mexico (USA); Bill Mitchell, Univ. of California, Santa Barbara (USA); Sanjay Krishna, The Univ. of New Mexico (USA) . . . . . [9370-45]

9:05 am: **3D hollow nanostructures as high quality plasmonic nanocavities for multipurpose applications** *(Invited Paper)*, Andrea Jacassi, Michele Dipalo, Mario Malerba, Grabriele C. Messina, Francesco De Angelis, Istituto Italiano di Tecnologia (Italy) . . . . . [9370-46]

9:25 am: **Plasmonic characteristics of metallic nano-ring structures**, Doo-Gun Kim, Byung Gue Jung, Seon Hoon Kim, Hyun Chul Ki, Tae Un Kim, Hwe Jong Kim, Korea Photonics Technology Institute (Korea, Republic of); Hong-Seung Kim, Young Wan Choi, Chung-Ang Univ. (Korea, Republic of) . . . . . [9370-47]

9:40 am: **Photonic and plasmonic modulators based on optical switching in VO_2** *(Invited Paper)*, Richard F. Haglund Jr., Sharon M. Weiss, Vanderbilt Univ. (USA); Kannatassen Appavoo, Brookhaven National Lab. (USA) . . . . . [9370-48]

Coffee Break . . . . . Tue 10:00 am to 10:25 am

SESSION 12

LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . TUE 10:25 AM TO 12:10 PM

QCLs and Applications II

Session Chairs: **Ivan Favero,** Univ. Paris 7-Denis Diderot (France); **Maria Ana Cataluna,** Univ. of Dundee (United Kingdom)

10:25 am: **Quantum cascade laser THz metrology** *(Invited Paper)*, Paolo De Natale, Luigi Consolino, Davide Mazzotti, Annamaria Campa, Marco Ravaro, Istituto Nazionale di Ottica (Italy); Miriam Serena Vitiello, NEST-CNR (Italy); Saverio Bartalini, Istituto Nazionale di Ottica (Italy) . . . . . [9370-49]

10:45 am: **Octave-spanning THz quantum cascade laser**, Markus Roesch, ETH Zürich (Switzerland) and Institute of Quantum Electronics, ETH Zurich (Switzerland); Giacomo Scalari, Mattias Beck, Jérôme Faist, ETH Zürich (Switzerland) . . . . . [9370-50]

11:00 am: **Mid-IR and terahertz digital holography based on quantum cascade lasers**, Marco Ravaro, Massimiliano Locatelli, Eugenio Pugliese, Mario Siciliani de Cumis, Francesco D'Amato, Luigi Consolino, Saverio Bartalini, Istituto Nazionale di Ottica (Italy); Miriam S. Vitiello, Consiglio Nazionale delle Ricerche (Italy); Paolo De Natale, Istituto Nazionale di Ottica (Italy) . . . . [9370-51]

11:15 am: **Homogeneous anisotropic terahertz response by photo-designed sub-wavelength grating**, Lorenzo L. Columbo, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and CNR-IFN UOS Bari (Italy); Francesco P. Mezzapesa, Univ. degli Studi di Bari Aldo Moro (Italy) and CNR-Istituto di Fotonica e Nanotecnologie (Italy); Massimo Brambilla, Univ. degli Studi di Bari Aldo Moro (Italy) and CNR-IFN UOS Bari (Italy); Maurizio Dabbicco, Univ. degli Studi di Bari Aldo Moro (Italy) and CNR-Istituto di Fotonica e Nanotecnologie (Italy); Miriam S. Vitiello, Consiglio Nazionale delle Ricerche (Italy); Carlo Rizza, Univ. degli Studi dell'Insubria (Italy); Gaetano Scamarcio, Univ. degli Studi di Bari Aldo Moro (Italy) and CNR-IFN UOS Bari (Italy) . . . . . [9370-52]

11:30 am: **Investigating the coherence properties of terahertz quantum cascade lasers with fs-laser combs** *(Invited Paper)*, Stefano Barbieri, Univ. Paris 7-Denis Diderot (France) . . . . . [9370-53]

11:50 am: **All solid-state mid-infrared dual-comb spectroscopy platform based on QCL technology** *(Invited Paper)*, Andreas Hugi, Markus Geiser, IRsweep GmbH (Switzerland) and ETH Zürich (Switzerland); Gustavo F. Villares, ETH Zürich (Switzerland); Francesco Cappelli, ETH Zürich (Switzerland) and Istituto Nazionale di Ottica (Italy); Stéphane Blaser, Alpes Lasers SA (Switzerland); Jérôme Faist, ETH Zürich (Switzerland) . . . . . [9370-54]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 1:10 pm

SESSION 13

LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . TUE 1:10 PM TO 2:10 PM

Integration Technologies

Session Chairs: **Lorenzo L. Columbo,** CNR-Istituto di Fotonica e Nanotecnologie (Italy); **Sebastian Lourdudoss,** KTH Royal Institute of Technology (Sweden)

1:10 pm: **Mid-IR integrated photonics for sensing applications** *(Invited Paper)*, Luca Carletti, Christelle Monat, Univ. de Lyon (France) and Ecole Centrale de Lyon (France); Regis Orobtchouk, Univ. de Lyon (France) and Institut National des Sciences Appliquées de Lyon (France); Pedro Rojo-Romeo, Zhen Lin, Univ. de Lyon (France) and Ecole Centrale de Lyon (France); Cecile Jamois, Univ. de Lyon (France) and Institut National des Sciences Appliquées de Lyon (France); Jean Louis Leclerc, Pierre Viktorovitch, Xavier Letartre, Christian Grillet, Univ. de Lyon (France) and Ecole Centrale de Lyon (France) . . . . . [9370-55]

1:30 pm: **Fabrication of silica integrated waveguide circuits for quantum-enhanced sensing, quantum information processing and number-resolving detection** *(Invited Paper)*, Peter G. R. Smith, James C. Gates, Christopher Holmes, Corin B. E. Gawith, Lewis G. Carpenter, Paolo L. Mennea, Matthew T. Posner, Peter A. Cooper, Stephen G. Lynch, Univ. of Southampton (United Kingdom). . . . . [9370-56]

1:50 pm: **Advances in three-dimensional integration technologies in support of infrared focal plane arrays** *(Invited Paper)*, Dorota S. Temple, E. P. Vick, D. Malta, M. R. Lueck, RTI International (USA); M. R. Skokan, C. M. Masterjohn, M. S. Muzilla, DRS Technologies, Inc. (USA) . . . . . [9370-57]

SESSION 14

LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . TUE 2:10 PM TO 3:25 PM

Recent Advances in Quantum Sensing and Nanophotonics I

Session Chairs: **Manijeh Razeghi,** Northwestern Univ. (USA); **Michel Krakowski,** Thales Research & Technology (France)

2:10 pm: **Polarimetric determination of the orientation of a single nano-emitter** *(Invited Paper)*, Clotilde Lethiec, Institut des NanoSciences de Paris, Univ. Pierre et Marie Curie (France); Julien Laverdant, Institut Lumière Matière (France); H. Vallon, Institut des NanoSciences de Paris, Univ. Pierre et Marie Curie (France); Clémentine Javaux, Benoit Dubertret, Ecole Supérieure de Physique et de Chimie Industrielles de la Ville de Paris (France); Ferrucio Pisanello, Instituto Italiano diTechnologia (Italy); Luigi Carbone, Istituto Nanoscienze-CNR (Italy); Alberto Bramati, Lab. Kastler Brossel, CNRS, Univ. Pierre et Marie Curie (France); Laurent Coolen, Agnès Maître, Institut des NanoSciences de Paris, Univ. Pierre et Marie Curie (France) . . . . . [9370-106]

2:30 pm: **THz and mid-IR integrated multiwavelength devices** *(Invited Paper)*, Jérôme Faist, ETH Zürich (Switzerland) . . . . . [9370-107]

2:50 pm: **Top-down and bottom-up fabrication of GaN core/shell micropillar arrays on Si** *(Invited Paper)*, Albert V. Davydov, National Institute of Standards and Technology (USA); Sergiy Krylyuk, Jong-Yoon Ha, National Institute of Standards and Technology (USA) and Univ. of Maryland, College Park (USA); Ratan Debnath, Baomei Wen, National Institute of Standards and Technology (USA) and N5 Sensors Inc. (USA); Matthew King, Northrop Grumman Electronic Systems (USA); Marcus Müller, Frank Bertram, Jürgen Christen, Otto-von-Guericke-Univ. Magdeburg (Germany); Abhishek Motayed, National Institute of Standards and Technology (USA) and Univ. of Maryland, College Park (USA) and N5 Sensors Inc. (USA) . . . . . [9370-108]

3:10 pm: **Helmholtz resonator for electric field enhancement from visible to far-infrared**, Paul Chevalier, Patrick Bouchon, ONERA (France); Jean-Jacques Greffet, Lab. Charles Fabry, Institut d'Optique (France); Jean-Luc Pelouard, Lab. de Photonique et de Nanostructures (France); Riad Haidar, ONERA (France); Fabrice Pardo, Lab. de Photonique et de Nanostructures (France) . . . . [9370-95]

Coffee Break . . . . . Tue 3:25 pm to 3:50 pm

SESSION 15

LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . TUE 3:50 PM TO 6:20 PM

Recent Advances in Quantum Sensing and Nanophotonics II

Session Chairs: **Manijeh Razeghi,** Northwestern Univ. (USA); **Michel Krakowski,** Thales Research & Technology (France)

3:50 pm: **Nanophotonic phenomena in atomically-thin van der Waals crystals** *(Keynote Presentation)*, Dmitri N. Basov, Univ. of California, San Diego (USA) . . . . . [9370-87]

4:20 pm: **Ultra fine pitch quantum infrared sensors** *(Invited Paper)*, Olivier Gravrand, CEA-LETI (France) . . . . . [9370-88]

4:40 pm: **Low noise InGaAs/InP single-photon detector for singlet oxygen detection**, Gianluca Boso, Boris Korzh, Tommaso Lunghi, Univ. de Genève (Switzerland); Bruno Sanguinetti, id Quantique SA (Switzerland) and Univ. de Genève (Switzerland); Hugo Zbinden, Univ. de Genève (Switzerland) . . [9370-89]

4:55 pm: **InGaAs/InP single-photon detector with low-noise, low-timing jitter and high count rate**, Mirko Sanzaro, Niccolò Calandri, Alessandro Ruggeri, Carmelo Scarcella, Gianluca Boso, Mauro Buttafava, Alberto Tosi, Politecnico di Milano (Italy) . . . . . [9370-90]

5:10 pm: **High linearity SPAD and TDC array for TCSPC and 3D ranging applications**, Federica A. Villa, Rudi Lussana, Danilo Bronzi, Alberto Dalla Mora, Davide Contini, Politecnico di Milano (Italy); Simone Tisa, Micro Photon Devices S.r.l. (Italy); Alberto Tosi, Franco Zappa, Politecnico di Milano (Italy) . . . [9370-91]

5:25 pm: **Nitrogen vacancies (NV) centers in diamond for magnetic sensors and quantum sensing** *(Invited Paper)*, Mayeul Chipaux, Stéphane Xavier, Thales Research & Technology (France); Alexandre Tallaire, Jocelyn Achard, Lab. des Sciences des Procédés et des Matériaux, CNRS, Univ. Paris 13 (France); Sébastien Pezzagna, Jan Meijer, Univ. Leipzig (Germany); Vincent Jacques, Jean-François Roch, Lab. Aimé Cotton, CNRS, Univ. Paris-Sud and ENS de Cachan (France); Thierry Debuisschert, Thales Research & Technology (France) . . . . . [9370-31]

5:45 pm: **Terahertz harmonic generation in graphene** *(Invited Paper)*, Samwel K. Sekwao, Jean-Pierre Leburton, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9370-109]

6:05 pm: **Photoluminescence quenching of InP/ZnS quantum dots by charge injection**, Martin Möbius, Technische Univ. Chemnitz (Germany); Xiangyu Ma, Univ. of Delaware (USA); Jörg Martin, Fraunhofer-Institut für Elektronische Nanosysteme (Germany); Matthew F. Doty, Univ. of Delaware (USA); Thomas Otto, Thomas Gessner, Fraunhofer-Institut für Elektronische Nanosysteme (Germany) . . . . . [9370-112]

Wednesday 11 February

SESSION 16

LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . WED 8:00 AM TO 8:30 AM

Keynote Session

Session Chair: **Manijeh Razeghi,** Northwestern Univ. (USA)

8:00 am: **Turning assistive machines into assistive robots**, Brenna D. Argall, Northwestern Univ. (USA) . . . . . [9370-58]

SESSION 17

LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . WED 8:30 AM TO 10:20 AM

IR Photodetectors

Session Chairs: **Alexander Soibel,** Jet Propulsion Lab. (USA); **Gail J. Brown,** Air Force Research Lab. (USA)

8:30 am: **Flexibility properties of type-II InAs/GaSb SL to design MWIR pin photodiodes** *(Invited Paper)*, Philippe Christol, Marie Delmas, Jean-Baptiste Rodriguez, Institut d'Electronique du Sud (France); Edouard Giard, Isabelle Ribet-Mohamed, ONERA (France); Julien Imbert, ONERA (France) and III-V Lab. (France); Sophie Derelle, ONERA (France); Virginie Trinite, III-V Lab. (France) . . . . . [9370-59]

8:50 am: **Physics and technology of antimonide heterostructure devices at SCD** *(Invited Paper)*, Philip C. Klipstein, SCD SemiConductor Devices (Israel) . . . . . [9370-60]

9:10 am: **High-responsivity photovoltaic intersubband detectors**, Peter Reininger, Benedikt Schwarz, Hermann Detz, Aaron M. Andrews, Werner Schrenk, Gottfried Strasser, Technische Univ. Wien (Austria) . . [9370-61]

9:25 am: **10µm pitch design of** *HgCdTe* diode array in Sofradir, Nicolas Péré-Laperne, Laurent Rubaldo, Alexandre Kerlain, Emmanuel Carrère, Loïc Dargent, Rachid Taalat, Jocelyn Berthoz, SOFRADIR (France) . . . . . [9370-62]

9:40 am: **Extended-shortwave IR unipolar barrier detectors** *(Invited Paper)*, Gary W. Wicks, Amethyst Research Inc. (USA) and Univ. of Rochester (USA); Terry Golding, Amethyst Research Inc. (USA); Manish Jain, Amethyst Research Inc. (United Kingdom); Gregory R. Savich, Daniel E. Sidor, Xiaoyu Du, Univ. of Rochester (USA); Mukul C. Debnath, The Univ. of Oklahoma Bioengineering Ctr. (USA); Tetsuya D. Mishima, M. B. Santos, The Univ. of Oklahoma (USA) . . . . . [9370-63]

10:00 am: **Military applications for high-performance thermal imaging** *(Invited Paper)*, Kenneth J. McEwan, Defence Science and Technology Lab. (United Kingdom) . . . . . [9370-64]

Coffee Break . . . . . .Wed 10:20 am to 10:50 am

SESSION 18

LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . WED 10:50 AM TO 12:10 PM

Nonlinear Optics

Session Chairs: **Juliette Mangeney,** Ecole Normale Supérieure (France); **Tobias J. Kippenberg,** Ecole Polytechnique Fédérale de Lausanne (Switzerland)

10:50 am: **High-power non linear frequency converted laser diodes** *(Invited Paper)*, Ole B. Jensen, Peter E. Andersen, Anders K. Hansen, Technical Univ. of Denmark (Denmark) and DTU Fotonik (Denmark); Dominik Marti, Risø DTU (Denmark) and DTU Fotonik (Denmark); Peter M. W. Skovgaard, Norlase ApS (Denmark); Paul M. Petersen, Technical Univ. of Denmark (Denmark) . . . . . [9370-65]

11:10 am: **High-power tunable two-color VECSEL for on-demand wavelength generation** *(Invited Paper)*, Mahmoud Fallahi, Chris Hessenius, Michal Lukowski, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9370-66]

11:30 am: **Frequency conversion in AlGaAs microdisks in the telecom range** *(Invited Paper)*, Giuseppe Leo, Silvia Mariani, Alessio Andronico, Univ. Paris 7-Denis Diderot (France); Aristide Lemaitre, Lab. de Photonique et de Nanostructures (France); Sara Ducci, Ivan Favero, Univ. Paris 7-Denis Diderot (France) . . . . . [9370-67]

11:50 am: **Integrated optical sensing technologies on Si** *(Invited Paper)*, Amr S. Helmy, Payam Abolghasem, Janahan Ramanan, Dongpeng Kang, Dylan F. Logan, Univ. of Toronto (Canada) . . . . . [9370-68]

Lunch/Exhibition Break . . . . . .Wed 12:10 pm to 1:30 pm

SESSION 19

LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . WED 1:30 PM TO 2:25 PM

Interband Cascade Lasers

Session Chairs: **Stefano Barbieri,** Univ. Paris 7-Denis Diderot (France); **Riccardo Degl'Innocenti,** Univ. of Cambridge (United Kingdom)

1:30 pm: **Interband cascade lasers with high-cw power and brightness** *(Invited Paper)*, Mijin Kim, Sotera Defense Solutions, Inc. (USA); Chul Soo Kim, William W. Bewley, Charles D. Merritt, Chadwick L. Canedy, Joshua Abell, Igor Vurgaftman, Jerry R. Meyer, U.S. Naval Research Lab. (USA) . . . . [9370-69]

1:50 pm: **Widely-tunable interband cascade lasers for the mid-infrared** *(Invited Paper)*, Michael von Edlinger, Julian Scheuermann, nanoplus GmbH (Germany); Robert Weih, Julius-Maximilians-Univ. Würzburg (Germany); Lars Naehle, Marc Fischer, nanoplus GmbH (Germany); Sven Höfling, Julius-Maximilians-Univ. Würzburg (Germany); Johannes Koeth, nanoplus GmbH (Germany); Martin Kamp, Julius-Maximilians-Univ. Würzburg (Germany) . . . . . [9370-70]

2:10 pm: **Interband cascade laser based absorption sensor for ppb-level formaldehyde detection**, Wei Ren, Rice Univ. (USA) and Chinese Univ. of Hong Kong (Hong Kong, China); Longqiang Luo, Yingchun Cao, Wenzhe Jiang, Frank K. Tittel, Rice Univ. (USA) . . . . . [9370-71]

SESSION 20

LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . WED 2:25 PM TO 3:20 PM

Laser Diodes

Session Chairs: **Jean-Pierre Huignard,** Jphopto (France); **Anne Amy-Klein,** Lab. de Physique des Lasers (France)

2:25 pm: **Review of Al-free active region laser diodes on GaAs for pumping applications** *(Invited Paper)*, Michel Krakowski, Thales Research & Technology (France) and III-V Lab. (France); Michel Lecomte, III-V Lab. (France) and Thales Research and Technology (France); Nicolas Michel, M. Calligaro, M. Carbonnelle, M. Tran, M. Lamponi, C. Cayron, V. Ligeret, III-V Lab. (France); Joseph P. Bebe Manga Lobe, Roberto Mostallino, Nicolas von Bandel, Alexandre Larrue, Yannick Robert, Eric Vinet, III-V Lab. (France) and Thales Research and Technology (France); Olivier Drisse, III-V Lab. (France); Michel Garcia, Olivier Parillaud, III-V Lab. (France) and Thales Research and Technology (France) . . . . . [9370-72]

2:45 pm: **High-power ultrafast and broadly-tunable quantum-dot lasers** *(Invited Paper)*, Maria Ana Cataluna, Ying Ding, Stephanie E. Haggett, David Bajek, Univ. of Dundee (United Kingdom); Michel Krakowski, III-V Lab. (France) . . . . . [9370-73]

3:05 pm: **High-performance GaSb laser diodes and diode arrays in the 2.1-3.3 micron wavelength range for sensing and defense applications**, Edgaras Dvinelis, Augustinas Trinkūnas, Mindaugas Greibus, Mindaugas Kaušylas, Tomas Žukauskas, Ieva Šimonyte, Ramūnas Songaila, Augustinas Vizbaras, Kristijonas Vizbaras, Brolis Semiconductors UAB (Lithuania) [9370-74]

Coffee Break . . . . . .Wed 3:20 pm to 3:50 pm

SESSION 21

LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . WED 3:50 PM TO 4:10 PM

GaN Challenges

Session Chair: **Manijeh Razeghi,** Northwestern Univ. (USA)

3:50 pm: **Polarization-free GaN emitters in the ultraviolet and visible spectra via heterointegration on CMOS-compatible Si (100)** *(Invited Paper)*, Can Bayram, Univ. of Illinois at Urbana-Champaign (USA); John Ott, Kuen-Ting Shiu, Cheng-Wei Cheng, Yu Zhu, Jeehwan Kim, Devendra K. Sadana, IBM Thomas J. Watson Research Ctr. (USA); Manijeh Razeghi, Northwestern Univ. (USA) . . . . . [9370-75]

SESSION 22

LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . WED 4:10 PM TO 5:55 PM

Late-Breaking Results and Awards

Session Chair: **Manijeh Razeghi,** Northwestern Univ. (USA)

SPIE announces the continuation of the Awards for Breakthroughs in Human-Centered Research. The awards will recognize students who present the most notable recent discoveries with broad impact to benefit our understanding of the human body, its diagnosis, or its medical treatment, in the fields of biosensing, nanomedicine, and related fields. This year there are four winners chosen from this Late-Breaking Results session. Presentations will be given, and winners announced.

4:10 pm: **Introduction and Opening Remarks**

4:15 pm: **High-performance dual-band mid-/long-wavelength infrared $InAs/InAs_{1-x}Sb_x$ type-II superlattice-based photodetectors for medical thermography applications**, Abbas Haddadi, R. Chevallier, Guanxi Andy Chen, Anh Minh Hoang, Manijeh Razeghi, Northwestern Univ. (USA) . . . . . [9370-113]

4:25 pm: **THz digital holography for real-time biomedical imaging,** Marco Ravaro, Massimiliano Locatelli, Saverio Bartalini, Luigi Consolino, Istituto Nazionale di Ottica (Italy), European Lab. for Non-linear Spectroscopy (Italy); Miriam Serena Vitiello, Istituto Nazionale di Ottica (Italy), Istituto Nanoscienze and Scuola Normale Superiore (Italy); Riccardo Cicchi, Istituto Nazionale di Ottica (Italy), European Lab. for Non-linear Spectroscopy (Italy); Francesco S. Pavone, Istituto Nazionale di Ottica (Italy), European Lab. for Non-linear Spectroscopy (Italy), Univ. di Firenze (Italy); Paolo De Natale, Istituto Nazionale di Ottica (Italy), European Lab. for Non-linear Spectroscopy (Italy . . . [9370-120]

4:35 pm: **World's first pMp superlattice photodetectors enables high operating temperature infrared imaging**, Guanxi Andy Chen, Abbas Haddadi, Anh Minh Hoang, Romain Chevallier, Manijeh Razeghi, Northwestern Univ. (USA) . . . . . [9370-115]

4:45 pm: **Nano III-V plasmonic light-sources for monolithic integration on silicon**, Ning Li, IBM Thomas J. Watson Research Ctr. (USA); Ke Liu, The George Washington Univ. (USA) and Beijing Univ. of Technology (China); Volker J. Sorger, The George Washington Univ. (USA); Devendra K. Sadana, IBM Thomas J. Watson Research Ctr. (USA) . . . . . [9370-119]

4:55 pm: **High-power mid-IR frequency comb quantum cascade laser source**, Quan-Yong Lu, Manijeh Razeghi, Steven Slivken, Neelanjan Bandyopadhyay, Yanbo Bai, Wei Zhou, M. Chen, David Heydari, Abbas Haddadi, Ryan McClintock, Northwestern Univ. (USA); Maria Amanti, Carlo Sirtori, Univ. Paris 7-Denis Diderot (France) . . . . . [9370-114]

5:05 pm: **High-power continuous-wave surface-emitting quantum cascade ring laser in fundamental mode operation**, Yanbo Bai, M. Chen, David Heydari, Neelanjan Bandyopadhyay, Steven Slivken, Manijeh Razeghi, Northwestern Univ. (USA) . . . . . [9370-116]

5:15 pm: **Unveiling the spatio-temporal organization of TRPV1 nociceptor in live cell membranes,** Barbara Storti, Scuola Normale Superiore (Italy), Istituto Nanoscienze, CNR (Italy) . . . . . [9370-121]

5:25 pm: **Broadband quantum cascade laser tunable from 6.1 to 10.2 µm**, Neelanjan Bandyopadhyay, Yanbo Bai, S. Sengupta, M. Chen, Steven Slivken, Manijeh Razeghi, Northwestern Univ. (USA) . . . . . [9370-117]

5:35 pm: **High-power quantum cascade lasers with angled cavities**, David Heydari, Neelanjan Bandyopadhyay, Steven Slivken, Manijeh Razeghi, Northwestern Univ. (USA) . . . . . [9370-118]

5:45 pm: **Quantum-cascade-laser-based optoacoustic detection for breath sensor applications,** Pietro Patimisco, Univ. degli Studi di Bari Aldo Moro (Italy) . . . . . [9370-122]

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Towards graphene photonics and plasmonics, Shin Mou, Don Abeysinghe, Air Force Research Lab. (USA); Joshua Myers, Wright State Univ. (USA) and Air Force Research Lab. (USA); Justin W. Cleary, Nima Nader, Joshua R. Hendrickson, Air Force Research Lab. (USA) . . . . . [9370-92]

Long-wavelength interband cascade infrared photodetectors operating above room temperature, Hossein Lotfi, Lin Lei, Lu Li, Rui Q. Yang, Joel C. Keay, Matthew B. Johnson, The Univ. of Oklahoma (USA); Yueming Qiu, Dmitri Loubychev, Joel M. Fastenau, Amy W. K. Liu, IQE Inc. (USA) . . . . . [9370-93]

All-optical reservoir computing system based on InGaAsP ring resonators for high-speed identification and optical routing in optical networks, Charis Mesaritakis, Alexandros Kapsalis, Dimitris Syvridis, National and Kapodistrian Univ. of Athens (Greece) . . . . . [9370-94]

Multifunctional diffractive optical elements for the generation of higher order Bessel-like-beams, Anand Vijayakumar, Shanti Bhattacharya, Indian Institute of Technology Madras (India) . . . . . [9370-97]

Nanomaterials coated multiplexed fiber Bragg grating for multiparameter sensing, Shivananju B. N., Vishnu Prasad, Aravind C. G., Indian Institute of Science (India); Abha Misra, Indian Institute of Science (India) and Applied Photonics Initiative, Indian Institute of Science (India); Manoj M. Varma, Sundarrajan Asokan, Indian Institute of Science (India) . . . . . [9370-100]

Ultra-wide tuning of a nanofiber Bragg grating cavity, Hideaki Takashima, Hokkaido Univ. (Japan) and Osaka Univ. (Japan); Andreas W. Schell, Humboldt-Univ. zu Berlin (Germany); Shunya Kamioka, Yasuko Oe, Osaka Univ. (Japan); Masazumi Fujiwara, Hokkaido Univ. (Japan) and The Institute of Scientific and Industrial Research (Japan); Oliver Benson, Humboldt-Univ. zu Berlin (Germany); Shigeki Takeuchi, Kyoto Univ. (Japan) and Hokkaido Univ. (Japan) and Osaka Univ. (Japan) . . . . . [9370-101]

Electrical isolation of typeII InAs/InGaSb superlattices from GaSb substrates, William C. Mitchel, Air Force Research Lab. (USA); Said Elhamri, Univ. of Dayton (USA); Heather J. Haugan, Air Force Research Lab. (USA); R. Berney, Univ. of Dayton (USA); Shin Mou, Gail J. Brown, Air Force Research Lab. (USA) . . . . . [9370-102]

High-speed multichannel time-correlated single-photon counting electronics based on SiGe-integrated time-to-digital converters, Uwe Ortmann, Michael Wahl, Tino Roehlicke, Hans-Jürgen Rahn, PicoQuant GmbH (Germany); Nick Bertone, PicoQuant Photonics North America, Inc. (Canada); Gerald Kell, Fachhochschule Brandenburg (Germany) . . . . . [9370-103]

MWIR interband transitions in type-II In(GaAl)Sb quantum dots, Qin Wang, Acreo Swedish ICT AB (Sweden); Mehrdad Jafari, Halmstad Univ. (Sweden); Laiq Hussain, Lund Univ. (Sweden); Jindong Song, Won Jun Choi, Il Ki Han, Eun hye Lee, Suk In Park, Korea Institute of Science and Technology (Korea, Republic of); Ju Young Lim, Korea Photonics Technology Institute (Korea, Republic of); Amir Karim, Jan Y. Andersson, Acreo Swedish ICT AB (Sweden); Håkan Pettersson, Halmstad Univ. (Sweden) . . . . . [9370-104]

Thursday 12 February

SESSION 23

LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . THU 8:00 AM TO 8:30 AM

Keynote Session

Session Chair: **Manijeh Razeghi,** Northwestern Univ. (USA)

8:00 am: **Probing the real-world via terahertz nano-devices** *(Keynote Presentation)*, Miriam S. Vitiello, Consiglio Nazionale delle Ricerche (Italy) . . . . . [9370-77]

CONFERENCE 9370
LOCATION: ROOM 124 (EXHIBIT LEVEL)

SESSION 24
LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . THU 8:30 AM TO 10:30 AM

Quantum Optics

Session Chairs: **Carlo Sirtori,** Univ. Paris 7-Denis Diderot (France); **Andrea Di Falco,** Univ. of St. Andrews (United Kingdom)

8:30 am: **Quantum optics with semiconductor quantum dots** *(Invited Paper)*, Pascale Senellart, Valérian Giesz, Simone Luca Portalupi, Olivier Gazzano, Aristide Lemaitre, Isabelle Sagnes, Loic Lanco, Lab. de Photonique et de Nanostructures (France) . . . . . [9370-78]

8:50 am: **Control of spontaneous emission by shaping the vacuum field in nanophotonic structures** *(Invited Paper)*, Andrea Fiore, Chaoyuan Jin, Technische Univ. Eindhoven (Netherlands); Robert Johne, Technische Univ. Eindhoven (Netherlands) and Max-Planck-Institut für Physik komplexer Systeme (Germany); Ron Schutjens, Milo Swinkels, Thang Hoang, Leonardo Midolo, Rene van Veldhoven, Technische Univ. Eindhoven (Netherlands) . . . . . [9370-79]

9:10 am: **Orbital angular momentum injection in a polariton superfluid.** *(Invited Paper)*, Thomas Boulier, Quentin C. Glorieux, Emiliano Cancellieri, Elisabeth Giacobino, Alberto Bramati, Univ. Pierre et Marie Curie (France) . . . . . [9370-80]

9:30 am: **Photon pair sources in AlGaAs: from electrical injection to quantum state engineering** *(Invited Paper)*, Sara Ducci, Guillaume Boucher, Claire Autebert, Fabien Boitier, Ivan Favero, Giuseppe Leo, Univ. Paris 7-Denis Diderot (France) . . . . . [9370-81]

9:50 am: **Exciton-polariton Bose-Einstein condensation with a polymer at room temperature** *(Invited Paper)*, Thilo Stoeferle, IBM Research – Zürich (Switzerland); Johannes D. Plumhof, IBM Research – Zurich (Switzerland); Lijian Mai, IBM Research – Zürich (Switzerland); Ullrich Scherf, Bergische Univ. Wuppertal (Germany); Rainer F. Mahrt, IBM Research – Zürich (Switzerland) . . . . . [9370-82]

10:10 am: **Manipulation of electrical flicker-noise and line narrowing in free-running quantum cascade lasers** *(Invited Paper)*, Masamichi Yamanishi, Toru Hirohata, Hamamatsu Photonics K.K. (Japan) . . . . . [9370-111]

Coffee Break . . . . . Thu 10:30 am to 11:00 am

SESSION 25
LOCATION: ROOM 124 (EXHIBIT LEVEL) . . . . . THU 11:00 AM TO 1:00 PM

Recent Advances in Quantum Sensing and Nanophotonics III

Session Chairs: **Manijeh Razeghi,** Northwestern Univ. (USA); **Michel Krakowski,** Thales Research & Technology (France)

11:00 am: **Graphene vs more conventional narrow band semiconductors** *(Keynote Presentation)*, Jacob B. Khurgin, Johns Hopkins Univ. (USA) . . . . . [9370-83]

11:30 am: **Monolithic coupling of QCLs in evenescent waveguides on InP** *(Invited Paper)*, Clément Gilles, Gregory Maisons, Bouzid Simozrag, Mathieu Carras, III-V Lab. (France) . . . . . [9370-84]

11:50 am: **Low-dimensional II-VI oxide-based semiconductor nanostructure photodetectors for light sensing** *(Invited Paper)*, Jae Su Yu, Yeong Hwan Ko, Goli Nagaraju, Kyung Hee Univ. (Korea, Republic of) . . . . . [9370-98]

12:10 pm: **Monolithic optical frequency comb based on quantum dashed mode locked lasers for Tb/s data transmission** *(Invited Paper)*, Anthony Martinez, Cosimo Calò, V. Panapakkam, Kamel Merghem, Lab. de Photonique et de Nanostructures (France); Regan T. Watts, Vidak Vujicic, Colm Browning, Dublin City Univ. (Ireland); Alain Accard, François Lelarge, III-V Lab. (France); Liam P. Barry, Dublin City Univ. (Ireland); Abderrahim Ramdane, Lab. de Photonique et de Nanostructures (France) . . . . . [9370-85]

12:30 pm: **Tuning of superconducting nanowire single-photon detector parameters for VLSI circuit testing using time-resolved emission**, Andrea Bahgat Shehata, Franco Stellari, IBM Thomas J. Watson Research Ctr. (USA) . . . . . [9370-86]

12:45 pm: **Introducing Fourier-domain mobility spectrum analysis (FMSA) to deduce multi-component carrier mobility and density**, Boya Cui, Yang Tang, Matthew Grayson, Northwestern Univ. (USA) . . . . . [9370-110]

CONFERENCE 9371
LOCATION: ROOM 307 (ESPLANADE)

Monday–Thursday 9–12 February 2015 • Proceedings of SPIE Vol. 9371

Photonic and Phononic Properties of Engineered Nanostructures V

Conference Chairs: **Ali Adibi,** Georgia Institute of Technology (USA); **Shawn-Yu Lin,** Rensselaer Polytechnic Institute (USA); **Axel Scherer,** California Institute of Technology (USA)

Program Committee: **Andrea Alù,** The Univ. of Texas at Austin (USA); **William L. Barnes,** Univ. of Exeter (United Kingdom); **Ali Asghar Eftekhar,** Georgia Institute of Technology (USA); **Reginald K. Lee,** California Institute of Technology (USA); **Marko Loncar,** Harvard School of Engineering and Applied Sciences (USA); **Susumu Noda,** Kyoto Univ. (Japan); **Masaya Notomi,** NTT Basic Research Labs. (Japan); **Ekmel Özbay,** Bilkent Univ. (Turkey); **Yong Xu,** Virginia Polytechnic Institute and State Univ. (USA); **Eli Yablonovitch,** Univ. of California, Berkeley (USA); **Rashid Zia,** Brown Univ. (USA)

Monday 9 February

OPTO PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA) . . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA) . . . . . [9371-202]

Coffee Break . . . . . Mon 10:10 am to 10:30 am

SESSION 1
LOCATION: ROOM 307 (ESPLANADE) . . . . . MON 10:30 AM TO 12:30 PM

Recent Advances in Engineered Nanostructures
Session Chair: **Ali Adibi,** Georgia Institute of Technology (USA)

10:30 am: **Nanoscale engineering optical nonlinearities and nanolasers** *(Invited Paper)*, Yeshaiahu Fainman, Univ. of California, San Diego (USA)[9371-1]

11:00 am: **Electrical control and detection of nanoscale optical fields with 2d materials** *(Invited Paper)*, Frank H. Koppens, ICFO - Institut de Ciències Fotòniques (Spain). . . . . [9371-2]

11:30 am: **Detecting and controlling coherent acoustic phonons in complex nanostructures with plasmons** *(Invited Paper)*, Kevin O'Brien, Norberto D. Lanzillotti-Kimura, Junsuk Rho, Haim Suchowski, Xiaobo Yin, Xiang Zhang, Univ. of California, Berkeley (USA) . . . . . [9371-3]

12:00 pm: **Noise in microphotonic oscillators** *(Invited Paper)*, Lute Maleki, Andrey Matsko, OEwaves, Inc. (USA) . . . . . [9371-4]

Lunch Break . . . . . Mon 12:30 pm to 1:30 pm

SESSION 2
LOCATION: ROOM 307 (ESPLANADE) . . . . . MON 1:30 PM TO 3:00 PM

Novel Nanophotonic Materials and Devices I
Session Chair: **Andrei Faraon,** California Institute of Technology (USA)

1:30 pm: **Processable organic materials with large figures-of-merit for all-optical signal processing** *(Invited Paper)*, Joseph W. Perry, Ali Adibi, Stephen Barlow, Jean-Luc Brédas, Ali A. Eftekhar, Yulia A. Getmanenko, Rebecca L. Gieseking, Joel M. Hales, Amir H. Hosseinnia, Georgia Institute of Technology (USA); Khanh Kieu, The Univ. of Arizona (USA); Hyeongeu Kim, Seth R. Marder, Hesam Moradinejad, Georgia Institute of Technology (USA); Robert A. Norwood, The Univ. of Arizona (USA); Chad M. Risko, Georgia Institute of Technology (USA); Shiva Shahin, The Univ. of Arizona (USA); Yadong Zhang, Georgia Institute of Technology (USA) . . . . . [9371-5]

2:00 pm: **Sub-diffractional volume-confined polaritons in a natural hyperbolic material: hexagonal boron nitride**, Joshua D. Caldwell, U.S. Naval Research Lab. (USA); Andrey V. Kretinin, The Univ. of Manchester (United Kingdom); Yiguo Chen, Vincenzo Giannini, Imperial College London (United Kingdom); Michael M. Fogler, Univ. of California, San Diego (USA); Yan Francescato, Imperial College London (United Kingdom); Chase T. Ellis, Joseph G. Tischler, U.S. Naval Research Lab. (USA); Colin R. Woods, The Univ. of Manchester (United Kingdom); Alexander J. Giles, U.S. Naval Research Lab. (USA); Minghui Hong, National Univ. of Singapore (Singapore); Kenji Watanabe, Takashi Taniguchi, National Institute for Materials Science (Japan); Stefan A. Maier, Imperial College London (United Kingdom); Kostya S. Novoselov, The Univ. of Manchester (United Kingdom) . . . . . [9371-6]

2:20 pm: **Zinc oxide nanophotonics**, Sumin Choi, Cuong Ton-That, Univ. of Technology, Sydney (Australia); Stefania Castelletto, RMIT Univ. (Australia); Brett C. Johnson ?, The Univ. of Melbourne (Australia); Matthew R. Phillips, Igor Aharonovich, Univ. of Technology, Sydney (Australia) . . . . . [9371-7]

2:40 pm: **Silicon carbide tetrapods: novel room temperature quantum systems**, Igor Aharonovich, Univ. of Technology, Sydney (Australia); Zoltan Bodrog, Wigner Research Ctr. for Physics of the H.A.S. (Hungary); Andrew P. Magyar, Harvard Univ. (USA); Angus R. Gentle, Univ. of Technology, Sydney (Australia); Adam Gali, Budapest Univ. of Technology and Economics (Hungary); Stefania Castelletto, RMIT Univ. (Australia). . . . . [9371-8]

Coffee Break . . . . . Mon 3:00 pm to 3:30 pm

SESSION 3
LOCATION: ROOM 307 (ESPLANADE) . . . . . MON 3:30 PM TO 5:40 PM

Novel Nanophotonic Materials and Devices II
Session Chair: **Frank H. Koppens,**
ICFO - Institut de Ciències Fotòniques (Spain)

3:30 pm: **Flat free-space optical components and systems based on sub-wavelength high-index dielectric structures** *(Invited Paper)*, Amir Arbabi, Yu Horie, Alexander J. Ball, California Institute of Technology (USA); Mahmood Bagheri, Jet Propulsion Lab. (USA); Andrei Faraon, California Institute of Technology (USA) . . . . . [9371-9]

4:00 pm: **Enhancing and inhibiting stimulated Brillouin scattering in photonic integrated circuits** *(Invited Paper)*, Benjamin J. Eggleton, The Univ. of Sydney (Australia) . . . . . [9371-10]

OPTO

4:30 pm: **Strategies for optical integration of single-photon sources** *(Invited Paper)*, Oliver Benson, Andreas W. Schell, Tanja Neumer, Humboldt-Univ. zu Berlin (Germany); Qiang Shi, Karlsruhe Institute of Technology (Germany); Johannes Kaschke, Joachim Fischer, Martin Wegener, Karlsruher Institut für Technologie (Germany) . . . . . [9371-11]

5:00 pm: **Ultra-compact waveguide devices in thin film lithium niobate**, Abdoulaye Ndao, Wentao Qiu, Xin Xu, Clement Guyot, Roland Salut, Gwen Ulliac, Nadege Courjal, Hervé Maillotte, Fadi Issam Baida, Maria Pilar Bernal, FEMTO-ST (France). . . . . [9371-12]

5:20 pm: **Local resonance control of high-Q coupled nanocavities**, Sergei Sokolov, Jin Lian, Univ. Twente (Netherlands); Alfredo De Rossi, Sylvain Combrie, Thales Research & Technology (France); Allard P. Mosk, Univ. Twente (Netherlands) . . . . . [9371-13]

Tuesday 10 February

SESSION 4

LOCATION: ROOM 307 (ESPLANADE) . . . . . TUE 8:00 AM TO 10:10 AM

Photonic Crystal Structures

Session Chair: **Ali Adibi,** Georgia Institute of Technology (USA)

8:00 am: **Nano-spectroscopy using fabricated photonic crystals and plasmonic geometries** *(Invited Paper)*, Axel Scherer, Sameer Walavalkar, William S. Fegadolli, California Institute of Technology (USA) . . . . . [9371-14]

8:30 am: **Experimental observation of Anderson localization modes in a compositionally-disordered photonic crystal system**, Myungjae Lee, Jeongkug Lee, Minsu Kang, Heonsu Jeon, Seoul National Univ. (Korea, Republic of) . . . . . [9371-15]

8:50 am: **Polarization sensitive beam bending using a spatially-variant photonic crystal**, Jennefir Digaum, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Javier J. Pazos, Raymond C. Rumpf, The Univ. of Texas at El Paso (USA); Jeffrey Chiles, Sasan Fathpour, Stephen M. Kuebler, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9371-16]

9:10 am: **The circular Bragg phenomenon for oblique incidence**, Sema Erten, Akhlesh Lakhtakia, The Pennsylvania State Univ. (USA) . . . . . [9371-17]

9:30 am: **Linear and nonlinear optical responses in chiral metamaterials**, Wenshan Cai, Sean P. Rodrigues, Shoufeng Lan, Yonghao Cui, Lei Kang, Georgia Institute of Technology (USA) . . . . . [9371-18]

9:50 am: **Introducing planar defects into colloidal crystals via self-assembly at the air/water interface**, Kuo Zhong, Pieter-Jan H. M. Demeyer, Olga Kruglova, Katholieke Univ. Leuven (Belgium); Niels Verellen, Katholieke Univ. Leuven (Belgium) and IMEC (Belgium); Victor V. Moshchalkov, Katholieke Univ. Leuven (Belgium); Kai Song, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences (China); Koen Clays, Katholieke Univ. Leuven (Belgium) . . . . . [9371-19]

Coffee Break . . . . . Tue 10:10 am to 10:30 am

SESSION 5

LOCATION: ROOM 307 (ESPLANADE) . . . . . TUE 10:30 AM TO 12:00 PM

Properties and Applications of Engineered Metasurfaces

Session Chair: **Axel Scherer,** California Institute of Technology (USA)

10:30 am: **From light modulation to far-field excitation of graphene plasmons: science and applications of graphene-integrated plasmonic metasurfaces** *(Invited Paper)*, Gennady B. Shvets, The Univ. of Texas at Austin (USA) . . . . . [9371-20]

11:00 am: **Holographic metasurface for wavelength and polarization demultiplexing via focused surface plasmon polariton beams**, Daniel Wintz, Harvard Univ. (USA); Patrice Genevet, Harvard School of Engineering and Applied Sciences (USA); Antonio Ambrosio, Alex Woolf, Harvard Univ. (USA); Federico Capasso, Harvard School of Engineering and Applied Sciences (USA) . . . . . [9371-21]

11:20 am: **Spectral and spatial manipulation of the polarization by metasurface made of v-shaped plasmonic MIM nanoantennas**, Patrick Bouchon, Quentin Lévesque, ONERA (France); Mathilde Makhsiyan, ONERA (France) and Lab. de Photonique et de Nanostructures (France); Julien Jaeck, ONERA (France); Fabrice Pardo, Jean-Luc Pelouard, Lab. de Photonique et de Nanostructures (France); Riad Haidar, ONERA (France) . . . . . [9371-22]

11:40 am: **Metallic metasurface anti-reflective coating in mid-wave infrared regime**, Joshua R. Hendrickson, Air Force Research Lab. (USA); Nima Nader, Air Force Research Lab. (USA) and Solid State Scientific Corp. (USA); Boyang Zhang, The Univ. of Alabama in Huntsville (USA); Hou-tong Chen, The Ctr. for Integrated Nanotechnologies (USA); Junpeng Guo, The Univ. of Alabama in Huntsville (USA). . . . . [9371-23]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:30 pm

SESSION 6

LOCATION: ROOM 307 (ESPLANADE) . . . . . TUE 1:30 PM TO 3:00 PM

Plasmonic Metamaterials

Session Chair: **Paul V. Braun,** Univ. of Illinois at Urbana-Champaign (USA)

1:30 pm: **Electrical manipulation of nonlinear optical processes in metamaterials** *(Invited Paper)*, Wenshan Cai, Lei Kang, Shoufeng Lan, Yonghao Cui, Sean P. Rodrigues, Georgia Institute of Technology (USA) . . . . . [9371-24]

2:00 pm: **High temperature applications enabled by refractory plasmonic materials**, Urcan Guler, Nano-Meta Technologies, Inc. (USA); Alexander V. Kildishev, Purdue Univ. (USA); Alexandra Boltasseva, Vladimir M. Shalaev, Purdue Univ. (USA) and Nano-Meta Technologies, Inc. (USA). . . . . [9371-25]

2:20 pm: **Genetic algorithm for true negative index in plasmonic metamaterials**, Ian A. Goforth, Max A. Burnett, Daniel B. Fullager, Christopher Rosenbury, Hossein Alisafaee, Michael A. Fiddy, The Univ. of North Carolina at Charlotte (USA) . . . . . [9371-26]

2:40 pm: **Quality-factor enhancement of fano resonance in asymmetric-double-bar metamaterials by alternately arranging inversed unit cells in the optical region**, Yuto Moritake, Yoshiaki Kanamori, Kazuhiro Hane, Tohoku Univ. (Japan). . . . . [9371-27]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 7

LOCATION: ROOM 307 (ESPLANADE) . . . . . TUE 3:30 PM TO 5:50 PM

Photonic Metamaterials

Session Chair: **Wenshan Cai,** Georgia Institute of Technology (USA)

3:30 pm: **Macroscopic broadband 3D invisibility cloaking for diffusive visible light** *(Invited Paper)*, Robert Schittny, Andreas Niemeyer, Muamer Kadic, Tiemo K. Bückmann, Andreas Naber, Martin Wegener, Karlsruher Institut für Technologie (Germany) . . . . . [9371-28]

4:00 pm: **3D optical metamaterials by self-assembly and templated directed solidification of eutectics** *(Invited Paper)*, Paul V. Braun, Univ. of Illinois at Urbana-Champaign (USA). . . . . [9371-29]

4:30 pm: **Photonic orbital Hall effect in double negative metamaterials**, Zhicheng Xiao, Han Li, Partha P. Banerjee, Univ. of Dayton (USA) . . . . [9371-30]

4:50 pm: **Epsilon near-zero metamaterials for ultra-low-power nonlinear applications**, Monika Pietrzyk, Univ. of St. Andrews (United Kingdom); Rishad Kaipurath, Daniele Faccio, Heriot-Watt Univ. (United Kingdom); Andrea Di Falco, Univ. of St. Andrews (United Kingdom) . . . . . [9371-31]

5:10 pm: **Advanced applications of flexible metamaterials at visible frequencies**, Blair Kirkpatrick, Peter J. Reader-Harris, Jingzhi Wu, Yufang Shen, Andrea Di Falco, Univ. of St. Andrews (United Kingdom) . . . . . [9371-32]

5:30 pm: **Paraxial ray optics cloaking**, Joseph S. Choi, Institute of Optics, Univ. of Rochester (USA). . . . . [9371-81]

Wednesday 11 February

SESSION 8

LOCATION: ROOM 307 (ESPLANADE) . . . . . WED 8:00 AM TO 9:50 AM

Nanophotonic Structures for Sensing and Imaging

Session Chair: **Ali Adibi,** Georgia Institute of Technology (USA)

8:00 am: **Hybrid nanoplasmonics for nonlinear optics, sensing, and biomiaging** *(Invited Paper)*, Stefan A. Maier, Imperial College London (United Kingdom). . . . . [9371-33]

8:30 am: **Plasmonic interferometry for non-invasive glucose sensing** *(Invited Paper)*, Domenico Pacifici, Brown Univ. (USA). . . . . [9371-34]

9:00 am: **Imaging with multimode fibers** *(Invited Paper)*, Demetri Psaltis, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9371-35]

9:30 am: **Mid-infrared opto-nanofluidics for on-chip chemical sensing**, Pao T. Lin, Sen Kwok, Massachusetts Institute of Technology (USA); Hao-Yu G. Lin, Harvard Univ. (USA); Dawn T. H. Tan, Singapore Univ. of Technology & Design (Singapore); Lionel Kimerling, Massachusetts Institute of technology (USA); Anu Agarwal, Massachusetts Institute of Technology (USA); George Whitesides, Harvard Univ. (USA) and Harvard Univ. (USA). . . . . [9371-36]

Coffee Break . . . . . .Wed 9:50 am to 10:30 am

SESSION 9

LOCATION: ROOM 307 (ESPLANADE) . . . . . WED 10:30 AM TO 12:00 PM

Plasmonic Nanostructures I

Session Chair: **Domenico Pacifici,** Brown Univ. (USA)

10:30 am: **Photonics and plasmonics with 2D atomic membranes: physics and device applications** *(Invited Paper)*, Farhan Rana, Cornell Univ. (USA) . . . . . [9371-37]

11:00 am: **Realizing a point cavity with near-field engineering of sub-wavelength plasmonic cavity**, Myung-Ki Kim, Hongchul Sim, Yong-Hee Lee, KAIST (Korea, Republic of) . . . . . [9371-38]

11:20 am: **Sub-wavelength confinement of the orbital angular momentum of light probed by plasmonic nanoantennae resonances**, Marta Carli, Gianluca Ruffato, Pierfrancesco Zilio, Denis Garoli, Univ. degli Studi di Padova (Italy); Valentina Giorgis, IOM-CNR (Italy); Filippo Romanato, Univ. degli Studi di Padova (Italy) and IOM-CNR (Italy) . . . . . [9371-39]

11:40 am: **Strong atom-field interactions in metallic coaxial nanocavities**, Hossein Hodaei, Ahmed El Halawani, Parinaz Aleahmad, Mercedeh Khajavikhan, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9371-40]

Lunch/Exhibition Break . . . . . .Wed 12:00 pm to 1:30 pm

SESSION 10

LOCATION: ROOM 307 (ESPLANADE) . . . . . WED 1:30 PM TO 3:00 PM

Plasmonic Nanostructures II

Session Chair: **Farhan Rana,** Cornell Univ. (USA)

1:30 pm: **Complex and hybrid functional plasmonics: from basics to applications** *(Invited Paper)*, Harald Giessen, Univ. Stuttgart (Germany) . . . . . [9371-41]

2:00 pm: **Controlling surface plasmon propagation by tilted optical beams Incident on a 1D Grating**, Doron Bar-Lev, Itai Epstein, Ady Arie, Jacob Scheuer, Tel Aviv Univ. (Israel) . . . . . [9371-42]

2:20 pm: **Hybrid optoplasmonic structures for efficient long-range energy transfer**, Wonmi Ahn, Xin Zhao, Yan Hong, Björn M. Reinhard, Boston Univ. (USA) . . . . . [9371-43]

2:40 pm: **Dispersion analysis and manipulation of TiN 2D plasmonic waveguides**, Hosam I. Mekawey, Mohamed A. Swillam, Yehea Ismail, The American Univ. in Cairo (Egypt). . . . . [9371-44]

Coffee Break . . . . . .Wed 3:00 pm to 3:30 pm

SESSION 11

LOCATION: ROOM 307 (ESPLANADE) . . . . . WED 3:30 PM TO 5:30 PM

Novel Phenomena in Plasmonic Structures

Session Chair: **Harald Giessen,** Univ. Stuttgart (Germany)

3:30 pm: **Non-linear optical effects in plasmonic gold nanoantennas**, Michael Kaniber, Konrad Schraml, Johannes Bartl, Glenn Glashagen, Armin Regler, Walter Schottky Institut (Germany); Tom Campbell, Virginia Polytechnic Institute and State Univ. (USA); Jonathan J. Finley, Walter Schottky Institut (Germany) . . . . . [9371-45]

3:50 pm: **Nano-patterning of $KTiOPO_4$ nonlinear crystal for plasmonic applications**, Itai Epstein, Gat Maman, Daniel Krol, Ady Arie, Tel Aviv Univ. (Israel) . . . . . [9371-46]

4:10 pm: **Shaping plasmonic light beams with near-field plasmonic holograms**, Itai Epstein, Yigal Lilach, Ady Arie, Tel Aviv Univ. (Israel) . . [9371-47]

4:30 pm: **Extremely-high near-field enhancement in a novel plasmonic nanomaterial used for photovoltage generation**, Debadrita Paria, Kallol Roy, Shishir Kumar, Haobijam J. Singh, Srinivasan Raghavan, Arindam Ghosh, Ambarish Ghosh, Indian Institute of Science (India) . . [9371-48]

4:50 pm: **Control of radiative processes of molecules and quantum dots using plasmonic structures**, Thang B. Hoang, Gleb M. Akselrod, Christos Argyropoulos, Cristian Ciracì, David R. Smith, Maiken H. Mikkelsen, Duke Univ. (USA). . . . . [9371-49]

5:10 pm: **Optical magnetism in asymmetric plasmonic structures**, Faezeh Tork Ladani, Vartkess A. Apkarian, Eric O. Potma, Univ. of California, Irvine (USA) . . . . . [9371-50]

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Tunable infrared extraordinary transmission through 2D hole arrays in conductive ZnO, Nima Nader, Shiva R. Vangala, Solid State Scientific Corp. (USA); Junpeng Guo, The Univ. of Alabama in Huntsville (USA); Joshua R. Hendrickson, Kevin D. Leedy, Air Force Research Lab. (USA); David C. Look, Wyle Labs. (USA); Justin W. Cleary, Air Force Research Lab. (USA) . . . [9371-69]

The analog of superradiant emission in thermal emitters, Ming Zhou, Soongyu Yi, Univ. of Wisconsin-Madison (USA); Ting S. Luk, Sandia National Labs. (USA); Qiaoqiang Gan, Univ. at Buffalo (USA); Zongfu Yu, Univ. of Wisconsin-Madison (USA). . . . . [9371-70]

Determination of enhanced excitation rate of quantum dots mediated by Bloch-like surface plasmon polaritons, Min Lin, Zhaolong Cao, Hock Chun Ong, The Chinese Univ. of Hong Kong (Hong Kong, China). . . . . [9371-71]

Optical Helmholtz resonators, Paul Chevalier, Patrick Bouchon, ONERA (France); Fabrice Pardo, Lab. de Photonique et de Nanostructures (France); Riad Haidar, ONERA (France) . . . . . [9371-72]

Highly-tolerant and reflective titanium dioxide stacks with tunability for visible wavelength applications, Jung Woo Leem, Jae Su Yu, Kyung Hee Univ. (Korea, Republic of). . . . . [9371-73]

Nonlinear light interaction in an array of dielectric subwavelength waveguides, Gregorio Mendoza González, Jesús Manuel Muñoz Pacheco, Erwin A. Martí Panameño, Benemérita Univ. Autónoma de Puebla (Mexico). . . . . [9371-74]

Towards practical realization of plasmonic waveguides cladded by hyperbolic metamaterials, Viktoriia E. Babicheva, DTU Fotonik (Denmark) and Purdue Univ. (USA) and ITMO Univ. (Russian Federation); Mikhail Shalaginov, Purdue Univ. (USA); Satoshi Ishii, Purdue Univ. (USA) and National Institute for Materials Science (Japan); Alexandra Boltasseva, Purdue Univ. (USA) and DTU Fotonik (Denmark); Alexander V. Kildishev, Purdue Univ. (USA) . . . . . [9371-75]

Lattice resonances of plasmonic nanoparticle array in TM-polarization, Viktoriia E. Babicheva, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); Andrey B. Evlyukhin, Laser Zentrum Hannover e.V. (Germany); Sergei V. Zhukovsky, DTU Fotonik (Denmark) and ITMO Univ. (Russian Federation) . . . . . [9371-76]

Numerical and experimental investigation of plasmonic properties of silver nanocrescent structures for sensing applications, Ahmed A. Abumazwed, Andrew G. Kirk, McGill Univ. (Canada); Wakana Kubo, Takuo Tanaka, RIKEN (Japan) . . . . . [9371-77]

3D microfabrication and bioimaging by using two-photon absorbing chromophores, Ha Neul Chae, Jin Sun Park, Jin-Kyung Park, Ju Hyoung Jung, Hannam Univ. (Korea, Republic of); Cheolwoo Ha, Dong-Yol Yang, KAIST (Korea, Republic of); Chang Su Lim, Bong Rae Cho, Korea Univ. (Korea, Republic of); Kwang-Sup Lee, Hannam Univ. (Korea, Republic of) . . . . [9371-78]

Saturation-limited second harmonic generation in a quantum well-nanoresonator coupled system, Omri Wolf, Salvatore Campione, Sandia National Labs. (USA); Arvind Pawan Ravikumar, Princeton Univ. (USA); Alexander Benz, Sheng Liu, Emil A. Kadlec, Benjamin V. Olson, Eric A. Shaner, John F. Klem, Michael B. Sinclair, Igal Brener, Sandia National Labs. (USA) . . . . . [9371-79]

Design of water molecule and its surrounding, Rostyslav I. Danylo, Boris A. Okhrimenko, National Taras Shevchenko Univ. of Kyiv (Ukraine) . . . . . [9371-80]

Thursday 12 February

SESSION 12

LOCATION: ROOM 307 (ESPLANADE) . . . . . THU 8:00 AM TO 10:00 AM

Optomechanical Structures

Session Chair: **Ali Adibi,** Georgia Institute of Technology (USA)

8:00 am: **Nano-optomechanics: Feedback control with zero point motion resolution at the thermal decoherence rate** *(Invited Paper)*, Dalziel J. Wilson, Vivishek Sudhir, Nicolas Piro Mastracchio, Tobias J. Kippenberg, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9371-52]

8:30 am: **Gallium arsenide and silicon nitride optomechanical crystals** *(Invited Paper)*, Kartik Srinivasan, Krishna C. Balram, Karen Grutter, Marcelo I. Davanco, National Institute of Standards and Technology (USA). . . . . [9371-53]

9:00 am: **Diamond waveguide optomechanics** *(Invited Paper)*, Paul E. Barclay, Univ. of Calgary (Canada) . . . . . [9371-54]

9:30 am: **Optomechanical and strain coupling in diamond phoxonic crystal cavities** *(Invited Paper)*, Laura Kipfstuhl, Christian Hepp, Christoph Becher, Univ. des Saarlandes (Germany). . . . . [9371-55]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 13

LOCATION: ROOM 307 (ESPLANADE) . . . . . THU 10:30 AM TO 11:50 AM

Phononic Crystal Structures

Session Chair: **Kartik Srinivasan,**
National Institute of Standards and Technology (USA)

10:30 am: **Chip-scale phonon-based scalable quantum computing** *(Invited Paper)*, Ihab El-Kady, Sandia National Labs. (USA) . . . . . [9371-56]

11:00 am: **Generation of spin waves in nanomagnets in a phononic crystal** *(Invited Paper)*, Yu Yahagi, Univ. of California, Santa Cruz (USA); Bruce D. Harteneck, Lawrence Berkeley National Lab. (USA); Stefano Cabrini, The Molecular Foundry (USA); Holger Schmidt, Univ. of California, Santa Cruz (USA) . . . . . [9371-57]

11:30 am: **GHz complete elastic bandgap in pillar-based membrane structures**, Reza Pourabolghasem, Saeed Mohammadi, Ali Asghar Eftekhar, Ali Adibi, Georgia Institute of Technology (USA). . . . . [9371-58]

Lunch/Exhibition Break . . . . . Thu 11:50 am to 1:00 pm

SESSION 14

LOCATION: ROOM 307 (ESPLANADE) . . . . . THU 1:00 PM TO 2:50 PM

Modeling and Simulation of Nanophotonic Structures I

Session Chair: **Holger Schmidt,** Univ. of California, Santa Cruz (USA)

1:00 pm: **Inverse design and implementation of nanophotonic structures** *(Invited Paper)*, Jelena Vuckovic, Stanford Univ. (USA) . . . . . [9371-59]

1:30 pm: **Cylindrical and spherical space equivalents to the plane wave expansion technique of Maxwell's wave equations**, Robert C. Gauthier, Mohammed A. Alzahrani, Seyed Hamed Jafari, Carleton Univ. (Canada) . . . . . [9371-60]

1:50 pm: **Spherical space Bessel-Legendre-Fourier mode solver for Maxwell's wave equations**, Mohammed A. Alzahrani, Robert C. Gauthier, Carleton Univ. (Canada) . . . . . [9371-61]

2:10 pm: **Cross-slot waveguide Bragg grating**, Matthieu Roussey, Petri Stenberg, Arijit Bera, Somnath Paul, Jani Tervo, Markku Kuittinen, Seppo Honkanen, Univ. of Eastern Finland (Finland) . . . . . [9371-62]

2:30 pm: **Optical biosensor based on silicon nanowire ridge waveguide**, Rania Wahdan, Yehia Ismail, The American Univ. in Cairo (Egypt) and Zewail City of Science and Technology (Egypt); Mohamed A. Swillam, The American Univ. in Cairo (Egypt). . . . . [9371-63]

Coffee Break . . . . . Thu 2:50 pm to 3:20 pm

SESSION 15

LOCATION: ROOM 307 (ESPLANADE) . . . . . THU 3:20 PM TO 5:00 PM

Modeling and Simulation of Nanophotonic Structures II

Session Chair: **Jelena Vuckovic,** Stanford Univ. (USA)

3:20 pm: **Total absorption by degenerate critical coupling**, Jessica R. Piper, Victor Liu, Shanhui Fan, Stanford Univ. (USA) . . . . . [9371-64]

3:40 pm: **Application of Fourier-Bessel technique for computing Eigen-states in a Bragg cylindrical space slot channel waveguide**, Seyed Hamed Jafari, Robert C. Gauthier, Carleton Univ. (Canada) . . . . . [9371-65]

4:00 pm: **Dispersion of mode-gap cavities**, Jin Lian, Sergei Sokolov, Univ. Twente (Netherlands); Alfredo De Rossi, Sylvain Combrie, Thales Research & Technology (France); Allard P. Mosk, Univ. Twente (Netherlands) . . . . . [9371-66]

4:20 pm: **All-optical control of form birefringence**, Subhajit Bej, Jani Tervo, Yuri Svirko, Jari Turunen, Univ. of Eastern Finland (Finland) . . . . . [9371-68]

4:40 pm: **Coherent control of coherent anti-Stokes Raman scattering by chiral sculptured thin films**, Joseph B. Geddes III, Rolith, Inc. (USA) . [9371-67]

CONFERENCE 9372
LOCATION: ROOM 123 (EXHIBIT LEVEL)

Wednesday–Thursday 11–12 February 2015 • Proceedings of SPIE Vol. 9372

High Contrast Metastructures IV

Conference Chairs: **Connie J. Chang-Hasnain,** Univ. of California, Berkeley (USA); **David Fattal,** LEIA Inc. (USA); **Fumio Koyama,** Tokyo Institute of Technology (Japan); **Weimin Zhou,** U.S. Army Research Lab. (USA)

Program Committee: **Markus-Christian Amann,** Walter Schottky Institut (Germany); **Il-Sug Chung,** Technical Univ. of Denmark (Denmark); **Ernst-Bernhard Kley,** Friedrich-Schiller-Univ. Jena (Germany); **Philippe Lalanne,** Institut d'Optique Graduate School (France); **John R. Lawall,** National Institute of Standards and Technology (USA); **Tien-Chang Lu,** National Chiao Tung Univ. (Taiwan); **Rainer F. Mahrt,** IBM Research – Zürich (Switzerland); **Gunther Roelkens,** Univ. Gent (Belgium); **Pierre Viktorovitch,** Ecole Centrale de Lyon (France); **Alan E. Willner,** The Univ. of Southern California (USA); **Ming C. Wu,** Univ. of California, Berkeley (USA); **Anshi Xu,** Peking Univ. (China)

Wednesday 11 February

SESSION 1

LOCATION: ROOM 123 (EXHIBIT LEVEL) .... WED 9:00 AM TO 10:30 AM

Harnessing Light

Session Chair: **Fumio Koyama,** Tokyo Institute of Technology (Japan)

9:00 am: **Advances of high-contrast gratings** *(Invited Paper)*, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA) . . . . . [9372-1]

9:30 am: **High-index contrast-integrated optics in the cylindrical coordinate** *(Invited Paper)*, Siyuan Yu, Univ. of Bristol (United Kingdom) and Sun Yat-Sen Univ. (China); Xinlun Cai, Sun Yat-Sen Univ. (China); Ning Zhang, Univ. of Bristol (United Kingdom). . . . . [9372-2]

10:00 am: **Electrical tuning and control of photonic crystal cavities for photonic quantum information processing** *(Invited Paper)*, Andrea Fiore, Tian Xia, Maurangelo Petruzzella, Leonardo Midolo, Francesco M. Pagliano, YongJin Cho, Frank W. M. van Otten, Technische Univ. Eindhoven (Netherlands); Lianhe Li, Edmund H. Linfield, Univ. of Leeds (United Kingdom) . . . . . [9372-3]

Coffee Break . . . . . Wed 10:30 am to 11:00 am

SESSION 2

LOCATION: ROOM 123 (EXHIBIT LEVEL) .... WED 11:00 AM TO 12:30 PM

VCSELs

Session Chair: **Connie J. Chang-Hasnain,** Univ. of California, Berkeley (USA)

11:00 am: **High-speed high-contrast grating VCSELs** *(Invited Paper)*, Werner H. Hofmann, Technische Univ. Berlin (Germany) . . . . . [9372-4]

11:30 am: **High-contrast grating reflectors for 980-nm vertical-cavity surface-emitting lasers** *(Invited Paper)*, Marcin Gebski, Olga Kuzior, Maciej Dems, Lodz Univ. of Technology (Poland); Anna Szerling, Anna Wojcik, Institute of Electron Technology (Poland); Norbert Palka, Military Univ. of Technology (Poland); Michal Wasiak, Lodz Univ. of Technology (Poland); Qi Jie Wang, Dao Hua Zhang, Nanyang Technological Univ. (Singapore); Tomasz G. Czyszanowski, Lodz Univ. of Technology (Poland) . . . . . [9372-5]

12:00 pm: **Fabrication of SiC membrane HCG blue reflector using nanoimprint lithography**, Ying-Yu Lai, National Chiao Tung Univ. (Taiwan); Akihiro Matsutani, Tokyo Institute of Technology (Japan); Tien-Chang Lu, Shing-Chung Wang, National Chiao Tung Univ. (Taiwan); Fumio Koyama, Tokyo Institute of Technology (Japan) . . . . . [9372-6]

12:15 pm: **Heterogeneously-integrated VCSEL using high-contrast grating on silicon**, James E. Ferrara Jr., Weijian Yang, Li Zhu, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA) . . . . . [9372-7]

Lunch/Exhibition Break . . . . . Wed 12:30 pm to 1:45 pm

SESSION 3

LOCATION: ROOM 123 (EXHIBIT LEVEL) ..... WED 1:45 PM TO 3:30 PM

Resonators

Session Chair: **Siyuan Yu,** Univ. of Bristol (United Kingdom)

1:45 pm: **Optomechanics with high-contrast gratings** *(Invited Paper)*, John R. Lawall, National Institute of Standards and Technology (USA) and Joint Quantum Institute (USA); Haitan Xu, National Institute of Standards and Technology (USA) and Joint Quantum Institute (USA); Yi-Chen Shuai, National Institute of Standards and Technology (USA) and Joint Quantum Institute (USA); Utku Kemiktarak, Corey Stambaugh, National Institute of Standards and Technology (USA) and Joint Quantum Institute (USA); Jacob M. Taylor, National Institute of Standards and Technology (USA) and Joint Quantum Institute (USA) . . . . . [9372-8]

2:15 pm: **High-contrast gratings for active-cavity optomechanics**, Stephen A. Gerke, Weijian Yang, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA). . . . . [9372-9]

2:30 pm: **Optical resonator for gas/liquid sensing based on high-contrast gratings**, Tianbo Sun, Univ. of California, Berkeley (USA); Krishanan Parameswaran, Physical Sciences Inc. (USA); Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA) . . . . . [9372-10]

2:45 pm: **Lasing characteristics of nonpolar a-plane GaN-based photonic crystal defect cavities** *(Invited Paper)*, Tsung-Sheng Kao, Tien-Chang Lu, Hao-Chung Kuo, Shing-Chung Wang, National Chiao Tung Univ. (Taiwan) . . . . . [9372-11]

3:15 pm: **TiO_2/air high-contrast grating reflectors for GaN-based vertical-cavity light emitters**, Seyed Ehsan Hashemi, Jorgen Bengtsson, Johan S. Gustavsson, Chalmers Univ. of Technology (Sweden); Georg Rossbach, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Åsa Haglund, Chalmers Univ. of Technology (Sweden). . . . . [9372-12]

Coffee Break . . . . . Wed 3:30 pm to 4:00 pm

SESSION 4

LOCATION: ROOM 123 (EXHIBIT LEVEL) .....WED 4:00 PM TO 5:30 PM

Novel Devices

Session Chair: **Tien-Chang Lu,** National Chiao Tung Univ. (Taiwan)

4:00 pm: **Virtually-imaged phased array based on Bragg reflector waveguide for large-port optical switching** *(Invited Paper)*, Fumio Koyama, Tokyo Institute of Technology (Japan) . . . . . [9372-13]

4:30 pm: **Bringing mirrors to rest: grating concepts for ultra-precise interferometry** *(Invited Paper)*, Stefanie Kroker, Friedrich-Schiller-Univ. Jena (Germany); Ernst-Bernhard Kley, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer IOF (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) . . . . . [9372-14]

5:00 pm: **Low-loss adiabatically-tapered high-contrast gratings for slow-wave modulators on SOI**, Corrado Sciancalepore, Karim Hassan, CEA-LETI (France); Thomas Ferrotti, STMicroelectronics (France) and CEA-LETI (France); Julie Harduin, Hélène Duprez, Sylvie Menezo, Badhise Ben Bakir, CEA-LETI (France) . . . . . [9372-15]

5:15 pm: **Highly-efficient polarization control using high-contrast transmit arrays**, Amir Arbabi, California Institute of Technology (USA); Mahmood Bagheri, Jet Propulsion Lab. (USA); Yu Horie, Andrei Faraon, California Institute of Technology (USA) . . . . . [9372-16]

OPTO

CONFERENCE 9372
LOCATION: ROOM 123 (EXHIBIT LEVEL)

Thursday 12 February

SESSION 5
LOCATION: ROOM 123 (EXHIBIT LEVEL) . . . . . THU 9:00 AM TO 10:30 AM

Metastructures

Session Chair: **John R. Lawall,**
National Institute of Standards and Technology (USA)

9:00 am: **Self-similar optical properties of fractal high-contrast gratings** *(Invited Paper)*, Bala Pesala, Ameen E., CSIR Madras Complex (India); Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA). . . . . [9372-17]

9:30 am: **Design and fabrication of 3D high-contrast metastructure THz cage waveguides**, Gerard T. Dang, Monica Taysing-Lara, Weimin Zhou, U.S. Army Research Lab. (USA); Tianbo Sun, Weijan Yang, Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA). . . . . [9372-18]

9:45 am: **Active coloration with flexible high-contrast metastructures**, Li Zhu, Univ. of California, Berkeley (USA); Jonas Kapraun, Julius-Maximilians-Univ. Würzburg (Germany); James E. Ferrara Jr., Connie J. Chang-Hasnain, Univ. of California, Berkeley (USA) . . . . . [9372-19]

10:00 am: **Gap-plasmon metasurfaces for circular dichroic spectroscopy and broadband optical activity**, Amr Shaltout, Jingjing Liu, Vladimir M. Shalaev, Alexander Kildishev, Purdue Univ. (USA) . . . . . [9372-20]

10:15 am: **PT symmetric metamaterials and polarisation phase transitions**, Mark Lawrence, The Univ. of Birmingham (United Kingdom); Ningning Xu, Oklahoma State Univ. (USA); Xueqian Zhang, The Univ. of Birmingham (United Kingdom) and Tianjin Univ. (China); Longqing Cong, Jiaguang Han, Tianjin Univ. (China); Weili Zhang, Oklahoma State Univ. (USA) and Tianjin Univ. (China); Shuang Zhang, The Univ. of Birmingham (United Kingdom) . . . . . [9372-21]

Coffee Break . . . . . Thu 10:30 am to 11:00 am

SESSION 6
LOCATION: ROOM 123 (EXHIBIT LEVEL) . . . . . THU 11:00 AM TO 12:45 PM

Engineering of Metastructures

Session Chair: **Andrea Fiore,**
Technische Univ. Eindhoven (Netherlands)

11:00 am: **Parameter-tolerant design of HCGs** *(Invited Paper)*, Christyves Chevallier, Supélec (France) and Georgia Tech-CNRS Joint Research Lab. (France); Nicolas Fressengeas, Univ. de Lorraine (France); Joël Jacquet, Captoor (France); Guilhem Almuneau, Youness Laaroussi, Olivier Gauthier-Lafaye, Lab. d'Analyse et d'Architecture des Systèmes (France); Laurent Cerutti, Univ. Montpellier 2 (France); Frédéric Genty, Supélec (France) . . . . . [9372-22]

11:30 am: **On-chip broadband spectral filtering using planar double high-contrast grating reflectors**, Yu Horie, Amir Arbabi, Andrei Faraon, California Institute of Technology (USA) . . . . . [9372-23]

11:45 am: **Efficient high NA flat microlenses realized using high-contrast transmit arrays**, Amir Arbabi, California Institute of Technology (USA); Mahmood Bagheri, Jet Propulsion Lab. (USA); Alexander J. Ball, Yu Horie, Andrei Faraon, California Institute of Technology (USA). . . . . [9372-24]

12:00 pm: **Tailoring the angular transmission behavior of high-contrast gratings** *(Invited Paper)*, Stefanie Kroker, Thomas Käsebier, Friedrich-Schiller-Univ. Jena (Germany); Ernst-Bernhard Kley, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer IOF (Germany); Andreas Tünnermann, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-IOF (Germany). . . . . [9372-25]

12:30 pm: **Polariton system control through surface pattern design in a subwavelength-grating-based microcavity**, Bo Zhang, Zhaorong Wang, Univ. of Michigan (USA); Sebastian Brodbeck, Christian Schneider, Martin Kamp, Julius-Maximilians-Univ. Würzburg (Germany); Sven Höfling, Univ. of St. Andrews (United Kingdom); Hui Deng, Univ. of Michigan (USA) . . . . . [9372-26]

Lunch/Exhibition Break . . . . . Thu 12:45 pm to 2:00 pm

SESSION 7
LOCATION: ROOM 123 (EXHIBIT LEVEL) . . . . . THU 2:00 PM TO 3:45 PM

Reflectors and Resonators

Session Chair: **Werner H. Hofmann,** Technische Univ. Berlin (Germany)

2:00 pm: **GaAs/AlO_x high-contrast grating mirrors for mid-infrared VCSELs** *(Invited Paper)*, Guilhem Almuneau, Youness Laaroussi, Lab. d'Analyse et d'Architecture des Systèmes (France) and Ctr. National de la Recherche Scientifique (France); Christyves Chevallier, Frédéric Genty, Nicolas Fressengeas, Lab. Matériauy Optiques, Photonique et Systèmes (France) and Supélec (France); Laurent Cerutti, Univ. Montpellier 2 (France); Olivier Gauthier-Lafaye, Lab. d'Analyse et d'Architecture des Systèmes (France) and Ctr. National de la Recherche Scientifique (France) . . . . . [9372-27]

2:30 pm: **Antireflection subwavelength gratings on optical fiber tips fabricated by a dedicated UV nano imprint lithography system** *(Invited Paper)*, Yoshiaki Kanamori, Masaaki Okochi, Kazuhiro Hane, Tohoku Univ. (Japan). . . . . [9372-28]

3:00 pm: **Integration of GaAs-based VCSEL array on SiN platform with HCG reflectors for WDM applications**, Sulakshna Kumari, Univ. Gent (Belgium) and IMEC (Belgium); Johan S. Gustavsson, Chalmers Univ. of Technology (Sweden); Ruijun Wang, Univ. Gent (Belgium) and IMEC (Belgium); Emanuel P. Haglund, Petter Westbergh, Chalmers Univ. of Technology (Sweden); Dorian Sanchez, Univ. Gent (Belgium); Erik Haglund, Asa Haglund, Jorgen Bengtsson, Chalmers Univ. of Technology (Sweden); Gunther Roelkens, Univ. Gent (Belgium) and IMEC (Belgium); Anders Larsson, Chalmers Univ. of Technology (Sweden); Roel G. Baets, Univ. Gent (Belgium) and IMEC (Belgium). . . . . [9372-29]

3:15 pm: **Photonic crystal membranes for the coherent control of thermal radiation: application to narrow-band and directive sources**, Cedric Blanchard, Ecole Centrale de Lyon (France); Cecile Jamois, Institut National des Sciences Appliquées de Lyon (France); Pierre Viktorovitch, Christian Grillet, Ecole Centrale de Lyon (France); Xavier Letartre, Institut des Nanotechnologies de Lyon (France) . . . . . [9372-30]

3:30 pm: **Guided resonance reflective phase shifters**, Yu Horie, Amir Arbabi, Andrei Faraon, California Institute of Technology (USA). . . . . [9372-31]

CONFERENCE 9373
LOCATION: ROOM 274 (MEZZANINE)

Monday–Wednesday 9–11 February 2015 • Proceedings of SPIE Vol. 9373

Quantum Dots and Nanostructures: Synthesis, Characterization, and Modeling XII

Conference Chairs: **Diana L. Huffaker,** Univ. of California, Los Angeles (USA); **Holger Eisele,** Technische Univ. Berlin (Germany)

Program Committee: **Alberto Bramati,** Lab. Kastler Brossel (France); **Massimo De Vittorio,** Univ. del Salento (Italy); **Axel Hoffmann,** Technische Univ. Berlin (Germany); **Minjoo Larry Lee,** Yale Univ. (USA); **Huiyun Liu,** Univ. College London (United Kingdom); **Vinod M. Menon,** Queens College (USA); **Zetian Mi,** McGill Univ. (Canada); **Jeffrey C. Owrutsky,** U.S. Naval Research Lab. (USA); **Gregory J. Salamo,** Univ. of Arkansas (USA); **Jonathan Spanier,** Drexel Univ. (USA); **Frank Szmulowicz,** Univ. of Dayton Research Institute (USA)

Monday 9 February

OPTO PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA). . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA). . . . . [9371-202]

Coffee Break . . . . . Mon 10:10 am to 10:30 am

SESSION 1

LOCATION: ROOM 274 (MEZZANINE) . . . . . MON 10:30 AM TO 12:00 PM

Devices

10:30 am: **Combining fast electrical control and resonant excitation to create a wavelength-tuneable and coherent quantum-dot light source** *(Invited Paper)*, Anthony J. Bennett, Toshiba Research Europe Ltd. (United Kingdom); Yameng Cao, Toshiba Research Europe Ltd. (United Kingdom) and Imperial College London (United Kingdom); David J. P. Ellis, Toshiba Research Europe Ltd. (United Kingdom); Ian Farrer, David A. Ritchie, Univ. of Cambridge (United Kingdom); Andrew J. Shields, Toshiba Research Europe Ltd. (United Kingdom) . . . . . [9373-1]

11:00 am: **High-performance nanopillar optical antenna avalanche diodes**, Pradeep N. Senanayake, Alan Farrell, Diana L. Huffaker, Univ. of California, Los Angeles (USA) . . . . . [9373-2]

11:20 am: **Low-noise four-wavelength simultaneous oscillation of a 1.3-μm external-cavity quantum-dot laser**, Nami Yausoka, The Univ. of Tokyo (Japan); Mitsuru Ishida, Kan Takada, Masaomi Yamaguchi, Tsuyoshi Yamamoto, Fujitsu Labs., Ltd. (Japan); Yasuhiro Arakawa, The Univ. of Tokyo (Japan). . . . . [9373-3]

11:40 am: **On-chip generation, routing, and detection of non-classical light**, Michael Kaniber, Technische Univ. München (Germany); Günther Reithmaier, Fabian Flassig, Walter Schottky Institut (Germany); Kai Müller, Stanford Univ. (USA); Rudolf O. Gross, Walther-Meissner-Institute (Germany); Jonathan J. Finley, Walter Schottky Institut (Germany) . . . . . [9373-4]

Lunch Break . . . . . Mon 12:00 pm to 1:30 pm

SESSION 2

LOCATION: ROOM 274 (MEZZANINE) . . . . . MON 1:30 PM TO 3:20 PM

Wires

1:30 pm: **High-efficiency AlGaN deep ultraviolet** *(Invited Paper)*, Zetian Mi, McGill Univ. (Canada). . . . . [9373-5]

2:00 pm: **Tailoring of GaAs/GaAsSb core-shell structured nanowires for IR photodetector applications**, Pavan K. Kasanaboina, Sai K. Ojha, Shifat U. Sami, Lew Reynolds, Shanthi Iyer, North Carolina A&T State Univ. (USA)[9373-6]

2:20 pm: **Optical characterisation of catalyst free GaAsP and GaAsP core-shell nanowires grown directly on Si substrates by MBE**, Jonathan R. Orchard, The Univ. of Sheffield (United Kingdom); Yunyan Zhang, Jiang Wu, Huiyun Liu, Univ. College London (United Kingdom); David J. Mowbray, The Univ. of Sheffield (United Kingdom) . . . . . [9373-7]

2:40 pm: **GaAsP nanowires on silicon substrates for high-efficiency and low-cost multi-junction solar cells**, Ramesh Babu Laghumavarapu, Univ. of California, Los Angeles (USA) . . . . . [9373-8]

3:00 pm: **Complex emission dynamics from InGaAs/GaAs core-shell nanopillars**, Katarzyna Komolibus, Tomasz J. Ochalski, Bryan Kelleher, Cork Institute of Technology (Ireland); Adam C. Scofield, Univ. of California, Los Angeles (USA); Guillaume Huyet, Cork Institute of Technology (Ireland); Diana L. Huffaker, Univ. of California, Los Angeles (USA). . . . . [9373-9]

Coffee Break . . . . . Mon 3:20 pm to 3:50 pm

SESSION 3

LOCATION: ROOM 274 (MEZZANINE) . . . . . MON 3:50 PM TO 5:30 PM

Optical Characterization

3:50 pm: **Carrier lifetime measurements for 1.3-μm InAs/GaAs quantum dot lasers using impedance matching**, Xiao Sun, Alcatel-Lucent Shanghai Bell Co. Ltd. (China) . . . . . [9373-11]

4:10 pm: **Enhanced single-photon emission of InGaN quantum dots coupled to a silver cavity**, Brandon J. Demory, Tyler Hill, Chu-Hsiang Teng, Lei Zhang, Hui Deng, Pei-Cheng Ku, Univ. of Michigan (USA). . . . . [9373-12]

4:30 pm: **Modification of photon antibunching behavior of single quantum dots near gold nanoparticles**, Swayandipta Dey, Univ. of Connecticut (USA); Yadong Zhou, Univ. of Central Florida (USA); Xiangdong Tian, Julie Jenkins, Univ. of Connecticut (USA); Ou Chen, Massachusetts Institute of Technology (USA); Shengli Zou, Univ. of Central Florida (USA); Jing Zhao, Univ. of Connecticut (USA). . . . . [9373-15]

4:50 pm: **Plasmon-coupled $CuInS_2$/ZnS core-shells for developing hybrid white LEDs**, Quinton Rice, Hampton Univ. (USA); Sangram Raut, Texas Christian Univ. (USA); Rahul Chib, Univ. of North Texas Health Science Ctr. at Fort Worth (USA); Zygmunt K. Gryczynski, Texas Christian Univ. (USA); Ignacy Gryczynski, Univ. of North Texas Health Science Ctr. at Fort Worth (USA); Wenjin Zhang, Xinhua Zhong, East China Univ. of Science and Technology (China); Mahmoud Abdel-Fattah, Bagher Tabibi, Jaetae Seo, Hampton Univ. (USA) . . . . . [9373-13]

5:10 pm: **Nonlinear versus linear optics transition selection rules in CdTe quantum dots**, Diogo B. Almeida, Instituto de Física "Gleb Wataghin" (Brazil); André A. de Thomaz, Univ. Estadual de Campinas (Brazil) and Instituto de Física (Brazil); Vitor B. Pelegati, Instituto de Física "Gleb Wataghin" (Brazil); Hernandes F. Carvalho, Univ. Estadual de Campinas (Brazil); Carlos L. Cesar, Univ. Estadual de Campinas (Brazil) and Instituto de Física (Brazil) . . . . . [9373-14]

OPTO

CONFERENCE 9373
LOCATION: ROOM 274 (MEZZANINE)

Tuesday 10 February

SESSION 4

LOCATION: ROOM 274 (MEZZANINE) . . . . . TUE 8:30 AM TO 10:00 AM

Nanostructure Design and Characterization

8:30 am: **Growth of InGaAs quantum dots on Si and tensile GaAs quantum dots on InP** *(Invited Paper)*, Minjoo Larry Lee, Yale Univ. (USA) . . . . . [9373-16]

9:00 am: **Optimising the defect filter layer design for III/V QDs on Si for integrated laser applications**, Jonathan R. Orchard, The Univ. of Sheffield (United Kingdom); Jiang Wu, Siming Chen, Qi Jiang, Univ. College London (United Kingdom); Thomas Ward, Richard Beanland, The Univ. of Warwick (United Kingdom); Huiyun Liu, Univ. College London (United Kingdom); David J. Mowbray, The Univ. of Sheffield (United Kingdom) . . . . . [9373-17]

9:20 am: **Heuristic method to calculate quantum dots energy levels**, André A. de Thomaz, Diogo B. Almeida, Vitor B. Pelegati, Univ. Estadual de Campinas (Brazil); Luiz G. Ferreira, Univ. de São Paulo (Brazil); Carlos L. Cesar, Univ. Estadual de Campinas (Brazil) . . . . . [9373-18]

9:40 am: **Stability in peak emission wavelength in strain coupled multilayer InAs/GaAs quantum dot heterostructures upon subjected to high-temperature rapid thermal annealing**, Saikalash Shetty, Sourav Adhikary, Hemant Ghadi, Subhananda Chakrabarti, Indian Institute of Technology Bombay (India) . . . . . [9373-19]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 5

LOCATION: ROOM 274 (MEZZANINE) . . . . . TUE 10:30 AM TO 12:10 PM

Colloidal and Synthesized Nanostructures

10:30 am: **Room temperature continuous-wave pumped lasing with colloidal CdSe nanosheets**, Joel Q. Grim, Sotirios Christodoulou, Francesco Di Stasio, Roman Krahne, Istituto Italiano di Tecnologia (Italy); Roberto Cingolani, Istituto Nazionale per la Fisica della Materia (Italy); Liberato Manna, Iwan Moreels, Istituto Italiano di Tecnologia (Italy) . . . . . [9373-20]

10:50 am: **Low-loss mid infrared surface phonon polariton modes in polar dielectric crystals**, Jeffrey C. Owrutsky, U.S. Naval Research Lab. (USA) . . . . . [9373-21]

11:10 am: **Water-soluble CdTe nanocrystals under high pressure**, Yan-Cheng Lin, National Chiao Tung Univ. (Taiwan) . . . . . [9373-22]

11:30 am: **Shape and size controlled lead sulfide (PbS) quantum dots for optical refrigeration applications**, Gurinder K. Ahluwalia, Mandeep S. Bakshi, College of The North Atlantic (Canada); Raman Kashyap, Ecole Polytechnique de Montréal (Canada) . . . . . [9373-23]

11:50 am: **Towards the fabrication of high-quality superstructures from ionic liquid electrolytic bath**, Khushbu Chauhan, Indrajit Mukhopadhyay, Pandit Deendayal Petroleum Univ. (India) . . . . . [9373-24]

Wednesday 11 February

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Capping layer growth rate and the optical and structural properties of GaAsSbN-capped InAs/GaAs quantum dots, Jose María M. Ulloa, Univ. Politécnica de Madrid (Spain); Daniel Reyes, Univ. de Cádiz (Spain); Antonio D. Utrilla, Alavaro Guzmán, Adrian Hierro, Univ. Politécnica de Madrid (Spain); Teresa Ben, David Gonzalez, Univ. de Cádiz (Spain). . . . . [9373-25]

Strong visible electroluminescence in silicon nanocrystals embedded in a silicon carbide matrix, Chul Huh, Tae-Youb Kim, Chang-Geun Ahn, Bong Kyu Kim, Electronics and Telecommunications Research Institute (Korea, Republic of) . . . . . [9373-26]

Optimization of Er^{3+}/Yb^{3+} co-doped LaF_3 nanoparticles for enhanced upconversion emission, Kagola Upendra Kumar, Tasso de Oliveira Sales, Carlos Jacinto da Silva, Univ. Federal de Alagoas (Brazil) . . . . . [9373-27]

Cross sectional TEM (XTEM) analysis for vertically-coupled quaternary InAlGaAs capped InAs/GaAs quantum dot infrared photodetectors, Binita Tongbram, Sourav Adhikary, Hemant Ghadi, Arjun Mandal, Subhananda Chakrabarti, Indian Institute of Technology Bombay (India) . . . . . [9373-28]

CONFERENCE 9374
LOCATION: ROOM 228 (MEZZANINE)

Sunday–Wednesday 8–11 February 2015 • Proceedings of SPIE Vol. 9374

COSPONSOR:

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Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII

Conference Chairs: **Georg von Freymann,** Technische Univ. Kaiserslautern (Germany); **Winston V. Schoenfeld,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Raymond C. Rumpf,** The Univ. of Texas at El Paso (USA)

Program Committee: **Cornelia Denz,** Münster Univ. (Germany); **Ruth Houbertz,** Multiphoton Optics GmbH (Germany); **Saulius Juodkazis,** Swinburne Univ. of Technology (Australia); **Stephen M. Kuebler,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Akhlesh Lakhtakia,** The Pennsylvania State Univ. (USA); **Robert R. McLeod,** Univ. of Colorado at Boulder (USA); **Hernán R. Míguez,** Institute of Materials Science of Seville (Spain); **Dennis W. Prather,** Univ. of Delaware (USA); **Aaron J. Pung,** Clemson Univ. (USA); **John A. Rogers,** Univ. of Illinois at Urbana-Champaign (USA); **Thomas J. Suleski,** The Univ. of North Carolina at Charlotte (USA); **Michael Thiel,** Nanoscribe GmbH (Germany)

Sunday 8 February

SESSION 1

LOCATION: ROOM 228 (MEZZANINE) . . . . . SUN 10:30 AM TO 12:00 PM

3D Direct Laser Writing I

Session Chair: **Stephen M. Kuebler,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

10:30 am: **Fabricating microscopic tools: Towards optically actuated micro-robotics** *(Invited Paper)*, David B. Phillips, Miles J. Padgett, Univ. of Glasgow (United Kingdom); Simon Hanna, Daniel Ho, Univ. of Bristol (United Kingdom); David Carberry, The Univ. of Queensland (Australia); Mervyn J. Miles, Univ. of Bristol (United Kingdom); Stephen H. Simpson, Univ. of Brno (Czech Republic) . . . . . [9374-1]

11:00 am: **Fabrication and characterization of micro-structures created by direct laser writing in multi-layered chalcogenide glasses**, Casey M. Schwarz, Univ. of Central Florida (USA); Chris N. Grabill, The College of Optics and Photonics, Univ. of Central Florida (USA); Benn Gleason, Spencer Novak, Univ. of Central Florida (USA) and Clemson Univ. (USA); Anna M. Lewis, Gerald D. Richardson, Univ. of Central Florida (USA); Clara Rivero-Baleine, Lockheed Martin Missiles and Fire Control (USA); Kathleen A. Richardson, The College of Optics and Photonics, Univ. of Central Florida (USA); Alexej Pogrebnyakov, Theresa S. Mayer, The Pennsylvania State Univ. (USA); Stephen M. Kuebler, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9374-2]

11:20 am: **Hybrid type-I/II waveguide embedded Bragg gratings in lithium niobate by direct femtosecond laser writing**, Sebastian Kroesen, Jörg Imbrock, Cornelia Denz, Westfälische Wilhelms-Univ. Münster (Germany) . . . . . [9374-3]

11:40 am: **Nano-scale optical actuation based on two-dimensional heterostructure photonic crystal cavities**, Tong Lin, Guangya Zhou, Fook Siong Chau, Feng Tian, National Univ. of Singapore (Singapore); Jie Deng, A*STAR Institute of Materials Research and Engineering (Singapore) . . . [9374-4]

Lunch Break . . . . . Sun 12:00 pm to 1:20 pm

SESSION 2

LOCATION: ROOM 228 (MEZZANINE) . . . . . SUN 1:20 PM TO 3:30 PM

3D Direct Laser Writing II

Session Chair: **Georg von Freymann,** Technische Univ. Kaiserslautern (Germany)

1:20 pm: **Recent progress on triple-helix gold-based metamaterials** *(Invited Paper)*, Johannes Kaschke, Karlsruher Institut für Technologie (Germany); Mark Blome, Sven Burger, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany); Martin Wegener, Karlsruher Institut für Technologie (Germany) . . . . . [9374-5]

1:50 pm: **Three-dimensional plasmonic nanostructures for enhanced circular dichroism**, Negar Otrooshi, Abraham Vazquez-Guardado, Daniel Franklin, Debashis Chanda, Univ. of Central Florida (USA) . . . . . [9374-6]

2:10 pm: **Reversible deformation in hybrid organic-inorganic photoresists processed by ultrafast direct laser write technique**, Vygantas Mizeikis, Shizuoka Univ. (Japan); Sima Rekstyte, Vytautas Purlys, Vilnius Univ. (Lithuania); Saulius Juodkazis, Swinburne Univ. of Technology (Australia). . . . . [9374-7]

2:30 pm: **Enhanced nanograting formation assisted by silver ions in a sodium gallophosphate glass: Correlation between surface nanostructuring, fluorescence, and effective second-order nonlinear optical properties**, Marie Vangheluwe, Univ. Laval (Canada); Feng Liang, Ctr. d'Optique, Photonique et Laser (Canada); Yannick Petit, Patricia Hée, Institut de Chimie de la Matière Condensée de Bordeaux (France); Yannick Ledemi, Ctr. d'Optique, Photonique et Laser (Canada); Sébastien Thomas, Institut de Chimie de la Matière Condensée de Bordeaux (France); Nicolas Marquestaut, Univ. Bordeaux 1 (France); Evelyne Fargin, Thierry Cardinal, Institut de Chimie de la Matière Condensée de Bordeaux (France); Younès Messaddeq, Ctr. d'Optique, Photonique et Laser (Canada); Lionel S. Canioni, Univ. Bordeaux 1 (France); Réal Vallée, Ctr. d'Optique, Photonique et Laser (Canada) . . . . [9374-8]

2:50 pm: **Femtosecond laser writing of phase-tuned multi-level volume gratings for holographic fabrication of symmetry-controlled 3D photonic crystal structure**, Liang Yuan, Peter R. Herman, Univ. of Toronto (Canada) . . . . . [9374-9]

3:10 pm: **Volumetric integration of photorefractive micromodifications in lithium niobate using femtosecond direct laser write technique**, Domas Paipulas, Vilnius Univ. (Lithuania); Vygantas Mizeikis, Shizuoka Univ. (Japan); Vytautas Purlys, Ausra Cerkauskaite, Vilnius Univ. (Lithuania); Saulius Juodkazis, Swinburne Univ. of Technology (Australia) . . . . . [9374-10]

Coffee Break . . . . . Sun 3:30 pm to 4:00 pm

SESSION 3

LOCATION: ROOM 228 (MEZZANINE) . . . . . SUN 4:00 PM TO 5:50 PM

3D Structures

Session Chair: **Ruth Houbertz,** Fraunhofer-Institut für Silicatforschung (Germany)

4:00 pm: **Direct laser writing of complex photonic structures** *(Invited Paper)*, Harald Giessen, Timo Gissibl, Univ. Stuttgart (Germany) . . . . . [9374-11]

4:30 pm: **Fiber endface Fabry-Perot vapour microsensors fabricated by multiphoton polymerization technique**, Vasileia Melissinaki, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece); Ioannis Konidakis, Maria Farsari, Savros Pissadakis, Foundation for Research and Technology-Hellas (Greece) . . . . . [9374-12]

4:50 pm: **Focused ion beam 3D nano-patterned optical fiber tips for advanced beam profile engineering**, Jaime Viegas, Masdar Institute of Science & Technology (United Arab Emirates); Ana R. Ribeiro, Masdar Institute of Science & Technology (United Arab Emirates) and Univ. do Porto (Portugal); Pedro A. S. Jorge, INESC Porto (Portugal); Ricardo Janeiro, Raquel Flores, Masdar Institute of Science & Technology (United Arab Emirates) . . . . [9374-13]

5:10 pm: **Large-scale fabrication of 3D photonic nanostructures**, Norbert Schneider, Alexander Kolew, Marc Schneider, Senta Schauer, Radwanul H. Siddique, Karlsruher Institut für Technologie (Germany); Juerg Leuthold, ETH Zürich (Switzerland); Hendrik Hoelscher, Matthias Worgull, Karlsruher Institut für Technologie (Germany) . . . . . [9374-14]

5:30 pm: **Optochemically organized light filaments: From wide-eyed polymer lattices to encoded beams**, Kalaichelvi Saravanamuttu, Ian D. Hosein, Hao Lin, Matthew Ponte, Dinesh K. Basker, McMaster Univ. (Canada) . . . . . [9374-15]

OPTO

CONFERENCE 9374
LOCATION: ROOM 228 (MEZZANINE)

Monday 9 February

OPTO PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA). . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA). . . . . [9371-202]

Coffee Break . . . . . Mon 10:10 am to 10:30 am

SESSION 4
LOCATION: ROOM 228 (MEZZANINE) . . . . . MON 10:30 AM TO 12:30 PM

Light Harvesting
Session Chair: **Björn M. Reinhard,** Boston Univ. (USA)

10:30 am: **Large area fabrication of light trapping nanostructures for high efficiency silicon solar cells** *(Invited Paper)*, Debashis Chanda, Univ. of Central Florida (USA) . . . . . [9374-16]

11:00 am: **Integrating III-V compound semiconductors with silicon for advanced multijunction solar cells** *(Invited Paper)*, Gregory N. Nielson, Sandia National Labs. (USA) . . . . . [9374-17]

11:30 am: **Thermal to electrical energy converter based on black Si**, Ryosuke Komatsu, Takuya Yamamura, Yokohama National Univ. (Japan); Gediminas Seniutinas, Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia); Pierrette Michaux, Swinburne Univ. of Technology (Australia); Yoshiaki Nishijima, Yokohama National Univ. (Japan); Basil T. Wong, Swinburne Univ. of Technology (Malaysia); Saulius Juodkazis, Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia) . . . . . [9374-18]

11:50 am: **Nanotextured CuO: Sensing and light harvesting platform**, Armandas Balcytis, Swinburne Univ. of Technology (Australia) and Ctr. for Physical Sciences and Technology (Lithuania); Gediminas Seniutinas, Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia); Jurga Juodkazyte, Biochemijos Institutas (Lithuania); Saulius Juodkazis, Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia) . . . . . [9374-19]

12:10 pm: **Electron beam-induced etching and restructuring of diamond**, Cameron J. Zachreson, Aiden A. Martin, Igor Aharonovich, Milos Toth, Matthew R. Phillips, Univ. of Technology, Sydney (Australia). . . . . [9374-20]

Lunch Break . . . . . Mon 12:30 pm to 2:00 pm

SESSION 5
LOCATION: ROOM 228 (MEZZANINE) . . . . . MON 2:00 PM TO 3:40 PM

Plasmonics and Metamaterials I
Session Chair: **Debashis Chanda,** Univ. of Central Florida (USA)

2:00 pm: **Nanoimprinted metallic arrays for highly directional light-emitting devices** *(Invited Paper)*, Gabriel Lozano, Spanish National Research Council (Spain) . . . . . [9374-21]

2:30 pm: **Design and fabrication of 3D meta-optics for beam customization and propagation** *(Invited Paper)*, Eric G. Johnson, Aaron J. Pung, Matthew Byrd, Kaitlyn Morgan, Indumathi Raghu Srimathi, Clemson Univ. (USA) . . . . . [9374-22]

3:00 pm: **Nano-media: A multi-channel image display and information storage medium using nano-structures**, Reza Qarehbaghi, Hao Jiang, Bozena Kaminska, Mohammad Naghshineh, Simon Fraser Univ. (Canada); Mohamadreza Najiminaini, Simon Fraser Univ. (Canada) and Univ. of Western Ontario (Canada) and Lawson Health Research Institute (Canada); Jeffrey J. L. Carson, Univ. of Western Ontario (Canada) and Lawson Health Research Institute (Canada) . . . . . [9374-23]

3:20 pm: **Nanoscale precision in ion milling for THz and optical antennas**, Gediminas Seniutinas, Gediminas Gervinskas, Saulius Juodkazis, Swinburne Univ. of Technology (Australia) and Melbourne Ctr. for Nanofabrication (Australia). . . . . [9374-24]

Coffee Break . . . . . Mon 3:40 pm to 4:10 pm

SESSION 6
LOCATION: ROOM 228 (MEZZANINE) . . . . . MON 4:10 PM TO 5:40 PM

Plasmonics and Metamaterials II
Session Chair: **Harald Giessen,** Univ. Stuttgart (Germany)

4:10 pm: **Template guided self-assembly strategies for discrete and extended optoplasmonic materials** *(Invited Paper)*, Björn M. Reinhard, Boston Univ. (USA) . . . . . [9374-25]

4:40 pm: **Parallel fabrication of wafer-scale plasmonic metamaterials for nano-optics**, Sahand Eslami, John G. Gibbs, Alberto Castillo, Hyeon-Ho Jeong, Andrew G. Mark, Tung Chun Lee, Max-Planck-Gesellschaft (Germany); Peer Fischer, Max-Planck Institut für Intelligente Systeme (Germany) and Univ. Stuttgart (Germany). . . . . [9374-26]

5:00 pm: **Scalable and 3D nanofabrication toward optical metamaterials and plasmonic nanostructures**, Junsuk Rho, Pohang Univ. of Science and Technology (Korea, Republic of) and Univ. of California, Berkeley (USA) and Lawrence Berkeley National Lab. (USA) . . . . . [9374-27]

5:20 pm: **Fabrication of two-dimensional aperiodic Vogel spiral photonic lattices by optical induction**, Falko Diebel, Patrick Rose, Martin Boguslawski, Cornelia Denz, Westfälische Wilhelms-Univ. Münster (Germany). . . . . [9374-28]

Tuesday 10 February

SESSION 7

LOCATION: ROOM 228 (MEZZANINE) . . . . . TUE 8:20 AM TO 10:30 AM

Advanced Manufacturing using a DMD or other SLM

Joint Session with Conferences 9374 and 9376

Session Chairs: **Philip S. King,** Texas Instruments Inc. (USA); **Cornelia Denz,** Westfälische Wilhelms-Univ. Münster (Germany)

8:20 am: **3D optical printing of piezoelectric nanoparticle-polymer composites** *(Invited Paper)*, Donald J. Sirbuly, Kanguk Kim, Wei Zhu, Shaochen Chen, Univ. of California, San Diego (USA). . . . . [9374-29]

8:50 am: **Spatial light modulator based holographic fabrication of 3D spatially varying photonic crystal templates**, Jeffrey R. Lutkenhaus, David George, Usha Philipose, Hualiang Zhang, Yuankun Lin, Univ. of North Texas (USA) . . . . . [9374-30]

9:10 am: **Large area maskless photopolymerization (LAMP): Disruptive technology for additive manufacturing using scanning spatial light modulators**, Suman Das, Marvin Kilgo, Michael Middlemas, Erica Davis, DDM Systems (USA). . . . . [9376-3]

9:30 am: **Software developments for DLP 3D printings**, Badia Koudsi, Optecks, LLC (USA) . . . . . [9376-2]

9:50 am: **Digital micromirror devices for laser-based manufacturing on the micro-scale**, Ben Mills, Univ. of Southampton (United Kingdom); Dan Heath, Matthias Feinäugle, Rob W. Eason, Optoelectronics Research Ctr. (United Kingdom) . . . . . [9376-4]

10:10 am: **Concepts for 3D print productivity systems with advanced DLP photoheads**, Alfred Jacobsen, Visitech AS (Germany); Oyvind Tafjord, Trond Jorgensen, Endre Kirkhorn, Visitech AS (Norway) . . . . . [9376-5]

Coffee Break . . . . . Tue 10:30 am to 11:00 am

SESSION 8

LOCATION: ROOM 228 (MEZZANINE) . . . . . TUE 11:00 AM TO 12:10 PM

Structured Light Applications: Metrology and 3D Machine Vision

Joint Session with Conferences 9374 and 9376

Session Chair: **Roland Höfling,** ViALUX GmbH (Germany)

11:00 am: **Transport-aware imaging** *(Invited Paper)*, Kyros Kutulakos, Matthew O'Toole, Univ. of Toronto (Canada) . . . . . [9376-6]

11:30 am: **3D microscopy for microfabrication quality control**, Matthew S. Muller, Paul D. De Jean, Swept Image Inc. (Canada) . . . . . [9376-7]

11:50 am: **Characteristics of digital micromirror projection for 3D shape measurement at extreme speed**, Roland Höfling, Petra Aswendt, Frank Leischnig, Matthias Förster, ViALUX GmbH (Germany) . . . . . [9376-8]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 1:40 pm

SESSION 9

LOCATION: ROOM 228 (MEZZANINE) . . . . . TUE 1:40 PM TO 3:20 PM

Diffractive Optical Elements I

Session Chair: **Winston V. Schoenfeld,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

1:40 pm: **Design and fabrication of sub-wavelength athermal resonant waveguide replicated gratings on different polymer substrates**, Muhammad Rizwan Saleem, Univ. of Eastern Finland (Finland) and National Univ. of Sciences and Technology (Pakistan); Seppo Honkanen, Jari Turunen, Univ. of Eastern Finland (Finland) . . . . . [9374-31]

2:00 pm: **Mask aligner lithography for TSV-structures using a double-sided (structured) photomask**, Tina Weichelt, Lorenz Stuerzebecher, Friedrich-Schiller-Univ. Jena (Germany); Uwe D. Zeitner, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9374-32]

2:20 pm: **Design and fabrication of diffractive optics for orbital angular momentum space division multiplexing**, Kaitlyn Morgan, Indumathi Srimathi Raghu, Eric G. Johnson, Clemson Univ. (USA). . . . . [9374-33]

2:40 pm: **Design and fabrication of a resonant mirrors for locking blue laser diodes**, Matthew Byrd, Joshua Baghdady, Aaron J. Pung, Eric G. Johnson, Clemson Univ. (USA). . . . . [9374-34]

3:00 pm: **Multilevel micro-structuring of glassy carbon for precision glass molding of diffractive optical elements**, Karin Prater, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Julia Dukwen, Fraunhofer-Institut für Produktionstechnologie (Germany); Toralf Scharf, Hans Peter Herzig, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Andreas Hermerschmidt, HOLOEYE Photonics AG (Germany) . . . . . [9374-35]

Coffee Break . . . . . Tue 3:20 pm to 3:50 pm

SESSION 10

LOCATION: ROOM 228 (MEZZANINE) . . . . . TUE 3:50 PM TO 4:30 PM

Diffractive Optical Elements II

Session Chair: **Aaron J. Pung,** Clemson Univ. (USA)

3:50 pm: **Finely control groove-depth variations of large-area diffraction gratings**, Lixiang Wu, Yanchang Zheng, Keqiang Qiu, Shaojun Fu, Univ. of Science and Technology of China (China) . . . . . [9374-36]

4:10 pm: **Electron beam written subwavelength gratings for polarization separation in the infrared**, Vayalamkuzhi Pramitha, Lakshmi R., Gayathri M. Sridharan, Shanti Bhattacharya, Indian Institute of Technology Madras (India). . . . . [9374-37]

SESSION 11

LOCATION: ROOM 228 (MEZZANINE) . . . . . TUE 4:30 PM TO 5:50 PM

Microoptical Elements

Session Chair: **Aaron J. Pung,** Clemson Univ. (USA)

4:30 pm: **Fluorescent signal enhancement using vapor-condensed micro-reflectors**, Zoltán S. Göröcs, Euan McLeod, Shiv Acharya, Aydogan Ozcan, Univ. of California, Los Angeles (USA) . . . . . [9374-38]

4:50 pm: **A tiny, VIS-NIR snapshot multispectral camera**, Bert Geelen, Murali Jayapala, Pilar Gonzalez, Klaas Tack, Andy Lambrechts, IMEC (Belgium) . . . . . [9374-39]

5:10 pm: **Process optimization for a 3D optical coupler and waveguide fabrication on a single substrate using buffercoat material**, Chris Summitt, Sunglin Wang, Tao Ge, Jilin Yang, Lee Johnson, Melissa Zaverton, Tom Milster, Yuzuru Takashima, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9374-40]

5:30 pm: **Low-stress silicon nitride for mid-infrared microphotonics**, Pao T. Lin, Massachusetts Institute of Technology (USA); Hao-Yu G. Lin, Harvard Univ. (USA); Tom Tiwald, J.A. Woollam Co., Inc. (USA); Dawn T. H. Tan, Singapore Univ. of Technology & Design (Sierra Leone); Lionel Kimerling, Anu Agarwal, Massachusetts Institute of Technology (USA) . . . . . [9374-41]

CONFERENCE 9374
LOCATION: ROOM 228 (MEZZANINE)

Wednesday 11 February

LASE PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . WED 10:20 AM TO 12:30 PM

Session Chairs: **Guido Hennig**, Daetwyler Graphics AG (Switzerland); **Yongfeng Lu**, Univ. of Nebraska-Lincoln (USA)

10:20 am: **Welcome and Opening Remarks**
Guido Hennig, Daetwyler Graphics AG (Switzerland); **Yongfeng Lu,** Univ. of Nebraska-Lincoln (USA)

10:25 am: **Announcement of the Green Photonics Best Paper Award and the 3D Printing, Fabrication, and Manufacturing Best Paper Award**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA); **Henry Helvajian,** The Aerospace Corp. (USA)

10:30 am: **NASA's Optical Communications Program: 2015 and Beyond**
Donald M. Cornwell Jr., NASA Headquarters, Space Communications and Navigation Program (USA) . . [9354-201]

11:10 am: **Coherent Combination of Ultrafast Laser Pulses: A Route to Joule-Class High Repetition Rate Femtosecond Lasers**
Jens Limpert, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9344-202]

11:50 am: **Laser 3D Printing of Metallic Components and its Industrial Applications: Technical Breakthroughs and Opportunities**
Xiaoyan Zeng, Wuhan National Lab. for Optoelectronics (China). . . . . [9353-203]

POSTERS-WEDNESDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Investigation of all-optical laser-based direct-write techniques, Ugis Gertners, Univ. of Latvia (Latvia); Janis Teteris, Institute of Solid State Physics (Latvia) . . . . . [9374-42]

Fabrication of sine-top broadband gold-coated gratings, Bilali Muhutijiang, Keqiang Qiu, Xiangdong Xu, Shaojun Fu, Univ. of Science and Technology of China (China) . . . . . [9374-43]

A novel fabrication process of digital encoding grating ruler for optical displacement sensors, Yu Wang, Zhengkun Liu, Huoyao Chen, Yilin Hong, Shaojun Fu, Univ. of Science and Technology of China (China). . . . . [9374-44]

Monte Carlo simulations applying rigorous coupled-wave analysis for tolerance analysis of diffractive optical elements, Toru Inomata, Kayoko Fujimura, Masato Okano, Kazuya Yamamoto, Takeshi Yamamoto, Hitoshi Kimura, Tomohiro Kanakugi, Seiichiro Kitagawa, Nalux Co., Ltd. (Japan) . . . . . [9374-45]

Simple volume expanding fabrication method for focal length controlled micro-lens array, Junoh Kim, Muyung Lee, Cheoljoong Kim, Jinsu Lee, Yonghyub Won, KAIST (Korea, Republic of) . . . . . [9374-46]

Fabrication of bilayer metal wire-grid polarizer, Quan Liu, Qiufeng Jin, Jianhong Wu, Soochow Univ. (China) . . . . . [9374-47]

Production of waveguides on borate glass doped with transition metals by femtosecond laser pulses, Juliana M. Almeida, Univ. de São Paulo (Brazil); Paulo Henrique D. Ferreira, Univ. Federal de Sao Carlos (Brazil); Ruben D. F. Rodriguez, Leonardo De Boni, Antonio C. Hernandes, Cleber R. Mendonca, Univ. de São Paulo (Brazil) . . . . . [9374-48]

High-efficiency encapsulated transmission gratings for chirped pulse amplification, Stephan Ratzsch, Ernst-Bernhard Kley, Friedrich-Schiller-Univ. Jena (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Adriana Szeghalmi, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9374-49]

High contrast and metal-less alignment process for all polymer optical interconnect devices, Tao Ge, Jilin Yang, Chris Summitt, The Univ. of Arizona (USA); Sunglin Wang, Lee Johnson, Melissa Zaverton, Tom Milster, Yuzuru Takashima, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9374-50]

Engineering of the extraordinary optical transmission of metallic gratings via Er^{3+}-doped tellurite glass, Otávio de Brito Silva, Victor A. G. Rivera, Euclydes Marega Jr., Univ. de São Paulo (Brazil) . . . . . [9374-51]

Micromilling with nanoscale roughness for silica photonics, Lewis G. Carpenter, Peter A. Cooper, Christopher Holmes, Corin B. E. Gawith, James C. Gates, Peter G. R. Smith, Univ. of Southampton (United Kingdom). . . . [9374-52]

Quantification of microscopic surface features of single point diamond turned optics with subsequent chemical polishing, Nelson Cardenas, Matthew Kyrish, Daniel Taylor, Margaret Fraelich, Oscar Lechuga, Richard Claytor, Nelson Claytor, Fresnel Technologies Inc. (USA) . . . . . [9374-53]

CONFERENCE 9375

LOCATION: ROOM 304 AMD ROOM 310 (ESPLANADE)

Monday–Thursday 9–12 February 2015 • Proceedings of SPIE Vol. 9375

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SAMSUNG ADVANCED INSTITUTE OF TECHNOLOGY

MOEMS and Miniaturized Systems XIV

Conference Chairs: **Wibool Piyawattanametha,** KMITL (Thailand) and Chulalongkorn Univ. (Thailand); **Yong-Hwa Park,** Samsung Advanced Institute of Technology (Korea, Republic of)

Program Committee: **Wyatt O. Davis,** MicroVision, Inc. (USA); **David L. Dickensheets,** Montana State Univ. (USA); **Jean-Christophe Eloy,** Yole Développement (France); **Jan Grahmann,** Fraunhofer-Institut für Photonische Mikrosysteme (Germany); **Jason C. Heikenfeld,** Univ. of Cincinnati (USA); **Ulrich Hofmann,** Fraunhofer-Institut für Siliziumtechnologie (Germany); **Il-Woong Jung,** Argonne National Lab. (USA); **David G. Lishan,** Plasma-Therm LLC (USA); **Jonathan T. Liu,** Stony Brook Univ. (USA); **Veljko Milanovic,** Mirrorcle Technologies, Inc. (USA); **Harald Schenk,** Fraunhofer Institute for Photonic Microsystems (Germany); **Jason B. Stewart,** MIT Lincoln Lab. (USA); **Wanjun Wang,** Louisiana State Univ. (USA); **Guangya Zhou,** National Univ. of Singapore (Singapore)

Monday 9 February

SESSION 1

LOCATION: ROOM 304 (ESPLANADE) . . . . . .MON 3:40 PM TO 5:00 PM

Miniature Instruments for Endoscopic Microscopy

Joint Session with Conferences 9304 and 9375

Session Chair: **Wibool Piyawattanametha,** King Mongkut's Institute of Technology Ladkrabang (Thailand), Chulalongkorn Univ. (Thailand)

3:40 pm: **MEMS-based handheld multiphoton endomicroscope for in vivo imaging**, Xiyu Duan, Haijun Li, Zhen Qiu, Bishnu P. Joshi, Asha Pant, Katsuo Kurabayashi, Kenn R. Oldham, Thomas D. Wang M.D., Univ. of Michigan (USA) . . . . . [9304-233]

4:00 pm: **Forward-viewing MEMS fiber scanner for endomicroscopic applications**, Yeong-Hyeon Seo, Hyeon-Cheol Park, Kyungmin Hwang, Ki-Hun Jeong, KAIST (Korea, Republic of) . . . . . [9304-234]

4:20 pm: **Maskless fabrication of micro-optical elements for functional endomicroscopic fiber tips**, Jae-Beom Kim, Ki-Hun Jeong, KAIST (Korea, Republic of). . . . . [9375-1]

4:40 pm: **Monolithic microfabrication of microprism arrays for 3D stereoscopic endoscope**, Sung-Pyo Yang, Jae-Jun Kim, Kyung-Won Jang, Ki-Hun Jeong, KAIST (Korea, Republic of) . . . . . [9375-2]

Wednesday 11 February

SESSION 2

LOCATION: ROOM 310 (ESPLANADE) . . . . . WED 1:30 PM TO 3:20 PM

NOTE ROOM CHANGE

Microscanner I

Session Chair: **Yong-Hwa Park,** Samsung Advanced Institute of Technology (Korea, Republic of)

1:30 pm: **An update on scanning micro mirror performance and its extended application range** *(Invited Paper)*, Jan Grahmann, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) . . . . . [9375-3]

2:00 pm: **Hybrid assembly of micro scanner arrays with large aperture and their system integration**, Thilo Sandner, Michael Wildenhain, Markus Schwarzenberg, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) . . . . . [9375-4]

2:20 pm: **MEMS scanner mirror based system for retina scanning and in eye projection**, Franziska Woittennek, Jens Knobbe, Tino Pügner, Hans-Georg Dallmann, Uwe Schelinski, Heinrich Grüger, Fraunhofer-Institut für Photonische Mikrosysteme (Germany). . . . . [9375-5]

2:40 pm: **Rotational MEMS mirror with latching arm for silicon photonics**, Jonathan Briere, Philippe-Olivier Beaulieu, Menouer Saidani, Frederic Nabki, Michael Menard, Univ. du Québec à Montréal (Canada) . . . . . [9375-6]

3:00 pm: **A MEMS based electrically pumped tunable VCSEL operating at 1060 nm for SS-OCT**, Keiji Isamoto, Santec Corp. (Japan); Kiyotaka Yamashita, Santec Corp. (Japan) and Tokyo Institute of Technology (Japan) and The Univ. of Tokyo (Japan); Mohammed Saad Khan, Santec Corp. (Japan); Nicolas Lafitte, The Univ. of Tokyo (Japan); Kouki Totsuka, Changho Chong, Santec Corp. (Japan); Nobuhiko Nishiyama, Tokyo Institute of Technology (Japan); Hiroshi Toshiyoshi, The Univ. of Tokyo (Japan) . . . . . [9375-37]

Coffee Break . . . . . .Wed 3:20 pm to 3:50 pm

SESSION 3

LOCATION: ROOM 310 (ESPLANADE) . . . . . WED 3:50 PM TO 5:20 PM

Microscanner II

Session Chair: **Guangya Zhou,** National Univ. of Singapore (Singapore)

3:50 pm: **Centimeter-scale MEMS scanning mirrors for high power laser application** *(Invited Paper)*, Ulrich Hofmann, Frank Senger, Fraunhofer-Institut für Siliziumtechnologie (Germany); Peter Gawlitza, Patrick Herwig, Fraunhofer IWS Dresden (Germany); Thomas von Wantoch, Fraunhofer-Institut für Siliziumtechnologie (Germany); Christoph Grune, Moises A. Ortega Delgado, Fraunhofer IWS Dresden (Germany); Joachim Janes, Christian Mallas, Wolfgang Benecke, Fraunhofer-Institut für Siliziumtechnologie (Germany) . . . . . [9375-7]

4:20 pm: **High brightness MEMS mirror based head-up display (HUD) modules with wireless data streaming capability**, Veljko Milanovic, Abhishek Kasturi, Mirrorcle Technologies, Inc. (USA). . . . . [9375-8]

4:40 pm: **A study of integrated piezoelectric position sensors for PZT resonant micromirrors**, Shanshan Gu-Stoppel, Joachim Janes, Hans-Joachim Quenzer, Felix Heinrich, Wolfgang Benecke, Fraunhofer-Institut für Siliziumtechnologie (Germany) . . . . . [9375-9]

5:00 pm: **2D tilting MEMS micro mirror integrating piezoresistive sensors position feedback**, Sebastien Lani, Dara Z. Bayat, Michel Despont, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland). . . . . [9375-10]

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

The stability analysis, simulation, and test verification of the spherical mobile robot, Hanxu Sun, Beijing Univ. of Posts and Telecommunications (China); Ping Sun, Beijing Normal Univ. (China) . . . . . [9375-33]

Fiber-optical endoscopy with MEMS scanner technology, Wibool Piyawattanametha, King Mongkut's Institute of Technology Ladkrabang (Thailand) and Chulalongkorn Univ. (Thailand); Chanikarn Pipitsombat, King Mongkut's Institute of Technology Ladkrabang (Thailand). . . . . [9375-34]

Inkjet printing of all-solid-state supercapacitors, Cristina Cordoba, Simon Fraser Univ. (Canada) . . . . . [9375-35]

Optical metrology of AlN piezomachined ultrasonic transducer arrays and piezopumps, Jaime Viegas, Inas Taha, Mateusz Madzik, Raquel Flores, Ricardo Janeiro, Masdar Institute of Science & Technology (United Arab Emirates) . . . . . [9375-36]

OPTO

CONFERENCE 9375
LOCATION: ROOM 310 (ESPLANADE)

Thursday 12 February

SESSION 4
LOCATION: ROOM 310 (ESPLANADE) . . . . . .THU 8:00 AM TO 10:00 AM

MOEMS for Sensing Applications
Session Chair: **Jan Grahmann,** Fraunhofer-Institut für Photonische Mikrosysteme (Germany)

8:00 am: **Spatially resolved contrast measurement of diffractive micromirror arrays**, Cornelius Sicker, Jörg Heber, Dirk Berndt, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Florian Rückerl, Jean-Yves Tinevez, Spencer Shorte, Institut Pasteur (France); Michael Wagner, Harald Schenk, Fraunhofer-Institut für Photonische Mikrosysteme (Germany) . . . . . [9375-11]

8:20 am: **Image based wavefront compensation with deformable mirror for small satellite remote sensing**, Norihide Miyamura, Meisei Univ. (Japan). . . . . [9375-12]

8:40 am: **Advanced MEMS spectral sensor for the NIR**, Jarkko E. Antila, Uula Kantojärvi, Jussi Mäkynen, Janne Suhonen, Spectral Engines Oy (Finland). . . . . [9375-13]

9:00 am: **Far infrared microbolometers for radiometric measurements of ice cloud**, Linh Ngo Phong, Canadian Space Agency (Canada); Christian Proulx, El-Hassane Oulachgar, François Châteauneuf, INO (Canada) . . . . . [9375-14]

9:20 am: **Compact MEMS mirror based Q-switch module for pulse-on-demand laser range finders**, Veljko Milanovic, Abhishek Kasturi, Bryan Atwood, Yu Su, Kevin Limkrailassiri, Mirrorcle Technologies, Inc. (USA); John E. Nettleton, Lew Goldberg, Jeffery Leach, U.S. Army RDECOM CERDEC NVESD (USA); Nathaniel Hough, Fibertek, Inc. (USA). . . . . [9375-15]

9:40 am: **Tuning mechanical resonant frequencies of nanoelectromechanical systems with light**, Feng Tian, Guangya Zhou, Fook Siong Chau, Jie Deng, National Univ. of Singapore (Singapore) . . [9375-16]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 5
LOCATION: ROOM 310 (ESPLANADE) . . . . . .THU 10:30 AM TO 11:50 AM

MOEMS for Imaging Applications
Session Chair: **Wyatt O. Davis,** MicroVision, Inc. (USA)

10:30 am: **Large-aperture MOEMS Fabry-Perot interferometer for miniaturized spectral imagers**, Anna Rissanen, Andreas Langner, Kai H. Viherkanto, Rami Mannila, VTT Technical Research Ctr. of Finland (Finland). . . . . [9375-17]

10:50 am: **Large size MOEMS Fabry-Perot interferometer filter for focal plane array hyperspectral imaging**, Julian L. Chee, EPIR Technologies, Inc. (USA) . . . . . [9375-18]

11:10 am: **Technological platform for vertical 3D multi-wafer integration of miniature imaging instruments**, Sylwester Bargiel, Maciej Baranski, Nicolas Passilly, Christophe Gorecki, FEMTO-ST (France); Maik Wiemer, Joerg Froemel, Dirk Wuensch, Wei-Shan Wang, Fraunhofer-Institut für Elektronische Nanosysteme (Germany) . . . . . [9375-19]

11:30 am: **A biaxial PZT optical scanner for pico-projector applications**, Keiichi Ikegami, Takaaki Koyama, Takao Saito, Yoshiaki Yasuda, Stanley Electric Co., Ltd. (Japan); Hiroshi Toshiyoshi, The Univ. of Tokyo (Japan). . . . . [9375-20]

Lunch/Exhibition Break . . . . . Thu 11:50 am to 1:20 pm

SESSION 6
LOCATION: ROOM 310 (ESPLANADE) . . . . . .THU 1:20 PM TO 3:00 PM

MOEMS Components and Systems I
Session Chair: **Ulrich Hofmann,** Fraunhofer-Institut für Siliziumtechnologie (Germany)

1:20 pm: **CMOS compatible fabrication of 3D photonic crystals by nanoimprint lithography**, Martin Eibelhuber, Gerald Kreindl, Thomas Glinsner, EV Group (Austria). . . . . [9375-21]

1:40 pm: **Piezoelectrically driven translatory optical MEMS actuator with 7mm apertures and large displacements**, Joachim Janes, Shanshan Gu-Stoppel, Hans-Joachim Quenzer, Fabian Stoppel, Christian Mallas, Ulrich Hofmann, Wolfgang Benecke, Fraunhofer-Institut für Siliziumtechnologie (Germany) . . . . . [9375-22]

2:00 pm: **Multi-wafer bonding technology for the integration of a micromachined Mirau interferometer**, Wei-Shan Wang, Fraunhofer-Institut für Elektronische Nanosysteme (Germany); Justine Lullin, FEMTO-ST (France); Maik Wiemer, Joerg Froemel, Fraunhofer-Institut für Elektronische Nanosysteme (Germany); Sylwester Bargiel, Nicolas Passilly, Christophe Gorecki, FEMTO-ST (France); Thomas Gessner, Fraunhofer-Institut für Elektronische Nanosysteme (Germany) . . . . . [9375-23]

2:20 pm: **Tunable optical buffer based on III-V MEMS design**, Wing H. Ng, Univ. College London (United Kingdom); Nina Podoliak, Peter Horak, Univ. of Southampton (United Kingdom); Huiyun Liu, Univ. College London (United Kingdom); William J. Stewart, Univ. of Southampton (United Kingdom); Anthony J. Kenyon, Univ. College London (United Kingdom). . . . . [9375-24]

2:40 pm: **Integrated packaging of 2D MOEMS mirrors with optical position feedback**, Andreas Tortschanoff, Martin Lenzhofer, Marcus Baumgart, Matthias P. Kremer, Carinthian Tech Research AG (Austria) . . . . . [9375-25]

Coffee Break . . . . . Thu 3:00 pm to 3:30 pm

SESSION 7
LOCATION: ROOM 310 (ESPLANADE) . . . . . .THU 3:30 PM TO 5:50 PM

MOEMS Components and Systems II
Session Chair: **David G. Lishan,** Plasma-Therm LLC (USA)

3:30 pm: **Improvement of Varioptic's liquid lens based on electrowetting: How to obtain a short response time and its application in the design of a high resolution iris biometric system**, Benjamin Burger, Varioptic-A BU of Parrot SA (France); Serge C. Meimon, Cyril Petit, ONERA (France); Minh Chau Nguyen, Varioptic-A BU of Parrot SA (France) . . . . . [9375-26]

3:50 pm: **Volume refractometry of liquids using stable optofluidic Fabry-Pérot resonator with curved surfaces**, Noha A. Gaber, Univ. Paris-Est (France); Yuto Takemur, Kagawa Univ. (Japan); Maurine Malak, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Frédéric Marty, Univ. Paris-Est (France); Diaa Khalil, Ain Shams Univ. (Egypt); Dan Angelescu, Elodie Richalot, Tarik Bourouina, Univ. Paris-Est (France) . . . . . [9375-27]

4:10 pm: **Fiber-coupled Fabry-Pérot notch filter combining in-plane axis, high speed MEMS tunability and large etching depth**, Yasser M. Sabry, Si-Ware Systems (Egypt) and Ain-Shams Univ. (Egypt); Yomna M. Eltagoury, Ain Shams Univ. (Egypt); Ahmed Shebl, Si-Ware Systems (Egypt) and Ain Shams Univ. (Egypt); Mostafa Solimanb, Mohamed Sadek, Si-Ware Systems (Egypt); Diaa Khalil, Ain Shams Univ. (Egypt) and Si-Ware Systems (Egypt) . . . . . [9375-28]

4:30 pm: **MEMS-based frequency modulation of fiber ring laser**, Kamal Khalil, Ain Shams Univ. (Egypt); Khaled Hassan, Ahmed Shebl, Mostafa Soliman, Si-Ware Systems (Egypt); Fares Al-Arifi, Mohammed Al-Otaibi, King Abdulaziz City for Science and Technology (Saudi Arabia); Yomna M. Eltagoury, Ain Shams Univ. (Egypt); Yasser M. Sabry, Ain Shams Univ. (Egypt) and Si-Ware Systems (Egypt); Diaa Khalil, Ain Shams Univ. (Egypt) and Si-Ware Systems (Egypt). . . . . [9375-29]

4:50 pm: **Large MOEMS diffraction grating results providing an EC-QCL wavelength scan of 20%**, Jan Grahmann, Fraunhofer-Institut für Photonische Mikrosysteme (Germany). . . . . [9375-30]

5:10 pm: **Resonant micro optic gyro using tens of centimeters long optical fiber coil**, Huilian Ma, Jianjie Zhang, Zhonghe Jin, Zhejiang Univ. (China) . . . . . [9375-31]

5:30 pm: **Modeling and simulations of new electrostatically driven, bimorph actuator for high beam steering micro-mirror deflection angles**, John P. Walton, Ronald A. Coutu Jr., Air Force Institute of Technology (USA) . . . . . [9375-32]

CONFERENCE 9376

LOCATION: ROOM 300 (ESPLANADE) AND ROOM 228 (MEZZANINE)

Tuesday–Wednesday 10–11 February 2015 • Proceedings of SPIE Vol. 9376

COSPONSOR:

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Emerging Digital Micromirror Device Based Systems and Applications VII

Conference Chairs: **Michael R. Douglass,** Texas Instruments Inc. (USA); **Philip S. King,** Texas Instruments Inc. (USA); **Benjamin L. Lee,** Texas Instruments Inc. (USA)

Program Committee: **Umit Batur,** Texas Instruments Inc. (USA); **Sara L. Best,** Univ. of Wisconsin School of Medicine and Public Health (USA); **Goksel Dedeoglu,** PercepTonic, LLC (USA); **Jason Geng,** Xigen, LLC (USA); **Roland Höfling,** ViALUX GmbH (Germany); **Alfred Jacobsen,** Visitech AS (Norway); **Yuval Kapellner Rabinovitz,** EKB Technologies Ltd. (Israel); **Srinivasa G. Narasimhan,** Carnegie Mellon Univ. (USA); **Michael W. O'Keefe,** Greenlight Optics, LLC (USA); **David Smith,** Wintech Digital Systems Technology Corp. (USA); **Ivo M. Vellekoop,** Univ. Twente (Netherlands); **Karel J. Zuzak,** Digital Light Innovations (USA)

Tuesday 10 February

SESSION 1

LOCATION: ROOM 228 (MEZZANINE) . . . . . TUE 8:20 AM TO 10:30 AM

Advanced Manufacturing using a DMD or other SLM

Joint Session with Conferences 9374 and 9376

Session Chairs: **Philip S. King,** Texas Instruments Inc. (USA); **Cornelia Denz,** Westfälische Wilhelms-Univ. Münster (Germany)

8:20 am: **3D optical printing of piezoelectric nanoparticle-polymer composites** *(Invited Paper)*, Donald J. Sirbuly, Kanguk Kim, Wei Zhu, Shaochen Chen, Univ. of California, San Diego (USA) . . . . . [9374-29]

8:50 am: **Spatial light modulator based holographic fabrication of 3D spatially varying photonic crystal templates**, Jeffrey R. Lutkenhaus, David George, Usha Philipose, Hualiang Zhang, Yuankun Lin, Univ. of North Texas (USA) . . . . . [9374-30]

9:10 am: **Large area maskless photopolymerization (LAMP): Disruptive technology for additive manufacturing using scanning spatial light modulators**, Suman Das, Marvin Kilgo, Michael Middlemas, Erica Davis, DDM Systems (USA) . . . . . [9376-3]

9:30 am: **Software developments for DLP 3D printings**, Badia Koudsi, Optecks, LLC (USA) . . . . . [9376-2]

9:50 am: **Digital micromirror devices for laser-based manufacturing on the micro-scale**, Ben Mills, Univ. of Southampton (United Kingdom); Dan Heath, Matthias Feinäugle, Rob W. Eason, Optoelectronics Research Ctr. (United Kingdom) . . . . . [9376-4]

10:10 am: **Concepts for 3D print productivity systems with advanced DLP photoheads**, Alfred Jacobsen, Visitech AS (Germany); Oyvind Tafjord, Trond Jorgensen, Endre Kirkhorn, Visitech AS (Norway) . . . . . [9376-5]

Coffee Break . . . . . Tue 10:30 am to 11:00 am

SESSION 2

LOCATION: ROOM 228 (MEZZANINE) . . . . . TUE 11:00 AM TO 12:10 PM

Structured Light Applications: Metrology and 3D Machine Vision

Joint Session with Conferences 9374 and 9376

Session Chair: **Roland Höfling,** ViALUX GmbH (Germany)

11:00 am: **Transport-aware imaging** *(Invited Paper)*, Kyros Kutulakos, Matthew O'Toole, Univ. of Toronto (Canada) . . . . . [9376-6]

11:30 am: **3D microscopy for microfabrication quality control**, Matthew S. Muller, Paul D. De Jean, Swept Image Inc. (Canada) . . . . . [9376-7]

11:50 am: **Characteristics of digital micromirror projection for 3D shape measurement at extreme speed**, Roland Höfling, Petra Aswendt, Frank Leischnig, Matthias Förster, ViALUX GmbH (Germany) . . . . . [9376-8]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 1:40 pm

SESSION 3

LOCATION: ROOM 300 (ESPLANADE) . . . . . TUE 1:40 PM TO 3:10 PM

NOTE ROOM CHANGE

Biomedical Imaging using a DMD or Other MEMS Array

Joint Session with Conferences 9328 and 9376

Session Chairs: **Michael R. Douglass,** Texas Instruments Inc. (USA); **Robert C. Leif,** Newport Instruments (USA)

1:40 pm: **High-speed phase modulation using the DLP: Application in imaging through complex media** *(Invited Paper)*, Eyal Niv, Antonio M. Caravaca-Aguirre, Donald B. Conkey, Rafael Piestun, Univ. of Colorado at Boulder (USA) . . . . . [9376-9]

2:10 pm: **Parallel acquisition of Raman spectra from a 2-D multifocal array using a modulated multifocal detection scheme**, Lingbo Kong, James W. Chan, Univ. of California, Davis (USA) . . . . . [9328-33]

2:30 pm: **DMD-based open-loop wavefront shaping technique: Turbidity suppression in biological tissues**, Mooseok Jang, Haowen Ruan, Haojiang Zhou, California Institute of Technology (USA); Daifa Wang, BeiHang Univ. (China); Changhuei Yang, California Institute of Technology (USA) . . . . [9376-10]

2:50 pm: **Head mounted DMD for visual stimulation in freely moving rats: A novel tool for visual neuroscience research**, Yossi Mandel, Tamar Arens-Arad, Nairouz Farah, Alex Zlotnik, Zeev Zalevsky, Bar-Ilan Univ. (Israel) [9376-11]

Coffee Break . . . . . Tue 3:10 pm to 3:40 pm

SESSION 4

LOCATION: ROOM 300 (ESPLANADE) . . . . . TUE 3:40 PM TO 4:50 PM

Biomedical Imaging with Advanced Microscopy using a DMD or other MEMS Array

Joint Session with Conferences 9328 and 9376

Session Chairs: **Michael R. Douglass,** Texas Instruments Inc. (USA); **Robert C. Leif,** Newport Instruments (USA)

3:40 pm: **Generation 3 programmable array microscope (PAM) for high speed, large format optical sectioning** *(Invited Paper)*, Anthony H. de Vries, Stephan Kramer, Donna J. Arndt-Jovin, Thomas M. Jovin, Max-Planck-Institut für Biophysikalische Chemie (Germany) . . . . . [9376-12]

4:10 pm: **In vivo confocal imaging of the retina using patterned illumination**, Mathivanan Damodaran, Kari V. Vienola, Rotterdam Ophthalmic Institute (Netherlands) and Vrije Univ. Amsterdam (Netherlands); Boy Braaf, Vrije Univ. Amsterdam (Netherlands); Koenraad A. Vermeer, Rotterdam Ophthalmic Institute (Netherlands); Mattijs de Groot, Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands) . . . . . [9376-13]

4:30 pm: **Non-mydriatic confocal retinal imaging using a digital light projector**, Matthew S. Muller, Aeon Imaging, LLC (USA); Jason J. Green, Karthikeyan Baskaran, Indiana Univ. (USA); Allen Ingling, Jeffrey Clendenon, Thomas J. Gast, Aeon Imaging, LLC (USA); Ann E. Elsner, Indiana Univ. (USA) . . . . . [9376-14]

OPTO

CONFERENCE 9376
LOCATION: ROOM 310 (ESPLANADE)

Wednesday 11 February

SESSION 5
LOCATION: ROOM 310 (ESPLANADE) . . . . . WED 8:00 AM TO 9:30 AM

NOTE ROOM CHANGE

Spectroscopy
Session Chair: **Benjamin L. Lee,** Texas Instruments Inc. (USA)

8:00 am: **Micro-mirror arrays for Raman spectroscopy** *(Invited Paper)*, Walter M. Duncan, The Univ. of Texas at Dallas (USA). . . . . [9376-15]

8:30 am: **DMD-based programmable wide field spectrograph for Earth observation**, Frédéric Zamkotsian, Patrick Lanzoni, Lab. d'Astrophysique de Marseille, CNRS (France); Arnaud Liotard, Thierry Viard, Thales Alenia Space (France); Vincent Costes, Philippe-Jean Hébert, Ctr. National d'Études Spatiales (France) . . . . . [9376-16]

8:50 am: **Techniques and applications of programmable spectral pattern coding in DLP spectroscopy**, Eric Pruett, Texas Instruments Inc. (USA) . . . . . [9376-17]

9:10 am: **Programmable spectroscopy enabled by DLP**, Bjarke Rose, Ibsen Photonics A/S (Denmark) . . . . . [9376-18]

SESSION 6
LOCATION: ROOM 310 (ESPLANADE) . . . . . WED 9:30 AM TO 10:40 AM

Novel and Emerging DMD Applications
Session Chair: **Benjamin L. Lee,** Texas Instruments Inc. (USA)

9:30 am: **Replacing scanning based laser processing applications with variable mask image amplification systems using TI DMD, pulsed Nd:YAG lasers, and amplifiers** *(Invited Paper)*, Farzan N Ghauri, Vardex Laser Solutions LLC (USA); Raymond Jones, Montana Laser Technologies (USA); Ryan Feeler, Mark E. Kushina, Northrop Grumman Cutting Edge Optronics (USA) . . [9376-19]

10:00 am: **Angularly sensitive detector for transmission Kikuchi diffraction in a scanning electron microscope**, Bryce Jacobson, Kaley Woods, RadiaBeam Technologies, LLC (USA). . . . . [9376-20]

10:20 am: **The Si elegans connectome: A neuromimetic emulation of neural signal transfer with DMD-structured light**, Alexey Petrushin, Lorenzo Ferrara, Axel W. Blau, Istituto Italiano di Tecnologia (Italy) . . . . . [9376-21]

Coffee Break . . . . . Wed 10:40 am to 11:00 am

SESSION 7
LOCATION: ROOM 310 (ESPLANADE) . . . . . WED 11:00 AM TO 12:20 PM

Laser Beam Shaping
Session Chairs: **Yuval Kapellner Rabinovitz,** EKB Technologies Ltd. (Israel); **Philip S. King,** Texas Instruments Inc. (USA)

11:00 am: **Applications of DMDs in quantum information science**, Robert W. Boyd, Univ. of Rochester (USA) and Univ. of Ottawa (Canada); Mohammad Mirhosseini, Omar S. Magaña-Loaiza, Brandon Rodenburg, Robert Cross, Univ. of Rochester (USA) . . . . . [9376-22]

11:20 am: **Controlling the phase and amplitude of light using a digital micromirror device**, Sebastianus A. Goorden, Univ. Twente (Netherlands); Jacopo Bertolotti, Univ. of Exeter (United Kingdom) and Univ. Twente (Netherlands); Allard P. Mosk, Univ. Twente (Netherlands). . . . . [9376-23]

11:40 am: **Fast and stable polarization state generation using DLP technology**, Alan She, Federico Capasso, Harvard Univ. (USA) . . . . . [9376-24]

12:00 pm: **Non diffraction beam generation using digital micromirror device (DMD)**, Yongdong Wang, Yilei Zhang, Nanyang Technological Univ. (Singapore) . . . . . [9376-25]

CONFERENCE 9377

LOCATION: ROOM 226 (MEZZANINE) AND ROOM 308 (ESPLANADE)

Tuesday–Thursday 10–12 February 2015 • Proceedings of SPIE Vol. 9377

Advances in Photonics of Quantum Computing, Memory, and Communication VIII

Conference Chairs: **Zameer Ul Hasan,** Temple Univ. (USA); **Philip R. Hemmer,** Texas A&M Univ. (USA); **Hwang Lee,** Louisiana State Univ. (USA); **Alan L. Migdall,** National Institute of Standards and Technology (USA)

Program Committee: **Dmitry Budker,** Univ. of California, Berkeley (USA); **Alan E. Craig,** Montana State Univ. (USA); **Jonathan P. Dowling,** Louisiana State Univ. (USA); **Gurudev Dutt,** Univ. of Pittsburgh (USA); **Geoff J. Pryde,** Griffith Univ. (Australia); **Kai-Mei C. Fu,** Univ. of Washington (USA); **David H. Hughes,** Air Force Research Lab. (USA); **Fedor Jelezko,** Univ. Stuttgart (Germany); **Seth Lloyd,** Massachusetts Institute of Technology (USA); **Marko Loncar,** Harvard School of Engineering and Applied Sciences (USA); **Hideo Mabuchi,** Stanford Univ. (USA); **Frank A. Narducci,** Naval Air Systems Command (USA); **Aleksander K. Rebane,** Montana State Univ. (USA); **Matthew J. Sellars,** The Australian National Univ. (Australia); **Selim M. Shahriar,** Northwestern Univ. (USA); **Alan E. Willner,** The Univ. of Southern California (USA); **Jörg Wrachtrup,** Univ. Stuttgart (Germany); **Horace P. Yuen,** Northwestern Univ. (USA); **M. Suhail Zubairy,** Texas A&M Univ. (USA)

Tuesday 10 February

SESSION 1

LOCATION: ROOM 226 (MEZZANINE) . . . . . TUE 1:30 PM TO 3:20 PM

Non-Bleaching and Ultra-Small Fluorescent Probes I

Joint Session with Conferences 9339 and 9377

Session Chairs: **Ramesh Raghavachari,** U.S. Food and Drug Administration (USA); **Philip R. Hemmer,** Texas A&M Univ. (USA)

1:30 pm: **Fluorescence imaging and quantum sensing using nitrogen-vacancy centers in nanodiamonds** *(Invited Paper)*, Huan-Cheng Chang, Academia Sinica (Taiwan) . . . . . [9377-1]

2:00 pm: **Neurons on diamond: towards optical sensing of action potential** *(Invited Paper)*, Milos Nesladek, Mathew McDonald, Univ. Hasselt (Belgium); Micha Spira, The Hebrew Univ. of Jerusalem (Israel) . . . . . [9377-2]

2:30 pm: **Nanoscale magnetic resonance detection and imaging using nitrogen-vacancy centers in diamond** *(Invited Paper)*, Daniel Rugar, IBM Research - Almaden (USA) . . . . . [9377-3]

3:00 pm: **Silica nanoparticles containing therapeutics for attenuation of oxidative stress in neurons** *(Invited Paper)*, Desiree White-Schenk, Riyi Shi, James F. Leary, Purdue Univ. (USA) . . . . . [9339-24]

Coffee Break . . . . . Tue 3:20 pm to 3:50 pm

SESSION 2

LOCATION: ROOM 226 (MEZZANINE) . . . . . TUE 3:50 PM TO 5:10 PM

Non-Bleaching and Ultra-Small Fluorescent Probes II

Joint Session with Conferences 9339 and 9377

Session Chairs: **Ramesh Raghavachari,** U.S. Food and Drug Administration (USA); **Philip R. Hemmer,** Texas A&M Univ. (USA)

3:50 pm: **New method to detect organic nanoparticles in live tissue** *(Invited Paper)*, Dror Fixler, Bar-Ilan Univ. (Israel) . . . . . [9339-25]

4:20 pm: **Microplasma synthesis of sub-5 nm nanodiamonds** *(Invited Paper)*, R. Mohan Sankaran, Case Western Reserve Univ. (USA). . . . . [9377-4]

4:50 pm: **Sub-diffraction optical manipulation of the charge state of nitrogen vacancy center in diamond**, Fang-Wen Sun, Xiang-Dong Chen, Chang-Ling Zou, Guang-Can Guo, Univ. of Science and Technology of China (China) . . . . . [9377-5]

Wednesday 11 February

SESSION 3

LOCATION: ROOM 308 (ESPLANADE) . . . . . WED 8:00 AM TO 10:10 AM

NOTE ROOM CHANGE

Few Photon Nonlinearities and Hybrid Quantum Systems

Session Chair: **Gennady B. Shvets,** The Univ. of Texas at Austin (USA)

8:00 am: **Control of the cavity reflectivity using a single quantum dot spin** *(Invited Paper)*, Shuo Sun, Hyochul Kim, Univ. of Maryland, College Park (USA); Glenn S. Solomon, National Institute of Standards and Technology (USA) and Joint Quantum Institute (USA); Edo Waks, Univ. of Maryland, College Park (USA) . . . . . [9377-6]

8:30 am: **Hybrid nanophotonic resonators for coupling to rare-earth ions**, Evan Miyazono, Alex Hartz, Tian Zhong, Andrei Faraon, California Institute of Technology (USA) . . . . . [9377-7]

8:50 am: **Qubits, qutrits, and ququads stored in single photons** *(Invited Paper)*, Axel Kuhn, Univ. of Oxford (United Kingdom) . . . . . [9377-8]

9:20 am: **Coherent control of energy transfer in a quantum dot strongly coupled to a photonic crystal molecule**, Tao Cai, Univ. of Maryland, College Park (USA); Ranojoy Bose, Univ. of Maryland, College Park (USA); Kaushik R. Choudhury, Univ. of Maryland, College Park (USA); Glenn S. Solomon, National Institute of Standards and Technology (USA) and Univ. of Maryland, College Park (USA); Edo Waks, Univ. of Maryland, College Park (USA) and Joint Quantum Institute (USA) . . . . . [9377-9]

9:40 am: **Few-photon nonlinearities mediated by Rydberg interaction** *(Invited Paper)*, Sebastian Hofferberth, Univ. Stuttgart (Germany) . . . . . [9377-10]

Coffee Break . . . . . Wed 10:10 am to 10:30 am

SESSION 4

LOCATION: ROOM 308 (ESPLANADE) . . . . . WED 10:30 AM TO 12:20 PM

Quantum Technologies with Photons I

Session Chair: **Hwang Lee,** Louisiana State Univ. (USA)

10:30 am: **Continuous-variable quantum computing: toward an experimental assessment** *(Invited Paper)*, Olivier Pfister, Univ. of Virginia (USA); Nicolas C. Menicucci, The Univ. of Sydney (Australia); Moran Chen, Pei Wang, Wenjiang Fan, Univ. of Virginia (USA) . . . . . [9377-11]

11:00 am: **Extensions to the Wigner inequality for high-loss experimental scenarios**, William N. Plick, Institut für Quantenoptik und Quanteninformation (Austria); Johannes Kofler, Max-Planck-Institut für Quantenoptik (Germany) . . . . [9377-12]

11:20 am: **New concepts and laboratory protocols for quantum technologies** *(Invited Paper)*, Robert W. Boyd, Univ. of Ottawa (Canada) and Univ. of Rochester (USA). . . . . [9377-13]

11:50 am: **An ultrahigh-resolution quantum optical coherence tomography with dispersion-tolerance** *(Invited Paper)*, Shigeki Takeuchi, Osaka Univ. (Japan) and Kyoto Univ. (Japan); Masayuki Okano, Ryo Okamoto, Kyoto Univ. (Japan); Sunao Kurimura, National Institute for Materials Science (Japan); Norihiko Nishizawa, Nagoya Univ. (Japan) . . . . . [9377-14]

Lunch/Exhibition Break . . . . . Wed 12:20 pm to 1:50 pm

OPTO

CONFERENCE 9377
LOCATION: ROOM 308 (ESPLANADE)

SESSION 5
LOCATION: ROOM 308 (ESPLANADE) . . . . . .WED 1:50 PM TO 3:10 PM

Quantum Technologies with Photons II

Session Chair: **Olivier Pfister,** Univ. of Virginia (USA)

1:50 pm: **Time-bin entangled photon pairs from spontaneous parametric down-conversion pumped by a cw multi-mode diode laser** *(Invited Paper)*, Yoon-Ho Kim, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9377-15]

2:20 pm: **Quantum sensing meets compressive sensing** *(Invited Paper)*, John C. Howell, Gregory Howland, James Schneeloch, Daniel Lum, Univ. of Rochester (USA) . . . . . [9377-16]

2:50 pm: **Quantum-secure authentication without secret information**, Sebastianus A. Goorden, Marcel Horstmann, Allard P. Mosk, Univ. Twente (Netherlands); Boris ?koric, Technische Univ. Eindhoven (Netherlands); Pepijn W. H. Pinkse, Univ. Twente (Netherlands) . . . . . [9377-17]

Coffee Break . . . . . .Wed 3:10 pm to 3:40 pm

SESSION 6
LOCATION: ROOM 308 (ESPLANADE) . . . . . .WED 3:40 PM TO 5:00 PM

Quantum Technologies with Photons III

Session Chair: **Olivier Pfister,** Univ. of Virginia (USA)

3:40 pm: **Device-independent verification of entanglement and entangled measurements** *(Invited Paper)*, Geoff J. Pryde, Griffith Univ. (Australia) [9377-18]

4:10 pm: **Preserving flying qubit in single-mode fiber with Knill Dynamical Decoupling (KDD)** *(Invited Paper)*, Manish Kumar Gupta, Louisiana State Univ. (USA); Erik Navarro, California State Univ., Chico (USA); Todd Moulder, Jason Mueller, Ashkan Balouchi, Katherine L. Brown, Hwang Lee, Jonathan P. Dowling, Louisiana State Univ. (USA) . . . . . [9377-19]

4:40 pm: **Entanglement assisted time-energy QKD employing Franson interferometers and cavity quantum electrodynamics (CQED) principles**, Ivan B. Djordjevic, The Univ. of Arizona (USA) . . . . . [9377-20]

POSTERS-WEDNESDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Domain-engineered PPLN for generation of polarization-entangled photons, Paulina Kuo, National Institute of Standards and Technology (USA); Jason Pelc, Hewlett-Packard Labs. (USA); Oliver Slattery, Lijun Ma, Xiao Tang, National Institute of Standards and Technology (USA). . . . . [9377-34]

Singular layer transmission for continuous-variable quantum key distribution, Laszlo Gyongyosi, Budapest Univ. of Technology and Economics (Hungary) and Hungarian Academy of Sciences (Hungary); Sandor Imre, Budapest Univ. of Technology and Economics (Hungary) . . . . . [9377-35]

Abstract probabilistic CNOT gate model based on double encoding: study of the errors and physical realizability, Amor Gueddana, Attia Moez, Rihab Chatta, SUP'COM (Tunisia). . . . . [9377-36]

Quantum secure communication using multi-photon tolerant protocols, Mayssaa El Rifai, Pramode K. Verma, The Univ. of Oklahoma - Tulsa (USA) . . . . . [9377-37]

Thursday 12 February

SESSION 7
LOCATION: ROOM 308 (ESPLANADE) . . . . . THU 8:00 AM TO 10:30 AM

Synthetic Gauge and Topological Order

Session Chair: **Jonas N. Becker,** Technische Univ. Berlin (Germany)

8:00 am: **Topological physics in photonic devices** *(Invited Paper)*, Mikael C. Rechtsman, Technion-Israel Institute of Technology (Israel); Julia Zeuner, Friedrich-Schiller-Univ. Jena (Germany); Yonatan Plotnik, Yaakov Lumer, Mordechai Segev, Technion-Israel Institute of Technology (Israel); Alexander Szameit, Friedrich-Schiller-Univ. Jena (Germany) . . . [9377-21]

8:30 am: **Photons in synthetic gauge fields** *(Invited Paper)*, Mohammad Hafezi, Joint Quantum Institute (USA). . . . . [9377-22]

9:00 am: **Engineering topological order for light in bianisotropic metacrystals with and without time-reversal symmetry** *(Invited Paper)*, Alexander B. Khanikaev, Queens College (USA). . . . . [9377-23]

9:30 am: **Guiding electromagnetic waves around sharp corners: topologically-protected photonic transport in meta-waveguides** *(Invited Paper)*, Gennady B. Shvets, The Univ. of Texas at Austin (USA) [9377-24]

10:00 am: **Breaking reciprocity on-chip** *(Invited Paper)*, Michal Lipson, Cornell Univ. (USA) . . . . . [9377-25]

Coffee Break . . . . . Thu 10:30 am to 11:00 am

SESSION 8
LOCATION: ROOM 308 (ESPLANADE) . . . . . THU 11:00 AM TO 12:20 PM

Solid State Quantum Memories and Photonics I

Session Chair: **Jörg Wrachtrup,** Univ. Stuttgart (Germany)

11:00 am: **Prospects for photonic integration of rare-earth quantum memories** *(Invited Paper)*, Matthew J. Sellars, The Australian National Univ. (Australia). . . . . [9377-26]

11:30 am: **Spin properties and optical interfacing of silicon vacancy color centers in diamond** *(Invited Paper)*, Jonas N. Becker, Univ. des Saarlandes (Germany); Benjamin Pingault, Univ. of Cambridge (United Kingdom); Carsten Arend, Univ. des Saarlandes (Germany); Christian Hepp, Univ. des Saarlandes (Germany) and Univ. of Cambridge (United Kingdom); Janine Riedrich-Möller, Univ. des Saarlandes (Germany); Mete Atatüre, Univ. of Cambridge (United Kingdom); Christoph Becher, Univ. des Saarlandes (Germany) . . . . . [9377-27]

12:00 pm: **Coupling of rare-earth ions to a YSO nanophotonic resonator for efficient quantum memory**, Tian Zhong, Jonathan Kindem, Evan Miyazono, Alex Hartz, Andrei Faraon, California Institute of Technology (USA) . . . [9377-28]

Lunch/Exhibition Break . . . . . Thu 12:20 pm to 1:30 pm

SESSION 9
LOCATION: ROOM 308 (ESPLANADE) . . . . . THU 1:30 PM TO 4:10 PM

Solid State Quantum Memories and Photonics II

Session Chair: **Philip R. Hemmer,** Texas A&M Univ. (USA)

1:30 pm: **Optical control and readout of single spins in diamond** *(Invited Paper)*, Fedor Jelezko, Univ. Ulm (Germany) . . . . . [9377-29]

2:00 pm: **Quantum memory based on nuclear spin in nitrogen vacancy in diamond for quantum repeater** *(Invited Paper)*, Sen Yang, Ya Wang, Thai Hien Tran, S. Ali Momenzadeh, Helmut Fedder, Rainer Stöhr, Univ. Stuttgart (Germany); Naofumi Abe, Tohoku Univ. (Japan); Philipp Neumann, Univ. Stuttgart (Germany); Hideo Kosaka, Tohoku Univ. (Japan); Jörg Wrachtrup, Univ. Stuttgart (Germany). . . . . [9377-30]

2:30 pm: **Quantum networks based on diamond spins: From long-distance teleportation to a loophole-free Bell test** *(Invited Paper)*, Hannes Bernien, Bas Hensen, Wolfgang Pfaff, Anais Dreau, Andreas Reiserer, Machiel Blok, Suzanne van Dam, Just Ruitenberg, Technische Univ. Delft (Netherlands); Matthew Markham, Daniel Twitchen, Element Six Ltd. (United Kingdom); Tim H. Taminiau, Ronald Hanson, Technische Univ. Delft (Netherlands) . . . . . [9377-31]

3:00 pm: **Diamond photonics** *(Invited Paper)*, Marko Loncar, Harvard School of Engineering and Applied Sciences (USA) . . . . . [9377-32]

3:30 pm: **Multidimensional quantum interferometry on a chip**, Zachary Chaboyer, Thomas D. Meany, Luke G. Helt, Michael J. Steel, Michael J. Withford, Macquarie Univ. (Australia) . . . . . [9377-33]

3:50 pm: **Toward remote ion-ion entanglement with barium**, Thomas Noel, Carolyn Auchter, Chen-Kuan Chou, Boris Blinov, Univ. of Washington (USA) . . . . . [9377-38]

CONFERENCE 9378
LOCATION: ROOM 236 (MEZZANINE)

Sunday–Thursday 8–12 February 2015 • Proceedings of SPIE Vol. 9378

Slow Light, Fast Light, and Opto-Atomic Precision Metrology VIII

Conference Chairs: **Selim M. Shahriar,** Northwestern Univ. (USA); **Jacob Scheuer,** Tel Aviv Univ. (Israel)

Program Committee: **Tony Abi-Salloum,** Widener Univ. (USA); **Shanhui Fan,** Stanford Univ. (USA); **Daniel Joseph Gauthier,** Duke Univ. (USA); **Kohzo Hakuta,** The Univ. of Electro-Communications (Japan); **Ortwin Hess,** Imperial College London (United Kingdom); **John C. Howell,** Univ. of Rochester (USA); **Jacob B. Khurgin,** Johns Hopkins Univ. (USA); **Uriel Levy,** The Hebrew Univ. of Jerusalem (Israel); **Frank A. Narducci,** Naval Air Systems Command (USA); **Irina Novikova,** The College of William & Mary (USA); **Gour S. Pati,** Delaware State Univ. (USA); **Stefania Residori,** Institut Non Linéaire de Nice Sophia Antipolis (France); **Yuri Rostovtsev,** Univ. of North Texas (USA); **David D. Smith,** NASA Marshall Space Flight Ctr. (USA); **Yanhong Xiao,** Fudan Univ. (China)

Sunday 8 February

SESSION 1

LOCATION: ROOM 236 (MEZZANINE) . . . . . SUN 1:30 PM TO 3:25 PM

Slow Light: Waveguides and Resonators

Session Chair: **Gour S. Pati,** Delaware State Univ. (USA)

1:30 pm: **Group velocity and extraordinary subwavelength imaging in graphene waveguides** *(Invited Paper)*, Zheng Wang, The Univ. of Texas at Austin (USA) . . . . . [9378-1]

1:55 pm: **Recent progress in waveguide-based atom photonics** *(Invited Paper)*, Holger Schmidt, Jennifer A. Black, Univ. of California, Santa Cruz (USA) . . . . . [9378-2]

2:20 pm: **Induced transparency in optical whispering gallery microcavity systems** *(Invited Paper)*, Yun-Feng Xiao, Peking Univ. (China) . . . . . [9378-3]

2:45 pm: **Ultra-slow light in erbium-doped whispering gallery mode microresonators**, Vincent Huet, Alphonse L. Rasoloniaina, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France); Michel S. Mortier, Ecole Nationale Supérieure de Chimie de Paris (France); Kamel Bencheikh, A. Yacomotti, A. Levenson, Lab. de Photonique et de Nanostructures (France); Patrice Féron, Yannick Dumeige, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France) . . . . . [9378-4]

3:00 pm: **Optical microfiber knot resonator (OMKR) and its slow-light performance** *(Invited Paper)*, Liyong Ren, Xi'an Institute of Optics and Precision Mechanics (China) . . . . . [9378-5]

Coffee Break . . . . . Sun 3:25 pm to 3:55 pm

SESSION 2

LOCATION: ROOM 236 (MEZZANINE) . . . . . SUN 3:55 PM TO 5:25 PM

Precision Metrology: CPT-based Clocks and Cooled Molecular Ions

Session Chair: **Yannick Dumeige,** Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France)

3:55 pm: **Compact cold-atom clocks and interferometers based on stimulated Raman transitions** *(Invited Paper)*, Elizabeth Donley, National Institute of Standards and Technology (USA) . . . . . [9378-6]

4:20 pm: **AC stark shift in Raman-Ramsey interference using a multi-level system calculation** *(Invited Paper)*, Gour S. Pati, Zachary Warren, Delaware State Univ. (USA); Selim M. Shahriar, Northwestern Univ. (USA) . . . . . [9378-7]

4:45 pm: **Broadband rotational optical cooling of AlH+ to the rotational ground state,** Brian Odom, Chris Seck, Northwestern Univ. (USA). . . . . [9378-8]

5:00 pm: **Atomic clock based on a coherent population trapping resonance in 87Rb with improved high-frequency modulation parameters** *(Invited Paper)*, Sergey M. Kobtsev, "Tekhnoscan - Lab" LLC (Russian Federation); Daba A. Radnatarov, Sergey A. Khripunov, Novosibirsk State Univ. (Russian Federation) . . . . . [9378-9]

Monday 9 February

OPTO PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA). . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA). . . . . [9371-202]

Coffee Break . . . . . Mon 10:10 am to 10:30 am

SESSION 3

LOCATION: ROOM 236 (MEZZANINE) . . . . . MON 10:30 AM TO 12:25 PM

Slow Light: Optimization and Application of Delay

Session Chair: **Jacob Scheuer,** Tel Aviv Univ. (Israel)

10:30 am: **Tunable optical delays for implementing high-speed optical signal processing functions** *(Invited Paper)*, Alan E. Willner, The Univ. of Southern California (USA) . . . . . [9378-10]

10:55 am: **Co-propagating slow-light pulse system** *(Invited Paper)*, Toshihiko Baba, Keisuke Kondo, Yokohama National Univ. (Japan) . . . . . [9378-11]

11:20 am: **Slow light in ruby: delaying energy beyond the input pulse**, Emma Wisniewski-Barker, Graham Gibson, Sonja Franke-Arnold, Univ. of Glasgow (United Kingdom); Zhimin Shi, Univ. of South Florida (USA); Robert W. Boyd, Univ. of Ottawa (Canada) and Univ. of Rochester (USA); Miles J. Padgett, Univ. of Glasgow (United Kingdom) . . . . . [9378-12]

11:35 am: **Strong slow-light resonances in apodized deuterium-loaded femtosecond FBGs** *(Invited Paper)*, George Skolianos, Arushi Arora, Stanford Univ. (USA); Martin Bernier, Univ. Laval (Canada); Michel Digonnet, Stanford Univ. (USA) . . . . . [9378-13]

12:00 pm: **Optimizing delaying strength and distortion in linear slow light systems** *(Invited Paper)*, Luc Thévenaz, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9378-14]

Lunch Break . . . . . Mon 12:25 pm to 1:55 pm

OPTO

CONFERENCE 9378
LOCATION: ROOM 236 (MEZZANINE)

SESSION 4
LOCATION: ROOM 236 (MEZZANINE) . . . . . MON 1:55 PM TO 3:05 PM

Fast Light: Generation, Application, and Comparison with Slow Light

Session Chair: **David D. Smith,** NASA Marshall Space Flight Ctr. (USA)

1:55 pm: **Wideband perfect coherent absorber based on white-light cavity**, Omer Kotlicki, Jacob Scheuer, Tel Aviv Univ. (Israel) . . . . . [9378-15]

2:10 pm: **Proof of principle experiment on minimizing propagation time in optical communications**, Federico Tommasi, Emilio Ignesti, Univ. degli Studi di Firenze (Italy); Lorenzo Fini, Stefano Cavalieri, Univ. degli Studi di Firenze (Italy) and European Lab. for Non-Linear Spectroscopy (Italy). . . . . [9378-16]

2:25 pm: **Suppression of sensitivity due to length variation in a subluminal ring laser**, Zifan Zhou, Northwestern Univ. (USA) . . . . . [9378-17]

2:40 pm: **Towards long-distance superluminal propagation in optical fibers via cascaded Brillouin lasing resonators** *(Invited Paper)*, Li Zhan, Liang Zhang, Minglei Qin, Shanghai Jiao Tong Univ. (China); Jinmei Liu, Shanghai Jiao Tong Univ. (China) and East China Normal Univ. (China) . . . . . [9378-18]

Coffee Break . . . . . .Mon 3:05 pm to 3:35 pm

SESSION 5
LOCATION: ROOM 236 (MEZZANINE) . . . . . MON 3:35 PM TO 6:20 PM

Precision Metrology Using Fast Light: Gyroscopy and Gravitational Wave Detection

Session Chair: **Robert W. Boyd, Univ. of Ottawa (Canada)**

3:35 pm: **Towards fast-light gyroscope, modification of dispersion, and pulling sensitivity** *(Invited Paper)*, Eugeniy E. Mikhailov, Matt T. Simons, The College of William & Mary (USA); Simon Rochester, Dmitry Budker, Univ. of California, Berkeley (USA); Irina Novikova, The College of William & Mary (USA) . . . . . [9378-19]

4:00 pm: **Enhancement of bandwidth of a LIGO interferometer using white light cavity and signal recycling**, Minchuan Zhou, Zifan Zhou, Selim M. Shahriar, Northwestern Univ. (USA) . . . . . [9378-20]

4:15 pm: **Passive fast-light optical gyroscope** *(Invited Paper)*, David D. Smith, NASA Marshall Space Flight Ctr. (USA); Krishna Myneni, U.S. Army Research, Development and Engineering Command (USA); Hongrok Chang, Ducommun Inc. (USA); Heather A. Luckay, The Univ. of Alabama in Huntsville (USA). . . . . [9378-21]

4:40 pm: **Superluminal enhancement of rotation sensitivity in a laser gyroscope based on stimulated Raman scattering** *(Invited Paper)*, Sean M. Spillane, Los Gatos Research, Inc. (USA); Selim M. Shahriar, Northwestern Univ. (USA) . . . . . [9378-22]

5:05 pm: **Quantum noise limited linewidth of super- and sub-luminal lasers** *(Invited Paper)*, Jacob Scheuer, Tel Aviv Univ. (Israel); Selim M. Shahriar, Northwestern Univ. (USA) . . . . . [9378-23]

5:30 pm: **Theoretical design of a superluminal helium-neon ring laser via coupled cavities** *(Invited Paper)*, Tianliang Qu, National Univ. of Defense Technology (China) . . . . . [9378-24]

5:55 pm: **Quantum noise of white-light cavity using double-pumped gain medium** *(Invited Paper)*, Yiqiu Ma, The Univ. of Western Australia (Australia); Haixing Miao, Univ. of Birmingham (United Kingdom); Chunnong Zhao, The Univ. of Western Australia (Australia); Yanbei Chen, California Institute of Technology (USA) . . . . . [9378-77]

Tuesday 10 February

SESSION 6
LOCATION: ROOM 236 (MEZZANINE) . . . . . TUE 8:00 AM TO 10:05 AM

Slow Light: Quantum Information

Session Chair: **Eugeniy E. Mikhailov,** The College of William & Mary (USA)

8:00 am: **Enhanced wavelength conversion and photon pair generation using slow light effects and electronic carrier sweepout in silicon photonics devices** *(Invited Paper)*, Marc Savanier, Shayan Mookherjea, Univ. of California, San Diego (USA) . . . . . [9378-25]

8:25 am: **Controlling photonic transport using synthetic gauge field** *(Invited Paper)*, Mohammad Hafezi, Joint Quantum Institute (USA) . . . . [9378-26]

8:50 am: **Measuring the propagation of entanglement and information in dispersive media** *(Invited Paper)*, Jeremy B. Clark, Joint Quantum Institute (USA); Paul D. Lett, National Institute of Standards and Technology (USA) . . . . . [9378-27]

9:15 am: **Entangled photons from hot vapors** *(Invited Paper)*, John C. Howell, Justin Winkler, Univ. of Rochester (USA) . . . . . [9378-28]

9:40 am: **Towards noiseless integrated quantum memories** *(Invited Paper)*, Joshua Nunn, Univ. of Oxford (United Kingdom) . . . . . [9378-29]

Coffee Break . . . . . Tue 10:05 am to 10:35 am

SESSION 7
LOCATION: ROOM 236 (MEZZANINE) . . . . . TUE 10:35 AM TO 12:15 PM

Precision Metrology: Spin Squeezing, Optical Squeezing, and Photon Correlation Interferometry

Session Chair: **Elizabeth Donley,** National Institute of Standards and Technology (USA)

10:35 am: **Spin squeezing: a tutorial review** *(Invited Paper)*, Eugene S. Polzik, Niels Bohr Institute (Denmark). . . . . [9378-30]

11:05 am: **Photon-correlation amplifiers and interferometers for quantum metrology**, Weiping Zhang, East China Normal Univ. (China) . . . . . [9378-31]

11:20 am: **Generation of a squeezed state of an oscillator by stroboscopic quantum nondemolition measurement**, Eugene S. Polzik, Niels Bohr Institute (Denmark) . . . . . [9378-32]

11:35 am: **Spatial profile of the squeezed quantum noise generated and modified by resonant atomic ensembles** *(Invited Paper)*, Mi Zhang, Irina Novikova, Eugeniy E. Mikhailov, The College of William & Mary (USA); Jonathan P. Dowling, Louisiana State Univ. (USA) . . . . . [9378-33]

12:00 pm: **Sensing of magnetic and gravitational fields beyond standard quantum limits**, Eugene S. Polzik, Niels Bohr Institute (Denmark) . . . . [9378-34]

Lunch/Exhibition Break . . . . . Tue 12:15 pm to 1:45 pm

SESSION 8
LOCATION: ROOM 236 (MEZZANINE) . . . . . TUE 1:45 PM TO 3:25 PM

Slow Light: Non-Linear Optics and Photon Drag

Session Chair: **John C. Howell,** Univ. of Rochester (USA)

1:45 pm: **Title to be determined** *(Invited Paper)*, Andrey A. Sukhorukov, The Australian National Univ. (Australia) . . . . . [9378-35]

2:10 pm: **Enhancing the nonlinearity at ultra-low-light levels using spatial bunching of cold atoms** *(Invited Paper)*, Bonnie L. Schmittberger, Daniel Joseph Gauthier, Duke Univ. (USA) . . . . . [9378-36]

2:35 pm: **Photon drag effects in a rubidium slow-light medium** *(Invited Paper)*, Robert W. Boyd, Israel De Leon, Univ. of Ottawa (Canada); Mohammad Mirhosseini, Univ. of Rochester (USA) . . . . . [9378-37]

3:00 pm: **Speed-of-light management via RF-photon coupling in a nonlinear photonic crystal** *(Invited Paper)*, Igor V. Melnikov, National Research Univ. of Electronic Technology (Russian Federation). . . . . [9378-38]

Coffee Break . . . . . Tue 3:25 pm to 3:55 pm

SESSION 9

LOCATION: ROOM 236 (MEZZANINE) . . . . . TUE 3:55 PM TO 5:50 PM

Precision Metrology: Sensing with NV Diamond Color Centers

Session Chair: **Eugene S. Polzik,** Niels Bohr Institute (Denmark)

3:55 pm: **Precision magnetometry with diamond color centers** *(Invited Paper)*, Philip R. Hemmer, Texas A&M Univ. (USA) . . . . . [9378-39]

4:20 pm: **New developments in precision metrology with nitrogen-vacancy centers in diamond** *(Invited Paper)*, Andrey Jarmola, Univ. of California, Berkeley (USA). . . . . [9378-40]

4:45 pm: **Microwave saturation spectroscopy and coherence of nitrogen-vacancy ensembles in diamond**, Pauli Kehayias, Dmitry Budker, Univ. of California, Berkeley (USA) . . . . . [9378-41]

5:00 pm: **Cavity-enhanced magnetometry with nitrogen-vacancy ensembles in diamond based on infrared absorption** *(Invited Paper)*, K. Jensen, Nathan Leefer, Andrey Jarmola, Univ. of California, Berkeley (USA); Yannick Dumeige, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France); Victor M. Acosta, Pauli Kehayias, Brian Patton, Univ. of California, Berkeley (USA); Mayeul Chipaux, Thierry Debuisschert, Thales Research & Technology (France); François Treussart, Vincent Jacques, Jean-Francois Roch, Ecole Normale Supérieure de Cachan (France); Dmitry Budker, Univ. of California, Berkeley (USA) and Mainz Johannes Gutenberg Univ. (Germany) . . . . . [9378-42]

5:25 pm: **Optically-addressed spin sensors in nanostructured diamond** *(Invited Paper)*, Victor M. Acosta, Google (USA) . . . . . [9378-43]

Wednesday 11 February

SESSION 10

LOCATION: ROOM 236 (MEZZANINE) . . . . . WED 8:00 AM TO 10:05 AM

Slow Light: Novel Effects and New Directions

Session Chair: **Susanne F. Yelin,** Univ. of Connecticut (USA)

8:00 am: **Slow light and narrow resonances in electromagnetic-induced deflection** *(Invited Paper)*, David Eger, Slava Smartsev, Nir Davidson, Weizmann Institute of Science (Israel) . . . . . [9378-44]

8:25 am: **Formation of dark states of atoms near metallic nanoparticles** *(Invited Paper)*, Yuri V. Rostovtsev, Suman Dhayal, Univ. of North Texas (USA) . . . . . [9378-45]

8:50 am: **Slow exciton polaritons in 2D materials** *(Invited Paper)*, Jacob B. Khurgin, Johns Hopkins Univ. (USA) . . . . . [9378-46]

9:15 am: **Slow light optofluidics** *(Invited Paper)*, Misha Sumetsky, Aston Institute for Photonics Technologies (United Kingdom) . . . . . [9378-47]

9:40 am: **Slow light and its application to semiconductor lasers** *(Invited Paper)*, Jesper Mørk, Technical Univ. of Denmark (Denmark) . . [9378-48]

Coffee Break . . . . . .Wed 10:05 am to 10:35 am

SESSION 11

LOCATION: ROOM 236 (MEZZANINE) . . . . . WED 10:35 AM TO 12:20 PM

Slow Light: New Platforms and Systems

Session Chair: **Jacob B. Khurgin,** Johns Hopkins Univ. (USA)

10:35 am: **Recent achievements in chip scale and miniaturization of hybrid photonic-atomic devices** *(Invited Paper)*, Liron Stern, Meir Grajower, E. Talker, N. Mazurski, R. Zektzer, A. Neiman, Boris Desiatov, Uriel Levy, The Hebrew Univ. of Jerusalem (Israel) . . . . . [9378-49]

11:00 am: **Cold and thermal atoms in kagome fiber** *(Invited Paper)*, Fetah A. Benabid, Univ. of Bath (France); Thomas D. Bradley, Ekaterina Ilinova, XLIM Institut de Recherche (France); Hidetoshi Katori, S. Okaba, Tetsushi Takano, The Univ. of Tokyo (Japan) . . . . . [9378-50]

11:25 am: **Title to be determined** *(Invited Paper)*, Alexander L. Gaeta, Cornell Univ. (USA) . . . . . [9378-51]

11:50 am: **Dual wavelength and dual resonance on chip vapor spectroscopy in the telecom band**, Liron Stern, Meir Grajower, Uriel Levy, E. Talker, N. Mazurski, R. Zektzer, A. Neiman, The Hebrew Univ. of Jerusalem (Israel) . . . . . [9378-52]

12:05 pm: **Experimental observations of slow light using the EIT-like resonance in a self-coupled resonator**, Yundong Zhang, Xuenan Zhang, Chi Xu, Xianxin Zhai, Yongfeng Wu, Chunyu Zhang, Ping Yuan, Harbin Institute of Technology (China) . . . . . [9378-53]

Lunch/Exhibition Break . . . . . .Wed 12:20 pm to 1:50 pm

SESSION 12

LOCATION: ROOM 236 (MEZZANINE) . . . . . WED 1:50 PM TO 3:20 PM

Slow Light: Plasmonics and Metamaterials

Session Chair: **Michael S. Larsen,** Northrop Grumman Navigation Systems (USA)

1:50 pm: **Light-matter interaction in plasmonic groove waveguides** *(Invited Paper)*, N. Asger Mortensen, DTU Fotonik (Denmark) . . . . . [9378-54]

2:15 pm: **Coherent atomic gas metamaterials** *(Invited Paper)*, Susanne F. Yelin, Univ. of Connecticut (USA). . . . . [9378-55]

2:40 pm: **The crucial role of slow light in metamaterials: from theory (zero index media) to practice (efficient cascade detectors)** *(Invited Paper)*, Meir Orenstein, Technion-Israel Institute of Technology (Israel) . . . . . [9378-56]

3:05 pm: **From slow light to single-photon lasing and neutral-atom acceleration in a plasmonic crystal**, Igor V. Melnikov, National Research Univ. of Electronic Technology (Russian Federation) and Univ. of Illinois at Urbana-Champaign (USA); Joseph W. Haus, Univ. of Dayton (USA). . . . . [9378-57]

Coffee Break . . . . . .Wed 3:20 pm to 3:50 pm

SESSION 13

LOCATION: ROOM 236 (MEZZANINE) . . . . . WED 3:50 PM TO 6:20 PM

Precision Metrology: Coupled Resonator Gyroscopes and Other Sensors

Session Chair: **Uriel Levy,** The Hebrew Univ. of Jerusalem (Israel)

3:50 pm: **Rotation sensitivity analysis of a two-dimensional array of coupled resonators** *(Invited Paper)*, Kiarash Zamani-Aghaie, Stanford Univ. (USA); Pierre Vigneron, Ecole des Mines (France); Michel Digonnet, Stanford Univ. (USA) . . . . . [9378-58]

4:15 pm: **Optimization of gyroscope properties with passive and active coupled resonator optical waveguide structures** *(Invited Paper)*, Jiayang Chen, Hao Zhang, Long Zhao, Junjie Jin, Jian Lin, Zhuanfang Bi, Anping Huang, Zhisong Xiao, BeiHang Univ. (China) . . . . . [9378-59]

4:40 pm: **High-resolution Brillouin metrology of strain and temperature** *(Invited Paper)*, Yair Yair Antman, Bar-Ilan Univ. (Israel); David Elooz, Elbit Systems Electro-Optics El-Op Ltd. (Israel); Yosef London, Raphael Cohen, Avinoam Zadok, Bar-Ilan Univ. (Israel) . . . . . [9378-60]

5:05 pm: **Phase modulation detection with liquid crystal devices** *(Invited Paper)*, Umberto Bortolozzo, Stefania Residori, Institut Non Linéaire de Nice Sophia Antipolis (France) . . . . . [9378-61]

5:30 pm: **Nonlinear holography for acoustic wave detection** *(Invited Paper)*, Stefania Residori, Institut Non Linéaire de Nice Sophia Antipolis (France) . . . . . [9378-62]

5:55 pm: **Nuclear magnetic resonance gyroscope** *(Invited Paper)*, Michael S. Larsen, Northrop Grumman Corp. (USA) . . . . . [9378-78]

CONFERENCE 9378
LOCATION: ROOM 236 (MEZZANINE)

Thursday 12 February

SESSION 14
LOCATION: ROOM 236 (MEZZANINE) . . . . . THU 8:00 AM TO 10:00 AM

Precision Metrology: Atomic Interferometry
Session Chair: **Holger Muller,** Consultant (USA)

8:00 am: **Precise navigation and timing with atom-interferometric sensors** *(Invited Paper)*, David Butts, Draper Lab. (USA) . . . . . [9378-63]

8:25 am: **Collective state atomic interferometer with ultra-high Compton frequency**, Resham Sarkar, May Kim, Selim M. Shahriar, Northwestern Univ. (USA) . . . . . [9378-64]

8:45 am: **Towards an interferometer with thermal atoms trapped on a microwave chip** *(Invited Paper)*, Sylvain Schwartz, M. Dupont-Nivet, Thales Research & Technology (France); Peter Rosenbusch, Observatoire de Paris (France); Isabelle Bouchoule, Institut d'Optique Graduate School (France); Christoph I. Westbrook, Institut d'Optique Theorique et Appliquee (France); C. Guerlin, J. Reichel, Lab. Kastler Brossel (France). . . . . [9378-65]

9:10 am: **Atom interferometry using Bose-Einstein condensates on Earth and in space** *(Invited Paper)*, Charles Sackett, Univ. of Virginia (USA) . [9378-66]

9:35 am: **Photonic requirements for magnetically-guided cold atom gyroscopes** *(Invited Paper)*, John H. Burke, Air Force Research Lab. (USA) . . . . . [9378-67]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 15
LOCATION: ROOM 236 (MEZZANINE) . . . . . THU 10:30 AM TO 12:05 PM

Precision Metrology: Optical Clock and Frequency Combs
Session Chair: **Charles Sackett,** Univ. of Virginia (USA)

10:30 am: **Optical lattice clocks for ultra-precise atomic timekeeping** *(Invited Paper)*, Andrew D. Ludlow, National Institute of Standards and Technology (USA) . . . . . [9378-68]

10:55 am: **Materials for on-chip optical combs**, Michal Lipson, Cornell Univ. (USA) . . . . . [9378-69]

11:15 am: **Fiber-laser frequency combs for the generation of mm- and THz-waves, sinc-shaped Nyquist pulses, and tunable single-frequency laser lines** *(Invited Paper)*, Thomas Schneider, Karlsruher Institut für Technologie (Germany) . . . . . [9378-70]

11:40 am: **Cascaded optical link on a telecommunication fiber network for ultra-stable frequency dissemination** *(Invited Paper)*, Olivier Lopez, Nicola Chiodo, Lab. de Physique des Lasers (France); Fabio Stefani, Observatoire de Paris (France); Fabrice Wiotte, Nicolas Quintin, Anthony Bercy, Lab. de Physique des Lasers (France); Christian Chardonnet, Observatoire de Paris (France); Giorgio Santarelli, Observatoire de Paris (France) and Lab. de Physique des Lasers (France); Paul-Eric Pottie, Anne Amy-Klein, Lab. de Physique des Lasers (France) . . . . . [9378-71]

Lunch/Exhibition Break . . . . . Thu 12:05 pm to 1:35 pm

SESSION 16
LOCATION: ROOM 236 (MEZZANINE) . . . . . THU 1:35 PM TO 3:30 PM

Precision Metrology: Matter Wave Clock, Collective State Clock, and Other Developments
Session Chair: **John H. Burke,** Air Force Research Lab. (USA)

1:35 pm: **A matter wave clock** *(Invited Paper)*, Holger Muller, Consultant (USA) . . . . . [9378-72]

2:00 pm: **Collective state Raman-Ramsey atomic clock with trapped atoms**, May Kim, Resham Sarkar, Selim M. Shahriar, Northwestern Univ. (USA) . . . . . [9378-73]

2:20 pm: **Measurements and characterization of a Rb-based Raman-Ramsey vapor cell atomic clock**, Gour S. Pati, Zachary Warren, Renu Tripathi, Delaware State Univ. (USA); Selim M. Shahriar, Northwestern Univ. (USA) . . . . . [9378-74]

2:40 pm: **Investigation of atomic shot noise spectrum in a warm vapor cell** *(Invited Paper)*, Yanhong Xiao, Fudan Univ. (China) . . . . . [9378-75]

3:05 pm: **Precision measurement with ultra-broadband bi-photons** *(Invited Paper)*, Avi Pe'er, Bar-Ilan Univ. (Israel) . . . . . [9378-76]

CONFERENCE 9379
LOCATION: ROOM 110 (EXHIBIT LEVEL)

Wednesday–Thursday 11–12 February 2015 • Proceedings of SPIE Vol. 9379

Complex Light and Optical Forces IX

Conference Chairs: **Enrique J. Galvez,** Colgate Univ. (USA); **Jesper Glückstad,** Technical Univ. of Denmark (Denmark); **David L. Andrews,** Univ. of East Anglia (United Kingdom)

Program Committee: **Robert R. Alfano,** The City College of New York (USA); **Cornelia Denz,** Westfälische Wilhelms-Univ. Münster (Germany); **Kishan Dholakia,** Univ. of St. Andrews (United Kingdom); **Wolfgang A. Ertmer,** Leibniz Univ. Hannover (Germany); **Andrew Forbes,** CSIR National Laser Ctr. (South Africa); **Jörg B. Götte,** Max-Planck-Institut für Physik komplexer Systeme (Germany); **David G. Grier,** New York Univ. (USA); **Rüdiger Grunwald,** Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); **Jandir M. Hickmann,** Univ. Federal do Rio Grande do Sul (Brazil); **Thomas R. Huser,** Univ. Bielefeld (Germany); **Lorenzo Marrucci,** Univ. degli Studi di Napoli Federico II (Italy); **Miles J. Padgett,** Univ. of Glasgow (United Kingdom); **Darwin Palima,** Technical Univ. of Denmark (Denmark); **Monika Ritsch-Marte,** Medizinische Univ. Innsbruck (Austria); **Halina H. Rubinsztein-Dunlop,** The Univ. of Queensland (Australia); **Marat S. Soskin,** Institute of Physics (Ukraine); **Grover A. Swartzlander Jr.,** Rochester Institute of Technology (USA); **Nirmal K. Viswanathan,** Univ. of Hyderabad (India)

WEDNESDAY 11 FEBRUARY

SESSION 1

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . WED 8:20 AM TO 10:10 AM

Optical Beam Sculpturing

Session Chair: **Enrique J. Galvez,** Colgate Univ. (USA)

8:20 am: **The physics of "self-healing'" of structured wavefields** *(Invited Paper)*, Sabino Chávez-Cerda, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico) . . . . . [9379-1]

8:50 am: **Adaptive self-reconstruction and autocorrelation of nondiffracting wavepackets**, Alexander Treffer, Stefan Koenig, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Jens Brunne, Ulrike Wallrabe, Univ. of Freiburg (Germany); Ruediger Grunwald, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany). . . . . [9379-2]

9:10 am: **Deconvoluting principal modes for mode-division multiplexing**, Daniel A. Nolan, Corning Incorporated (USA); Giovanni Milione, Robert R. Alfano, The City College of New York (USA). . . . . [9379-3]

9:30 am: **Spiral phase plates for the generation of high-order Laguerre-Gaussian beams with non-zero radial index**, Gianluca Ruffato, Marta Carli, Filippo Romanato, Univ. degli Studi di Padova (Italy) . . . . . [9379-4]

9:50 am: **Attenuation-compensated Airy beams**, Miguel A. Preciado, Kishan Dholakia, Michael Mazilu, Univ. of St. Andrews (United Kingdom) . . . . . [9379-5]

Coffee Break . . . . . .Wed 10:10 am to 10:40 am

SESSION 2

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . WED 10:40 AM TO 12:10 PM

Polarization in Complex Light

Session Chair: **David L. Andrews,** Univ. of East Anglia (United Kingdom)

10:40 am: **Pancharatnam-Berry phase optical elements for generation and control of complex light and weak measurements without post-selection for probing the orbital angular momentum content of complex light** *(Invited Paper)*, Bruno Piccirillo, Univ. degli Studi di Napoli Federico II (Italy); Lorenzo Marrucci, Univ. degli Studi di Napoli Federico II (Italy) and CNR-SPIN (Italy); Enrico Santamato, Univ. degli Studi di Napoli Federico II (Italy) . . [9379-6]

11:10 am: **Holographic modulation of polarization singularities in the transverse plane of Poincaré beams**, Eileen Otte, Christian Schlickriede, Christina Alpmann, Cornelia Denz, Westfälische Wilhelms-Univ. Münster (Germany) . . . . . [9379-7]

11:30 am: **Is Monstar topologically the same as Lemon?**, Nirmal K. Viswanathan, Vijay Kumar, Univ. of Hyderabad (India) . . . . . [9379-8]

11:50 am: **Mobius strips and twisted ribbons in 3-dimensional optical fields**, Enrique J. Galvez, Jonathan J. Zeosky, Colgate Univ. (USA) . . . . . [9379-10]

Lunch/Exhibition Break . . . . . .Wed 12:10 pm to 1:40 pm

SESSION 3

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . WED 1:40 PM TO 3:00 PM

Quantum Effects

Session Chair: **Giovanni Milione,** The City College of New York (USA)

1:40 pm: **Real-time imaging of spin-to-orbital angular momentum quantum state teleportation** *(Invited Paper)*, Ebrahim Karimi, Manuel Erhard, Hammam Qassim, Harjaspreet Mand, Robert W. Boyd, Univ. of Ottawa (Canada) . . . . . [9379-11]

2:10 pm: **Quantum nonlinear optics with strongly interacting atoms: from few-photon applications to quantum many-body physics with light** *(Invited Paper)*, Thomas Pohl, Max-Planck-Institut für Physik komplexer Systeme (Germany) . . . . . [9379-12]

2:40 pm: **Quantum zeno suppression of a quantum phase transition**, Wolfgang A. Ertmer, Bernd Luecke, Jan Peise, Carsten Klempt, Frank Deuretzbacher, Luis Santos, Leibniz Univ. Hannover (Germany); Luca Pezzé, Istituto Nazionale di Ottica (Italy); Augusto Smerzi, European Lab. for Non-linear Spectroscopy (Italy) . . . . . [9379-13]

Coffee Break . . . . . .Wed 3:00 pm to 3:30 pm

SESSION 4

LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . WED 3:30 PM TO 5:00 PM

Quantum Complex Light

Session Chair: **Wolfgang A. Ertmer,** Leibniz Univ. Hannover (Germany)

3:30 pm: **Classical entanglement: more than an oxymoron** *(Invited Paper)*, Andrea Aiello, Max-Planck-Institut für die Physik des Lichts (Germany) and Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Falk Toeppel, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Christoph Marquardt, Gerd Leuchs, Max-Planck-Institut für die Physik des Lichts (Germany); Elisabeth Giacobino, Lab. Kastler Brossel (France) . . . . . [9379-14]

4:00 pm: **Spatially-varying polarization singular pattern: degree of polarization and coherence**, Nirmal K. Viswanathan, Samlan C. T., Rishabh Pandey, Anusuya Pal, Univ. of Hyderabad (India). . . . . [9379-15]

4:20 pm: **Imaging polarimetry of single-photon states**, Enrique J. Galvez, Xinru Cheng, Colgate Univ. (USA); Behzad Khajavi, Colgate Univ. (USA) and Florida Atlantic Univ. (USA) . . . . . [9379-16]

4:40 pm: **Quantum optics of non paraxial vortex beams**, Jörg B. Götte, Max-Planck-Institut für Physik komplexer Systeme (Germany); Matt M. Coles, Imperial College London (United Kingdom) . . . . . [9379-17]

OPTO

CONFERENCE 9379
LOCATION: ROOM 110 (EXHIBIT LEVEL)

POSTERS-WEDNESDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Constrained Brownian motion of nanoparticles near an interface using optical tweezers, Hui Yang, Matteo Cornaglia, Thomas Lehnert, Martin A. M. Gijs, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9379-32]

Force calibration of structured light in optical tweezers, Ann A. Bui, Alexander B. Stilgoe, Timo A. Nieminen, Halina Rubinsztein-Dunlop, The Univ. of Queensland (Australia) . . . . . [9379-33]

Cylindrical polarization analyzers, Roger M. Herman, The Pennsylvania State Univ. (USA); Daniel A. Nolan, Corning Incorporated (USA) and New York State Ctr. for Complex Light (USA). . . . . [9379-34]

Classical entanglement in polarization metrology, Falk Töppel, Andrea Aiello, Christoph Marquardt, Elisabeth Giacobino, Gerd Leuchs, Max Planck Institute for the Science of Light (Germany) . . . . . [9379-35]

THURSDAY 12 FEBRUARY

SESSION 5
LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . THU 8:00 AM TO 10:30 AM

Structured Light in Photonics Instrumentation

Joint Session with Conferences 9369 and 9379

Session Chair: **Yakov G. Soskind,** DHPC Technologies (USA); **Enrique J. Galvez,** Colgate Univ. (USA)

8:00 am: **Structured light from lasers by dynamic and geometric phase control** *(Invited Paper)*, Andrew Forbes, CSIR National Laser Ctr. (South Africa). . . . . [9369-19]

8:30 am: **Synthesis and characterization of complex partially-coherent beams** *(Invited Paper)*, Tatiana Alieva, Alejandro Cámara, José A. Rodrigo, Univ. Complutense de Madrid (Spain) . . . . . [9369-20]

9:00 am: **Formation of propagation-invariant laser beams with anamorphic optical systems** *(Invited Paper)*, Yakov G. Soskind, DHPC Technologies (USA) . . . . . [9369-21]

9:30 am: **Mode-division multiplexing using the basis of vector modes over free space and optical fibers**, Giovanni Milione, The City College of New York (USA); Martin P. J. Lavery, Univ. of Glasgow (United Kingdom); Hao Huang, Yongxiong Ren, Yan Yan, The Univ. of Southern California (USA); Ebrahim Karimi, Univ. of Ottawa (Canada); Thien An Nguyen, The City College of New York (USA); Ming-Jun Li, Dan A. Nolan, Corning Incorporated (USA); Robert R. Alfano, The City College of New York (USA); Alan E. Willner, The Univ. of Southern California (USA) . . . . . [9379-18]

9:50 am: **Optical vortex position detection with a Shack-Hartmann wavefront sensor using extended closed-contour**, Hongxin Huang, Hamamatsu Photonics K.K. (Japan); Jia Luo, Zhejiang Univ. (China); Yoshinori Matsui, Haruyoshi Toyota, Takashi Inoue, Hamamatsu Photonics K.K. (Japan). . . . . [9379-19]

10:10 am: **Characterization of OAM carrying beams by means of holographic correlation filters**, Robert Brüning, Christian Schulze, Daniel Flamm, Friedrich-Schiller-Univ. Jena (Germany); Andrew Forbes, CSIR National Laser Ctr. (South Africa); Michael Duparré, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9379-20]

Coffee Break . . . . . Thu 10:30 am to 11:00 am

SESSION 6
LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . THU 11:00 AM TO 12:30 PM

Optical Tweezers

Session Chair: **David L. Andrews,** Univ. of East Anglia (United Kingdom)

11:00 am: **Dynamical stabilisation in optical tweezers** *(Invited Paper)*, Philip H. Jones, Christopher J. Richards, Thomas J. Smart, Univ. College London (United Kingdom); David Cubero, Univ. de Sevilla (Spain) . . . . [9379-21]

11:30 am: **Real-time dynamic coupling of GPC-enhanced diffraction-limited focal spots**, Mark Jayson M. Villangca, Andrew Rafael Bañas, Oleksii Kopylov, DTU Fotonik (Denmark); Darwin Palima, Jesper Glückstad, Technical Univ. of Denmark (Denmark). . . . . [9379-22]

11:50 am: **The efficiency of fiber optical tweezers for cell manipulation using distinct fabrication methods**, Ana Rita S. Rodrigues Ribeiro, INESC TEC (Portugal) and Masdar Institute of Science and Technology (United Arab Emirates) and Univ. do Porto (Portugal); Jaime Viegas, Masdar Institute of Science & Technology (United Arab Emirates); Ariel Guerreiro, Univ. do Porto (Portugal) and INESC TEC (Portugal); Pedro A. S. Jorge, INESC Porto (Portugal). [9379-23]

12:10 pm: **Optimal illumination of phase-only diffractive element using GPC light shaper**, Mark Jayson M. Villangca, Andrew Rafael Bañas, DTU Fotonik (Denmark); Oleksii Kopylov, Darwin Palima, Jesper Glückstad, Technical Univ. of Denmark (Denmark). . . . . [9379-24]

Lunch/Exhibition Break . . . . . Thu 12:30 pm to 2:00 pm

SESSION 7
LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . THU 2:00 PM TO 3:20 PM

Optical Flows

Session Chair: **Jörg B. Götte,** Max-Planck-Institut fur Physik komplexer Systeme (Germany)

2:00 pm: **Light shaping along 3D curves and particle manipulation** *(Invited Paper)*, José A. Rodrigo, Tatiana Alieva, Univ. Complutense de Madrid (Spain) . . . . . [9379-25]

2:30 pm: **The viability of achieving chiral separation through the optical manipulation of molecules**, David L. Andrews, David S. Bradshaw, Univ. of East Anglia (United Kingdom) . . . . . [9379-29]

3:00 pm: **Trapping atoms with laser written wave guides**, Jörg B. Götte, Dario Juki?, Thomas Pohl, Max-Planck-Institut für Physik komplexer Systeme (Germany) . . . . . [9379-27]

Coffee Break . . . . . Thu 3:20 pm to 3:50 pm

SESSION 8
LOCATION: ROOM 110 (EXHIBIT LEVEL) . . . . . THU 3:50 PM TO 5:00 PM

Optical Forces

Session Chair: **Enrique J. Galvez,** Colgate Univ. (USA)

3:50 pm: **Spin and orbital angular momentum interactions probed using microparticles trapped in vacuum** *(Invited Paper)*, Michael Mazilu, Yoshihiko Arita, Tom Vettenburg, Univ. of St. Andrews (United Kingdom); Ewan Wright, College of Optical Sciences, The Univ. of Arizona (USA); Kishan Dholakia, Univ. of St. Andrews (United Kingdom). . . . . [9379-28]

4:20 pm: **Optical sculpting of ultra-low-interfacial-tension oil droplets using holographic optical tweezers**, Jonathan M. Taylor, Univ. of Glasgow (United Kingdom); Andrew Kirby, Durham Univ. (United Kingdom); Guido Bolognesi, Imperial College London (United Kingdom); Oliver W. J. Burnham, Alex Hargreaves, David Tapp, Durham Univ. (United Kingdom); Alex Lubansky, Edith Cowan Univ. (Australia); Lian R. Hutchings, Gordon D. Love, Durham Univ. (United Kingdom); Oscar Ces, Imperial College London (United Kingdom); Buddhapriya Chakrabarti, Durham Univ. (United Kingdom); Mark Neil, Imperial College London (United Kingdom); Andrew Ward, Rutherford Appleton Lab. (United Kingdom); Colin D. Bain, Durham Univ. (United Kingdom). . . . . [9379-30]

4:40 pm: **Optical assembly of zeolite-L-nanocontainer-based waveguides and sensors**, Alvaro Barroso Peña, Katrin Dieckmann, Annika Uphoff, Christina Alpmann, Cornelia Denz, Westfälische Wilhelms-Univ. Münster (Germany) . . . . . [9379-31]

CONFERENCE 9380
LOCATION: ROOM 309 (ESPLANADE)

Wednesday–Thursday 11–12 February 2015 • Proceedings of SPIE Vol. 9380

Laser Refrigeration of Solids VIII

Conference Chairs: **Richard I. Epstein,** The Univ. of New Mexico (USA); **Denis V. Seletskiy,** Univ. Konstanz (Germany); **Mansoor Sheik-Bahae,** The Univ. of New Mexico (USA)

Program Committee: **Daniel A. Bender,** Sandia National Labs. (USA); **Steven Bowman,** U.S. Naval Research Lab. (USA); **Tal Eliezer Carmon,** Univ. of Michigan (USA); **Joaquín Fernández,** Univ. del País Vasco (Spain); **Zameer Ul Hasan,** Temple Univ. (USA); **Raman Kashyap,** Ecole Polytechnique de Montréal (Canada); **Paul D. LeVan,** Air Force Research Lab. (USA); **Mauro Tonelli,** Univ. di Pisa (Italy); **Qihua Xiong,** Nanyang Technological Univ. (Singapore)

Wednesday 11 February

SESSION 1

LOCATION: ROOM 309 (ESPLANADE) . . . . . WED 1:00 PM TO 3:00 PM

Cryogenic Refrigeration in Rare-Earth Doped Systems

Session Chair: **Raman Kashyap,**
Ecole Polytechnique de Montréal (Canada)

1:00 pm: **Optical refrigeration demonstrates the first cooling below 100 K** *(Invited Paper)*, Seth D. Melgaard, Air Force Research Lab. (USA) and The Univ. of New Mexico (USA); Denis V. Seletskiy, Univ. Konstanz (Germany); Alexander R. Albrecht, Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) . . . [9380-1]

1:30 pm: **Intracavity-enhanced optical refrigeration of Yb:YLF crystal to cryogenic temperatures** *(Invited Paper)*, Mohammadreza Ghasemkhani, Alexander R. Albrecht, Seth D. Melgaard, The Univ. of New Mexico (USA); Denis V. Seletskiy, Univ. Konstanz (Germany); Jeffrey G. Cedeberg, Sandia National Labs. (USA); Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) . . . [9380-2]

2:00 pm: **Purification of precursors of Yb^{3+}-doped YLF crystals by solvent extraction and electrochemical processing** *(Invited Paper)*, William L. Boncher, Markus P. Hehlen, Los Alamos National Lab. (USA) . . . . . [9380-3]

2:30 pm: **A novel approach for solid-state cryocooler** *(Invited Paper)*, Mauro Tonelli, Alberto Dilieto, Azzurra Volpi, Univ. di Pisa (Italy) . . . . . [9380-4]

Coffee Break . . . . . .Wed 3:00 pm to 3:30 pm

SESSION 2

LOCATION: ROOM 309 (ESPLANADE) . . . . . WED 3:30 PM TO 5:50 PM

Novel Rare-Earth Doped Systems

Session Chair: **Steven Bowman,** U.S. Naval Research Lab. (USA)

3:30 pm: **Recent advances in proposed techniques for laser cooling of solids** *(Invited Paper)*, Raman Kashyap, Galina Nemova, Elton S. L. Filho, Sebastien Loranger, Ecole Polytechnique de Montréal (Canada); Venkata Krishnaiah, Ecole Polytechnique de Montréal (Canada) and Univ. of Laval (Canada); Ye Jin Yu, Ecole Polytechnique de Montréal (Canada) and Univ. Laval (Canada); Younes Merssaddeq, Yannick Ledemi, Univ. Laval (Canada); Fiorenzo Vetrone, Marta Quintanilla, Institut National de la Recherche Scientifique (Canada); Gurinder K. Ahluwalia, College of The North Atlantic (Canada) [9380-5]

4:00 pm: **laser-refrigeration of rare-earth-doped nanocrystals in water** *(Invited Paper)*, Peter J. Pauzauskie, Paden B. Roder, Bennett E. Smith, Xuezhe Zhou, Univ. of Washington (USA) . . . . . [9380-6]

4:30 pm: **Optical refrigeration of Yb^{3+}:YAG nanocrystals**, Galina Nemova, Raman Kashyap, Ecole Polytechnique de Montréal (Canada) . . . . . [9380-7]

4:50 pm: **Spectroscopy characterization and laser cooling performance of Yb^{3+}-doped $LuLiF_4$ crystals** *(Invited Paper)*, Biao Zhong, Lin Chen, East China Normal Univ. (China); Youhua Jia, Shanghai Second Polytechnic Univ. (China); Jianping Yin, East China Normal Univ. (China) . . . . . [9380-8]

5:20 pm: **Spectroscopic and thermal study of Er-doped oxysulfide crystal powders** *(Invited Paper)*, Joaquín Fernández, Rolindes Balda, Macarena Barredo, Univ. del País Vasco (Spain); Odile Merdrignac, Noha Hakmeh, Univ. de Rennes 1 (France) . . . . . [9380-9]

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Comparative spectroscopic studies of Ho: KPb_2Cl_5, Ho: KPb_2Br_2, and Ho: YAG for 2 µm laser cooling applications, EiEi Brown, Uwe H. Hömmerich, Hampton Univ. (USA); Sudhir B. Trivedi, Brimrose Corp. of America (USA) . . . . . [9380-23]

Nanocrystallization in Yb^{3+}-doped oxyfluoride glasses for laser cooling, Venkata Krishnaiah Kummara, Ecole Polytechnique de Montréal (Canada); Yannick Ledemi, Younes Messaddeq, Ctr. d'Optique, Photonique et Laser (Canada); Raman Kashyap, Ecole Polytechnique de Montréal (Canada) [9380-24]

Characterization of fluoride nanocrystals for optical refrigeration, Elton Soares de Lima Filho, Ecole Polytechnique de Montréal (Canada); Marta Quintanilla, Fiorenzo Vetrone, Institut National de la Recherche Scientifique (Canada); Galina Nemova, Raman Kashyap, Ecole Polytechnique de Montréal (Canada) . . . . . [9380-25]

Prospects of optical refrigeration on oxyfluoride glasses and glass-ceramics: experiments, Elton Soares de Lima Filho, Kummara Venkata Krishnaiah1, Ye Jin Yu, Ecole Polytechnique de Montréal (Canada); Yannick Ledemi, Ctr. d'Optique, Photonique et Laser (Canada); Younes Messaddeq, Univ. Laval (Canada); Raman Kashyap, Ecole Polytechnique de Montréal (Canada) . . . . . [9380-26]

Laser cooling of doped crystals by methods of coherent pumping, Andrei V. Ivanov, Yuri V. Rozhdestvensky, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation) . . . . . [9380-27]

Thursday 12 February

SESSION 3

LOCATION: ROOM 309 (ESPLANADE) . . . . . THU 8:00 AM TO 10:10 AM

Laser Cooling in Semiconductors

Session Chair: **Paul D. LeVan,** Air Force Research Lab. (USA)

8:00 am: **Sideband Raman cooling of optical phonons in semiconductors** *(Invited Paper)*, Jun Zhang, Nanyang Technological Univ. (Singapore); Leong C. Kwek, National Univ. of Singapore (Singapore) and Nanyang Technological Univ. (Singapore); Qi Hua Xiong, Nanyang Technological Univ. (Singapore) . . . . . [9380-10]

8:30 am: **Multi-phonon-assisted absorption and emission in semiconductors and its potential for laser refrigeration** *(Invited Paper)*, Jacob B. Khurgin, Johns Hopkins Univ. (USA) . . . . . [9380-11]

9:00 am: **Anti-Stokes Raman processes based on second-order nonlinearities at phonon-polariton resonances for phonon removal and laser cooling** *(Invited Paper)*, Yujie J. Ding, Lehigh Univ. (USA) . . . . . [9380-12]

9:30 am: **Photoluminescence study of suspended MQW structures for laser refrigeration purposes**, Iman Hassani Nia, Hooman Mohseni, Northwestern Univ. (USA) . . . . . [9380-13]

9:50 am: **High sensitivity background absorption measurements in semiconductors**, Nathan Giannini, The Univ. of New Mexico (USA); Junior R. Silva, Univ. Estadual de mato Grosso do Sul (Brazil) and The Univ. of New Mexico (USA); Chengao Wang, The Univ. of New Mexico (USA); Seth D. Melgaard, The Univ. of New Mexico (USA) and Air Force Research Lab. (USA); Alexander R. Albrecht, Mansoor Sheik-Bahae, The Univ. of New Mexico (USA) . . . . . [9380-14]

Coffee Break . . . . . Thu 10:10 am to 10:30 am

OPTO

CONFERENCE 9380
LOCATION: ROOM 309 (ESPLANADE)

SESSION 4
LOCATION: ROOM 309 (ESPLANADE) . . . . . .THU 10:30 AM TO 12:20 PM

Applications and Device Concepts

Session Chair: **Daniel A. Bender,** Sandia National Labs. (USA)

10:30 am: **Next-generation ultrastable lasers based on crystalline materials** *(Invited Paper)*, Wei Zhang, Lindsay Sonderhouse, Jun Ye, JILA (USA). [9380-15]

11:00 am: **Low-thermal-noise and high-reflectivity crystalline coatings for the near- and mid-infrared** *(Invited Paper)*, Garrett D. Cole, Crystalline Mirror Solutions, LLC (USA) and Vienna Ctr. for Quantum Science and Technology (Austria) . . . . . [9380-16]

11:30 am: **Design study of a laser-cooled infrared sensor** *(Invited Paper)*, Markus P. Hehlen, William L. Boncher, Steven P. Love, Los Alamos National Lab. (USA) . . . . . [9380-17]

12:00 pm: **Thermal modeling of an optical refrigerator cold finger**, Kyle W. Martin, Applied Technology Associates (USA); Jason Schomacker, Rensselaer Polytechnic Institute (USA); Christopher Dodson, Tom Fraser, Air Force Research Lab. (USA). . . . . [9380-18]

Lunch/Exhibition Break . . . . . Thu 12:20 pm to 1:30 pm

SESSION 5
LOCATION: ROOM 309 (ESPLANADE) . . . . . .THU 1:30 PM TO 3:30 PM

Novel Cooling Concepts

Session Chair: **Galina A. Nemova,**
Ecole Polytechnique de Montréal (Canada)

1:30 pm: **Optically-cooled solid-state lasers** *(Invited Paper)*, Steven Bowman, U.S. Naval Research Lab. (USA). . . . . [9380-19]

2:00 pm: **Optical refrigeration for ultra-efficient photovoltaics** *(Invited Paper)*, Assaf Manor, Leopoldo L. Martin, Carmel Rotschild, Technion-Israel Institute of Technology (Israel) . . . . . [9380-20]

2:30 pm: **A Kennard-Stepanov relation study on redistributional laser cooling in dense gaseous ensembles** *(Invited Paper)*, Stavros Christopoulos, Anne Sass, Peter Moroshkin, Lars Weller, Roberto Cota, Benedikt Gerwers, Katharina Knicker, Martin Weitz, Rheinische Friedrich-Wilhelms-Univ. Bonn (Germany) . . . . . [9380-21]

3:00 pm: **Excitation strategies and propagation effects in laser cooling of solids via superradiance** *(Invited Paper)*, Guang-Zong Dong, Xin-Lu Zhang, Harbin Engineering Univ. (China). . . . . [9380-22]

CONFERENCE 9381
LOCATION: ROOM 274 (MEZZANINE)

Wednesday–Thursday 11–12 February 2015 • Proceedings of SPIE Vol. 9381

Vertical-Cavity Surface-Emitting Lasers XIX

Conference Chairs: **Chun Lei,** EMCORE Corp. (USA); **Kent D. Choquette,** Univ. of Illinois at Urbana-Champaign (USA)

Program Committee: **Aaron James Danner,** National Univ. of Singapore (Singapore); **Kent M. Geib,** Sandia National Labs. (USA); **James K. Guenter,** Finisar Corp. (USA); **Martin Grabherr,** Philips Technologie GmbH U-L-M Photonics (Germany); **Fumio Koyama,** Tokyo Institute of Technology (Japan); **Anders Larsson,** Chalmers Univ. of Technology (Sweden); **Kevin L. Lear,** Colorado State Univ. (USA); **James A. Lott,** Technische Univ. Berlin (Germany); **M. V. Ramana Murty,** Avago Technologies Ltd. (USA); **Krassimir Panajotov,** Vrije Univ. Brussel (Belgium); **Jean-Francois Seurin,** Princeton Optronics, Inc. (USA); **Noriyuki Yokouchi,** Furukawa Electric Co., Ltd. (Japan)

Wednesday 11 February

SESSION 1

LOCATION: ROOM 274 (MEZZANINE) . . . . . WED 8:30 AM TO 10:00 AM

Commercial VCSELs

Session Chair: **Chun Lei,** EMCORE Corp. (USA)

8:30 am: **New applications boost VCSEL quantities: recent developments at Philips** *(Invited Paper)*, Martin Grabherr, Philips Technologie GmbH U-L-M Photonics (Germany) . . . . . [9381-1]

9:00 am: **Vertical-cavity surface-emitting lasers enable high-density ultra-high bandwidth optical interconnects** *(Invited Paper)*, Nicolae Chitica, TE Connectivity Ltd. (Sweden) . . . . . [9381-2]

9:30 am: **Mode partition noise characterization of 25 Gb/s VCSELs** *(Invited Paper)*, M. V. Ramana Murty, Laura Giovane, David G. Cunningham, Jingyi Wang, Avago Technologies Ltd. (USA); Zheng-Wen Feng, Avago Technologies Ltd. (Singapore); Thomas R. Fanning, Avago Technologies Ltd. (USA) . . . . . [9381-3]

Coffee Break . . . . . .Wed 10:00 am to 10:30 am

SESSION 2

LOCATION: ROOM 274 (MEZZANINE) . . . . . WED 10:30 AM TO 12:20 PM

Emerging VCSEL Applications

Session Chair: **Kent D. Choquette,**
Univ. of Illinois at Urbana-Champaign (USA)

10:30 am: **Concepts for long wavelength VCSELs above 2µm** *(Invited Paper)*, Stephan Sprengel, Markus-Christian Amann, Technische Univ. München (Germany) . . . . . [9381-4]

11:00 am: **Long wavelength VCSEL by VCSEL optically injection locked optoelectronic oscillator**, Juan F. Coronel, Institut Supérieur de l'Aéronautique et de l'Espace (France) and Univ. Nacional de Colombia (Colombia); Angélique Rissons, Institut Supérieur de l'Aéronautique et de l'Espace (France); Margarita Varon, Univ. Nacional de Colombia (Colombia) . . . . . [9381-5]

11:20 am: **Heat-assisted magnetic recording (HAMR) demonstration using C-shaped nano-apertures**, Sajid Hussain, Charanjit S. Bhatia, Yang Hyunsoo, Aaron J. Danner, National Univ. of Singapore (Singapore) . . . . . [9381-6]

11:40 am: **Optical power of VCSELs stabilized to 35 ppm/°C without a TEC**, John Downing, USL Technologies LLC (USA) . . . . . [9381-7]

12:00 pm: **Vertical-cavity surface-emitting laser for space applications**, Sébastien Chaudron, Angélique Rissons, Veronique Gernigon, Institut Supérieur de l'Aéronautique et de l'Espace (France) . . . . . [9381-8]

Lunch/Exhibition Break . . . . . .Wed 12:20 pm to 1:30 pm

SESSION 3

LOCATION: ROOM 274 (MEZZANINE) . . . . . WED 1:30 PM TO 3:00 PM

High-Power VCSELs

Session Chair: **Martin Grabherr,**
Philips Technologie GmbH U-L-M Photonics (Germany)

1:30 pm: **High-power VCSEL arrays for consumer electronics** *(Invited Paper)*, Luke A. Graham, Hao Chen, Jonathan Cruel, James Guenter, David Q. Kelly, Alirio Melgar, Jim A. Tatum, Edward Shaw, Finisar Corp. (USA) . . . . . [9381-9]

2:00 pm: **Progress on high-power high-brightness VCSELs and applications** *(Invited Paper)*, Delai Zhou, Jean-Francois Seurin, Guoyang Xu, Pu Zhao, Bing Xu, Tong Chen, Robert Van Leeuwen, Alexander Miglo, Chuni Ghosh, Princeton Optronics, Inc. (USA) . . . . . [9381-10]

2:30 pm: **High-speed and scalable high-power VCSEL arrays and their applications** *(Invited Paper)*, Mial E. Warren, Richard F. Carson, John R. Joseph, Thomas Wilcox, David J. Abell, Kirk J. Otis, TriLumina, Inc. (USA) . . . . . [9381-11]

Coffee Break . . . . . .Wed 3:00 pm to 3:30 pm

SESSION 4

LOCATION: ROOM 274 (MEZZANINE) . . . . . .WED 3:30 PM TO 6:00 PM

Digital VCSEL Modulation

Session Chair: **M. V. Ramana Murty,** Avago Technologies Ltd. (USA)

3:30 pm: **High-speed VCSELs and VCSEL arrays for single- and multi-core fiber interconnects** *(Invited Paper)*, Anders Larsson, Petter Westbergh, Johan S. Gustavsson, Erik Haglund, Emanuel P. Haglund, Chalmers Univ. of Technology (Sweden) . . . . . [9381-12]

4:00 pm: **850-nm Zn-diffusion VCSELs with oxide-relief structure for optical interconnects from very-short to medium (2km) reaches** *(Invited Paper)*, Jin-Wei Shi, National Central Univ. (Taiwan); Chia-Chien Wei, National Sun Yat-Sen Univ. (Taiwan); Jyehong Chen, National Chiao Tung Univ. (Taiwan); Ying-Jay Yang, National Taiwan Univ. (Taiwan) . . . . . [9381-13]

4:30 pm: **High-speed modulation, wavelength, and mode control in vertical-cavity surface-emitting lasers** *(Invited Paper)*, Nikolay N. Ledentsov, Vitaly A. Shchukin, Joerg–Reinhardt R. Kropp, Gunther Steinle, Nikolay Ledentsov Jr., VI Systems GmbH (Germany); Kent D. Choquette, Univ. of Illinois at Urbana-Champaign (USA); Sven Burger, Frank Schmidt, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany); Jarek P. Turkiewicz, Warsaw Univ. of Technology (Poland); Bo Wu, Qiu Shaofeng, Yanan Ma, Zhiyong Feng, Huawei Technologies Co., Ltd. (China) . . . . . [9381-14]

5:00 pm: **Phased VCSEL array modulation**, Kent D. Choquette, Stewart T. M. Fryslie, Bradley Thompson, Zihe Gao, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9381-15]

5:20 pm: **Extraction and analysis of high-frequency response and impedance of 980-nm VCSELs as a function of temperature and oxide aperture diameter**, Philip Wolf, Hui Li, Philip Moser, Gunter Larisch, James A. Lott, Technische Univ. Berlin (Germany); Dieter H. Bimberg, Technische Univ. Berlin (Germany) and King Abdulaziz Univ. (Saudi Arabia) . . . . . [9381-16]

5:40 pm: **Ultrafast polarization dynamics with controlled polarization oscillations in vertical-cavity surface-emitting lasers**, Markus Lindemann, Henning Höpfner, Nils C. Gerhardt, Martin R. Hofmann, Ruhr-Univ. Bochum (Germany); Tobias Pusch, Rainer Michalzik, Univ. Ulm (Germany). . . . . [9381-17]

Thursday 12 February

SESSION 5

LOCATION: ROOM 274 (MEZZANINE) . . . . . .THU 8:00 AM TO 10:00 AM

VCSEL Characterization and Modeling

Session Chair: **Krassimir Panajotov,** Vrije Univ. Brussel (Belgium)

8:00 am: **Cold-cavity optical loss measurements of oxide-confined VCSELs**, Stewart T. M. Fryslie, Charlene Tai, Univ. of Illinois at Urbana-Champaign (USA); Janice Blane, Univ. of Illinois at Urbana-Champaign (USA) and U.S. Military Academy (USA); Kent D. Choquette, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9381-18]

8:20 am: **VCSEL modeling with self-consistent models: From simple approximations to comprehensive numerical analysis**, Maciej Dems, Piotr Beling, Marcin Gebski, Lukasz Piskorski, Jaroslaw Walczak, Maciej Kuc, Leszek Frasunkiewicz, Michal Wasiak, Robert Sarzala, Tomasz Czyszanowski, Lodz Univ. of Technology (Poland) . . . . . [9381-19]

OPTO

8:40 am: **Spectrally-resolved imaging of the transverse modes in multimode VCSELs**, Stephen M. Misak, Kelly R. Farner, Daniel J. Thul, Daniel G. Dugmore, Evan R. Hale, Kirsten A. Middleton, Rose-Hulman Institute of Technology (USA); Kent D. Choquette, Univ. of Illinois at Urbana-Champaign (USA); Paul O. Leisher, Rose-Hulman Institute of Technology (USA) . . . . . [9381-20]

9:00 am: **Efficiency optimization and analysis of 808nm VCSELs with a full electro-thermal-optical numerical model**, Andreas P. Engelhardt, Univ. Kassel (Germany); Johanna S. Kolb, Philips Technologie GmbH (Germany); Friedhard Römer, Univ. Kassel (Germany); Ulrich Weichmann, Holger Moench, Philips Technologie GmbH (Germany); Bernd Witzigmann, Univ. Kassel (Germany) . . . . . [9381-21]

9:20 am: **Electrical, thermal, and optical modeling of high-performance 25-50 Gb/s 980 nm VCSELs**, Michal Wasiak, Tomasz Czyszanowski, Jaroslaw Walczak, Robert Sarzala, Lodz Univ. of Technology (Poland); Philip Moser, Dieter H. Bimberg, James A. Lott, Technische Univ. Berlin (Germany) . . . . . [9381-22]

9:40 am: **Universal reliability model for VCSELs and other diode lasers**, Dennis Deppe, Xu Yang, Yu Zhang, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Guowei Zhao, sdPhotonics, LLC (USA); Mingxin Li, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9381-23]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 6

LOCATION: ROOM 274 (MEZZANINE) . . . . . THU 10:30 AM TO 12:10 PM

Novel VCSEL Structures

Session Chair: **James A. Lott,** Technische Univ. Berlin (Germany)

10:30 am: **Hybrid VCSEL: liquid crystal systems** *(Invited Paper)*, Krassimir Panajotov, Vrije Univ. Brussel (Belgium); Yi Xie, Jeroen Beeckman, Kristiaan Neyts, Univ. Gent (Belgium); Carlos Belmonte, Vrije Univ. Brussel (Belgium); Maciej Dems, Lodz Univ. of Technology (Poland); Hugo Thienpont, Vrije Univ. Brussel (Belgium) . . . . . [9381-24]

11:00 am: **Small-sized lithographic single-mode VCSELs with high-power conversion efficiency**, Xu Yang, Mingxin Li, Guowei Zhao, Yu Zhang, Sabine Freisem, Dennis Deppe, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9381-25]

11:20 am: **Double HCG 980-nm VCSEL with non-oxide lateral mode confinement scheme** *(Invited Paper)*, Marcin Gebski, Maciej Dems, Lodz Univ. of Technology (Poland); Y. Y. Xie, Z. J. Xu, Qi Jie Wang, D. H. Zhang, Nanyang Technological Univ. (Singapore); James A. Lott, Technische Univ. Berlin (Germany); Tomasz Czyszanowski, Lodz Univ. of Technology (Poland) [9381-26]

11:50 am: **Compliant heterogeneous assemblies of micro-VCSELs as a new materials platform for integrated optoelectronics**, Jongseung Yoon, The Univ. of Southern California (USA) . . . . . [9381-27]

Lunch/Exhibition Break . . . . . Thu 12:10 pm to 1:30 pm

SESSION 7

LOCATION: ROOM 274 (MEZZANINE) . . . . . THU 1:30 PM TO 3:20 PM

Engineering VCSEL Optical Properties

Session Chair: **James Guenter,** Finisar Corp. (USA)

1:30 pm: **Maximizing temperature insensitivity and energy-efficiency of 25-50 Gb/s 980-nm VCSELs via small oxide-aperture diameters and photon lifetime tuning** *(Invited Paper)*, Philip Moser, Maya Volwahsen, Gunter Larisch, James A. Lott, Dieter H. Bimberg, Technische Univ. Berlin (Germany) . [9381-28]

2:00 pm: **Theory and characterization of elliptically-polarized modes in vertical-cavity surface-emitting lasers**, Nicolas Volet, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9381-29]

2:20 pm: **Engineering of optical modes in vertical-cavity microresonators by the aperture placement: applications to single-mode and near-field lasers**, Vitaly A. Shchukin, Nikolay N. Ledentsov, Joerg–Reinhardt R. Kropp, Gunther Steinle, Nikolay Ledentsov Jr., VI Systems GmbH (Germany); Kent D. Choquette, Univ. of Illinois at Urbana-Champaign (USA); Sven Burger, Frank Schmidt, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany) . . . . . [9381-30]

2:40 pm: **Impact of a negative gain-to-cavity wavelength detuning on the performance of InGaAlAs oxide-confined vertical-cavity surface-emitting lasers**, Sergey A. Blokhin, Mikhail A. Bobrov, Nikolay A. Maleev, Ioffe Physical-Technical Institute (Russian Federation); Alexander G. Kuzmenkov, Ioffe Physical-Technical Institute (Russian Federation) and Connector Optics LLC (Russian Federation); Alexey V. Sakharov, Ioffe Physical-Technical Institute (Russian Federation); Alexei A. Blokhin, Saint-Petersburg State Polytechnical Univ. (Russian Federation); Philip Moser, James A. Lott, Technische Univ. Berlin (Germany); Dieter H. Bimberg, Technische Univ. Berlin (Germany) and King Abdulaziz Univ. (Saudi Arabia); Victor M. Ustinov, Ioffe Physical-Technical Institute (Russian Federation) . . . . . [9381-31]

3:00 pm: **Effect of temperature on polarization switching in long-wavelength VCSELs**, Ana Quirce, Vrije Univ. Brussel (Belgium); Angel Valle, Luis Pesquera, Univ. de Cantabria (Spain); Krassimir Panajotov, Hugo Thienpont, Vrije Univ. Brussel (Belgium) . . . . . [9381-32]

CONFERENCE 9382
LOCATION: ROOM 252 (MEZZANINE)

Monday–Thursday 9–12 February 2015 • Proceedings of SPIE Vol. 9382

Novel In-Plane Semiconductor Lasers XIV

Conference Chairs: **Alexey A. Belyanin,** Texas A&M Univ. (USA); **Peter M. Smowton,** Cardiff Univ. (United Kingdom)

Program Committee: **Yasuhiko Arakawa,** The Univ. of Tokyo (Japan); **Dan Botez,** Univ. of Wisconsin-Madison (USA); **Federico Capasso,** Harvard School of Engineering and Applied Sciences (USA); **Gary A. Evans,** Southern Methodist Univ. (USA); **Claire F. Gmachl,** Princeton Univ. (USA); **Michael Kneissl,** Technische Univ. Berlin (Germany); **Luke F. Lester,** Virginia Polytechnic Institute and State Univ. (USA); **Luke J. Mawst,** Univ. of Wisconsin-Madison (USA); **Jerry R. Meyer,** U.S. Naval Research Lab. (USA); **Roberto Paiella,** Boston Univ. (USA); **Richard V. Penty,** Univ. of Cambridge (United Kingdom); **Johann Peter Reithmaier,** Univ. Kassel (Germany); **Haisheng Rong,** Intel Corp. (USA); **Nelson Tansu,** Lehigh Univ. (USA); **Shinji Tsuji,** Hitachi, Ltd. (Japan); **Kresten Yvind,** Technical Univ. of Denmark (Denmark)

Monday 9 February

OPTO PLENARY SESSION

LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA). . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA). . . . . [9371-202]

SESSION 1

LOCATION: ROOM 252 (MEZZANINE) . . . . . .MON 1:30 PM TO 3:10 PM

Comms: Materials to Devices

Session Chair: **Richard V. Penty,** Univ. of Cambridge (United Kingdom)

1:30 pm: **GaAsBi lasers: Progress towards telecoms wavelengths**, Stephen J. Sweeney, Konstanze Hild, Igor P. Marko, Shirong Jin, Univ. of Surrey (United Kingdom); Eoin P. O'Reilly, Tyndall National Institute (Ireland); Kerstin Volz, Philipps-Univ. Marburg (Germany); Ar?nas Krotkus, Ctr. for Physical Sciences and Technology (Lithuania) . . . . . [9382-1]

1:50 pm: **GaInSb/AlInSb coupled QWs on GaSb for telecom laser**, Laurent Cerutti, Univ. Montpellier 2 (France) and Ctr. National de la Recherche Scientifique (France); Andrea Castellano, Univ. Montpellier 2 (France) and Ctr. National de la Recherche Scientifique (France) and III-V Lab. (France); Karine Madiomanana, Jean-Baptiste Rodriguez, Univ. Montpellier 2 (France) and Ctr. National de la Recherche Scientifique (France); François Lelarge, III-V Lab. (France); Eric Tournié, Univ. Montpellier 2 (France) and Ctr. National de la Recherche Scientifique (France) . . . . . [9382-2]

2:10 pm: **Highly stacked InAs quantum-dot laser grown on vicinal (001) InP substrate by strain-compensation technique**, Kouichi Akahane, Naokatsu Yamamoto, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan). . . . . [9382-3]

2:30 pm: **10Gb/s Direct modulation of widely tunable V-cavity-laser with chirp managed laser technology**, Jianjun Meng, Zhejiang Univ. (China); Lei Wang, Lightip Technologies Co., Ltd. (China); Jian-Jun He, Zhejiang Univ. (China) . . . . . [9382-5]

2:50 pm: **Low-chirp QD-based directly-modulated lasers monolithically integrated with a ring resonator for long-range access network**, Siddharth Joshi, Nicolas Chimot, III-V Lab. (France); François Lelarge, III-V Lab. (France) and CEA-LETI (France) . . . . . [9382-6]

Coffee Break . . . . . .Mon 3:10 pm to 3:40 pm

SESSION 2

LOCATION: ROOM 252 (MEZZANINE) . . . . . .MON 3:40 PM TO 5:30 PM

Nitrides

Session Chair: **Michael Kneissl,** Technische Univ. Berlin (Germany)

3:40 pm: **InGaN/GaN quantum dot and nanowire single-photon sources** *(Invited Paper)*, Pallab K. Bhattacharya, Saniya V. Deshpande, Thomas Frost, Arnab Hazari, Univ. of Michigan (USA) . . . . . [9382-7]

4:10 pm: **Longitudinal mode dynamics in (Al,In)GaN laser diodes**, Ulrich T. Schwarz, Univ. of Freiburg (Germany); Thomas Weig, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Thomas Hager, Georg Bruederl , Uwe Strauss, OSRAM Opto Semiconductors GmbH (Germany) . . . . . [9382-8]

4:30 pm: **Strategies and Progress towards Compact Deep UV Laser Sources** *(Invited Paper)*, Thomas Wunderer, Palo Alto Research Center, Inc. (USA) . . . . . [9382-9]

5:00 pm: **MOEMS integration of (Al,In)GaN laser diodes with optical waveguides for applications in optogenetics** *(Invited Paper)*, Ulrich T. Schwarz, Michael Schwaerzle, Annik Jakob, Linda Rudmann, Marie Alt, Eva Fiedler, Thomas Stieglitz, Patrick Ruther, Univ. of Freiburg (Germany) . . . . . [9382-10]

Tuesday 10 February

SESSION 3

LOCATION: ROOM 252 (MEZZANINE) . . . . . TUE 8:10 AM TO 10:00 AM

Quantum Dots and Mode-Locking

Session Chair: **Johann Peter Reithmaier,** Univ. Kassel (Germany)

8:10 am: **The role of optical delays for the dynamic behavior of passively mode-locked lasers** *(Invited Paper)*, Kathy Lüdge, Lina Jaurigue, Technische Univ. Berlin (Germany). . . . . [9382-11]

8:40 am: **Ultrafast pulse shortening through adjustment of the mode-locking threshold condition in passively mode-locked InAs quantum dot lasers**, Patrick Finch, Tyndall National Institute (Ireland); Matthew Hutchings, Syracuse Univ. (USA); Angela D. Sobiesierski, Cardiff Univ. (United Kingdom); Russell M. Gwilliam, Univ. of Surrey (United Kingdom); Peter M. Smowton, Peter Blood, Cardiff Univ. (United Kingdom); Ian O'Driscoll, Tyndall National Institute (Ireland) . . . . . [9382-12]

9:00 am: **Ultrashort pulse generation with semiconductor lasers using intracavity phase- and amplitude pulse shaping**, Benjamin Döpke, Jan C. Balzer, Rouven Pilny, Carsten Brenner, Ruhr-Univ. Bochum (Germany); Andreas Klehr, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany); Martin R. Hofmann, Ruhr-Univ. Bochum (Germany) . . . . . [9382-13]

9:20 am: **Evaluation of free carrier effects on the gain and spontaneous emission sectra of InAs/GaAs quantum dot lasers**, Negin Peyvast, David T. D. Childs, Kejia J. Zhou, Richard A. Hogg, The Univ. of Sheffield (United Kingdom); Takeo Kageyama, Kenichi Nishi, QD Laser, Inc. (Japan); Keizo Takemasa, QD lasers Inc. (Japan); Mitsuru Sugawara, QD Laser, Inc. (Japan). . . . . [9382-14]

9:40 am: **Mechanism controlling threshold current temperature dependence in InP QD lasers at elevated temperature**, Peter M. Smowton, Makarimi Kasim, Stella N. Elliott, Cardiff Univ. (United Kingdom); Andrey B. Krysa, The Univ. of Sheffield (United Kingdom) . . . . . [9382-15]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

OPTO

CONFERENCE 9382
LOCATION: ROOM 252 (MEZZANINE)

SESSION 4
LOCATION: ROOM 252 (MEZZANINE) . . . . . TUE 10:30 AM TO 12:10 PM

Novel Structures

Session Chair: **Lina Jaurigue,** Technische Univ. Berlin (Germany)

10:30 am: **A new methodology and experimental results for designing semiconductor lasers for high-coherence narrow linewidth** *(Invited Paper)*, Amnon Yariv, California Institute of Technology (USA) . . . . . [9382-66]

11:00 am: **Dynamic characteristics of double tunneling-injection quantum dot lasers**, Levon V. Asryan, Virginia Polytechnic Institute and State Univ. (USA) . . . . . [9382-16]

11:20 am: **Advances in nanowire quantum-dot lasers and single photon emitters** *(Invited Paper)*, Yasuhiko Arakawa, Jun Tatebayashi, Mark Holmes, Satoshi Iwamoto, The Univ. of Tokyo (Japan). . . . . [9382-17]

11:50 am: **Effect of difference-wavelength and temperature on the performance of Dual-λ InP-QD lasers**, Samuel Shutts, Peter M. Smowton, Cardiff Univ. (United Kingdom); Andrey B. Krysa, The Univ. of Sheffield (United Kingdom) . . . . . [9382-18]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 1:20 pm

SESSION 5
LOCATION: ROOM 252 (MEZZANINE) . . . . . TUE 1:20 PM TO 3:30 PM

Narrow Linewidth

Session Chair: **Geert Morthier,** Univ. Gent (Belgium)

1:20 pm: **Resonant self-injection locked ultra-narrow-line semiconductor lasers** *(Invited Paper)*, Andrey B. Matsko, Elijah B. Dale, Anatoliy A. Savchenkov, Wei Liang, Danny Eliyahu, Vladimir S. Ilchenko, David J. Seidel, Lute Maleki, OEwaves, Inc. (USA) . . . . . [9382-19]

1:50 pm: **Al-free active region laser diodes at 894nm for compact Cesium atomic clocks**, Nicolas von Bandel, Joseph P. Bebe Manga Lobe, Michel Garcia, Alexandre Larrue, Yannick Robert, Eric Vinet, Michel Lecomte, Olivier Drisse, Olivier Parillaud, Michel Krakowski, III-V Lab. (France) . . [9382-20]

2:10 pm: **DBR grating stabilized ridge waveguide lasers emitting at 647 nm for real 3D holographic displays**, David Feise, Johannes Pohl, Gunnar Blume, Katrin Paschke, Ferdinand-Braun-Institut (Germany) . . . . . [9382-21]

2:30 pm: **Theory and observation on non-linear and temperature-related effects limiting the coherence properties of semiconductor lasers**, Yaakov Vilenchik, Christos T. Santis, Scott T. Steger, Amnon Yariv, California Institute of Technology (USA) . . . . . [9382-22]

2:50 pm: **Thermally-tuneable integrated planar Bragg-grating stabilized diode laser**, Stephen G. Lynch, James C. Gates, Peter G. R. Smith, Univ. of Southampton (United Kingdom) . . . . . [9382-23]

3:10 pm: **400 mW output power at 445 nm with narrowband emission from an external cavity diode laser system**, Norman Ruhnke, André Müller, Bernd Eppich, Martin Maiwald, Bernd Sumpf, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany) . . . . . [9382-24]

Coffee Break . . . . . Tue 3:30 pm to 4:00 pm

SESSION 6
LOCATION: ROOM 252 (MEZZANINE) . . . . . TUE 4:00 PM TO 5:50 PM

Lasers on Silicon

Session Chair: **Haisheng Rong,** Intel Corp. (USA)

4:00 pm: **Heterogenously-integrated InP on Si microdisk lasers** *(Invited Paper)*, Geert Morthier, Thijs Spuesens, Pauline Mechet, Univ. Gent (Belgium) and IMEC (Belgium); Philippe Regreny, Institut des Nanotechnologies de Lyon (France); Rama Raj, Fabrice Raineri, Lab. de Photonique et de Nanostructures (France); Nicolas Olivier, Jean-Marc Fedeli, CEA-LETI (France); Dries Van Thourhout, Gunther Roelkens, Univ. Gent (Belgium) and IMEC (Belgium) . . . . . [9382-25]

4:30 pm: **Microwatt-threshold Raman silicon laser using photonic crystal high-Q nanocavity** *(Invited Paper)*, Yasushi Takahashi, Osaka Prefecture Univ. (Japan); Susumu Noda, Kyoto Univ. (Japan). . . . . [9382-26]

5:00 pm: **A monolithic electrically-injected nanowire array edge-emitting laser on (001) silicon**, Ethan M. Stark, Thomas Frost, Shafat Jahangir, Saniya V. Deshpande, Pallab K. Bhattacharya, Univ. of Michigan (USA) . . . . . [9382-27]

5:20 pm: **Membrane lasers on SiO_2/Si substrate** *(Invited Paper)*, Shinji Matsuo, Koji Takeda, Takuro Fujii, Tomonari Sato, NTT Photonics Labs. (Japan). . . . . [9382-28]

Wednesday 11 February

SESSION 7
LOCATION: ROOM 252 (MEZZANINE) . . . . . WED 8:20 AM TO 10:00 AM

Mid-Infrared Lasers

Session Chair: **Jerry R. Meyer,** U.S. Naval Research Lab. (USA)

8:20 am: **InP-based type-II heterostructure lasers for wavelengths up to 2.7 µm** *(Invited Paper)*, Stephan Sprengel, Ganpath K. Veerabathran, Technische Univ. München (Germany); Alexander Andrejew, Technische Univ. München (Germany) and Walter Schottky Institut (Germany); Anna Köninger, Technische Univ. München (Germany); Gerhard Boehm, Christian Grasse, Markus-Christian Amann, Technische Univ. München (Germany) and Walter Schottky Institut (Germany). . . . . [9382-29]

8:50 am: **Distributed feedback interband cascade lasers for applications in research and industry**, Johannes Koeth, Michael von Edlinger, Julian Scheuermann, Lars Nähle, Lars Hildebrandt, Marc Fischer, nanoplus GmbH (Germany); Robert Weih, Martin Kamp, Wilhelm-Conrad-Röntgen-Research-Ctr. for Complex Material Systems (Germany) . . . . . [9382-30]

9:10 am: **High performance low-dissipation QCL across the mid-IR range**, Alfredo Bismuto, Alpes Lasers SA (Switzerland). . . . . [9382-31]

9:30 am: **Type-I QW cascade diode lasers with 830 mW of CW power at 3 µm** *(Invited Paper)*, Leon Shterengas, Rui Liang, Takashi Hosoda, Gela Kipshidaze, Gregory Belenky, Stony Brook Univ. (USA); Sherrie S. Bowman, Richard L. Tober, U.S. Army Research Lab. (USA). . . . . [9382-32]

Coffee Break . . . . . Wed 10:00 am to 10:30 am

SESSION 8
LOCATION: ROOM 252 (MEZZANINE) . . . . . WED 10:30 AM TO 12:30 PM

Quantum Cascade Lasers

Session Chair: **Alexey A. Belyanin,** Texas A&M Univ. (USA)

10:30 am: **Quantum cascade lasers for broadband spectroscopy** *(Invited Paper)*, Jérôme Faist, ETH Zürich (Switzerland) . . . . . [9382-33]

11:00 am: **Electrically-tunable quantum-cascade lasers**, Alfredo Bismuto, Yves Bidaux, Camille Tardy, Stéphane Blaser, Romain Terazzi, Tobias Gresch, Antoine Muller, Alpes Lasers SA (Switzerland) . . . . . [9382-34]

11:20 am: **Experimental investigation of intensity noise in injection locked mid-infrared quantum cascade lasers**, Carsten Juretzka, Technische Univ. Darmstadt (Germany); Hercules Simos, National and Kapodistrian Univ. of Athens (Greece); Adonis Bogris, Technological Educational Institute of Athens (Greece); Dimitris Syvridis, Eugenia Roditi, National and Kapodistrian Univ. of Athens (Greece); Wolfgang E. Elsässer, Technische Univ. Darmstadt (Germany); Mathieu Carras, III-V Lab. (France) . . . . . [9382-35]

11:40 am: **Unique properties of quantum cascade lasers with applications to high-resolution molecular spectroscopy** *(Invited Paper)*, Gerard Wysocki, Andreas Hangauer, Michael G. Soskind, Yin Wang, Princeton Univ. (USA) . . . . . [9382-36]

12:10 pm: **Light emission from III-nitride quantum cascade structures designed with effective interface grading**, Yu Song, Princeton Univ. (USA); Rajaram J. Bhat, Corning Incorporated (USA); Andrew A. Allerman, Sandia National Labs. (USA); Tzu-Yung Huang, Princeton Univ. (USA); Chung-en Zah, Corning Incorporated (USA); Claire F. Gmachl, Princeton Univ. (USA). . [9382-67]

Lunch/Exhibition Break . . . . . Wed 12:30 pm to 1:50 pm

SESSION 9

LOCATION: ROOM 252 (MEZZANINE) . . . . . WED 1:50 PM TO 3:30 PM

QCLs, Plasmonics, and Metamaterials

Session Chair: **Luke J. Mawst,** Univ. of Wisconsin-Madison (USA)

1:50 pm: **Planarized process for resonant leaky-wave coupled phase-locked arrays of mid-IR quantum cascade lasers**, Chun-Chieh Chang, Jeremy D. Kirch, Colin Boyle, Christopher A. Sigler, Luke J. Mawst, Dan Botez, Brian Zutter, Phillip Buelow, Kevin Schulte, Thomas F. Kuech, Univ. of Wisconsin-Madison (USA); Thomas Earles, Intraband, LLC (USA). . . . . [9382-37]

2:10 pm: **Multiple quasi-stable spectral outputs at constant current from a continuous-wave high-power quantum cascade laser** *(Invited Paper)*, Tobias S. Mansuripur, Harvard Univ. (USA); Guy-Mael J. de Naurois, Harvard School of Engineering and Applied Sciences (USA); Yongrui Wang, Texas A&M Univ. (USA); Wondwosen Metaferia, KTH Royal Institute of Technology (Sweden); Carl Junesand, Epiclarus (Sweden); Sebastian Lourdudoss, KTH Royal Institute of Technology (Sweden); Bouzid Simozrag, Mathieu Carras, III-V Lab. (France); Alexey A. Belyanin, Texas A&M Univ. (USA); Federico Capasso, Harvard School of Engineering and Applied Sciences (USA) . . . . . [9382-38]

2:40 pm: **A mid-infrared on-chip sensor based on bi-functional quantum cascade structures and plasmonics**, Benedikt Schwarz, Daniela Ristanic, Peter Reininger, Hermann Detz, Aaron M. Andrews, Werner Schrenk, Gottfried Strasser, Technische Univ. Wien (Austria) . . . . . [9382-39]

3:00 pm: **Nonlinear optics with quantum-engineered intersubband metamaterials** *(Invited Paper)*, Jongwon Lee, Nishant Nookala, Mykhailo Tymchenko, Seungyong Jung, The Univ. of Texas at Austin (USA); Frederic Demmerle, Gerhard Boehm, Markus-Christian Amann, Technische Univ. München (Germany); Andrea Alù, Mikhail A. Belkin, The Univ. of Texas at Austin (USA) . . . . . [9382-40]

Coffee Break . . . . . .Wed 3:30 pm to 4:00 pm

SESSION 10

LOCATION: ROOM 252 (MEZZANINE) . . . . . .WED 4:00 PM TO 5:30 PM

Terahertz Lasers

Session Chair: **Mikhail A. Belkin,** The Univ. of Texas at Austin (USA)

4:00 pm: **Recent progress and future prospects of THz quantum-cascade lasers** *(Invited Paper)*, Hideki Hirayama, Wataru Terashima, Tsung-Tse Lin, Miho Sasaki, RIKEN (Japan) . . . . . [9382-41]

4:30 pm: **THz quantum cascade lasers operating on the radiative modes of a 2D photonic crystal** *(Invited Paper)*, Yacine Halioua, Univ. Paris-Sud 11 (France); Gangyi Xu, Univ. Paris-Sud 11 (France) and Institut d'Électronique Fondamentale (France); Souad Moumdji, Univ. Paris-Sud 11 (France); Lianhe H. Li, Giles Davies, Edmund H. Linfield, Univ. of Leeds (United Kingdom); Raffaele Colombelli, Institut d'Électronique Fondamentale (France) . . . [9382-42]

5:00 pm: **Recent advances in the research toward graphene-based terahertz lasers** *(Invited Paper)*, Taiichi Otsuji, Akira Satou, Takayuki Watanabe, Stephane A. Boubanga Tombet, Tohoku Univ. (Japan); Alexander A. Dubinov, Institute for Physics of Microstructures (Russian Federation) and Lobachevsky State Univ. (Russian Federation); Vyacheslav V. Popov, Institute of Radio Engineering and Electronics (Russian Federation); Vladimir Mitin, Univ. at Buffalo (USA); Michael Shur, Rensselaer Polytechnic Institute (USA); Victor Ryzhii, Tohoku Univ. (Japan). . . . . [9382-43]

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Improved efficiency in room temperature >3µm diodes using highly-strained quantum wells, Chunte A. Lu, Ron Kaspi, Tim C. Newell, Chi Yang, Sanh Q. Luong, Donald M. Gianardi Jr., Air Force Research Lab. (USA) [9382-60]

Electrical diagnosis of quantum cascade lasers, Peter G. Eliseev, Chi Yang, Tim C. Newell, Ron Kaspi, Air Force Research Lab. (USA). . . . . [9382-61]

Dynamic and static concept of laser-thyristor for high-peak power lasing, Sergey O. Slipchenko, Alexsandr Podoskin, Nikita A. Pikhtin, Valentin S. Yuferev, Il`ya S. Tarasov, Ioffe Physical-Technical Institute (Russian Federation) . . . . . [9382-62]

A ZnSe/BeTe p-grading superlattice layers with a low voltage drop for efficient hole injection in green-yellow BeZnCdSe quantum-well laser, Ryoichi Akimoto, National Institute of Advanced Industrial Science and Technology (Japan) . . . . . [9382-63]

Selective and tunable red- or blue-shift of GaAsP quantum well heterostructures, WeiFu Wang, Kai-Yuan Cheng, National Tsing Hua Univ. (Taiwan); Ching-Yi Huang, National Tsing Hua Univ. (Taiwan) and Institute of Electronics Engineering (Taiwan); Wei-Ting Liu, Bao-Hsien Wu, National Tsing Hua Univ. (Taiwan); Yu-Chen Cheng, Union Optronics Corp. (Taiwan); Kuang-Chien Hsieh, National Tsing Hua Univ. (Taiwan) . . . . . [9382-64]

Analysis of dual-mode lasing characteristics in a 1310-nm optically-injected quantum dot distributed feedback laser, Ravi Raghunathan, Justeen Olinger, Virginia Polytechnic Institute and State Univ. (USA); Antonio Hurtado, Univ. of Essex (United Kingdom) and Univ. of Strathclyde (United Kingdom); Frédéric Grillot, Télécom ParisTech (France); Vassilios I. Kovanis, Luke F. Lester, Virginia Polytechnic Institute and State Univ. (USA) . . . [9382-65]

Thursday 12 February

SESSION 11

LOCATION: ROOM 252 (MEZZANINE) . . . . . .THU 8:00 AM TO 10:00 AM

Novel Cavity Structures

Session Chair: **Peter M. Smowton,** Cardiff Univ. (United Kingdom)

8:00 am: **Waveguide and PC design of photonic crystal surface-emitting lasers**, Richard Taylor, Pavlo Ivanov, Alex Crombie, David T. D. Childs, Salam Khamas, Richard A. Hogg, The Univ. of Sheffield (United Kingdom) . . . . . [9382-44]

8:20 am: **785-nm dual wavelength DBR diode lasers and MOPA systems with output powers up to 750 mW**, Bernd Sumpf, Martin Maiwald, Andreas Klehr, André Müller, Frank Bugge, Jörg Fricke, Peter Ressel, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany) . . . . [9382-45]

8:40 am: **Using shape-memory polymer resonators for building continuously-tunable organic distributed feedback lasers**, Senta Schauer, Xin Liu, Norbert Schneider, Matthias Worgull, Uli Lemmer, Hendrik Hoelscher, Karlsruher Institut für Technologie (Germany). . . . . [9382-46]

9:00 am: **Demonstration of continuous-wave microsquare lasers and comparison to microdisk laser**, Chee-Wei Lee, Qian Wang, Yicheng Lai, Doris K. Ng, Siu Kit Ng, A*STAR - Data Storage Institute (Singapore) . . [9382-47]

9:20 am: **On-chip PT-symmetric microring lasers**, Hossein Hodaei, Mohammad-Ali Miri, Absar Ul Hassan, Enrique Sanchez Cristobal, Matthias Heinrich, Demetrios N. Christodoulides, Mercedeh Khajavikhan, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9382-48]

9:40 am: **Low-spatial coherence chaotic cavity laser for speckle-free full-field imaging**, Brandon Redding, Alexander Cerjan, Xue Huang, A. Douglas Stone, Minjoo L. Lee, Michael A. Choma, Hui Cao, Yale Univ. (USA). . . [9382-49]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

OPTO

CONFERENCE 9382
LOCATION: ROOM 252 (MEZZANINE)

SESSION 12
LOCATION: ROOM 252 (MEZZANINE) . . . . . .THU 10:30 AM TO 12:20 PM

High Brightness

Session Chair: **Gary A. Evans,** Southern Methodist Univ. (USA)

10:30 am: **Short-wavelength infrared defect emission as probe for degradation effects in diode lasers**, Martin Hempel, Jens W. Tomm, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Fangyu Yue, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) and East China Normal Univ. (China); Mauro A. Bettiati, 3S PHOTONICS S.A.S. (France); Thomas Elsaesser, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany). . . . . [9382-53]

10:50 am: **Numerical simulation and optimization of microstructured high brightness broad area laser diodes** *(Invited Paper)*, Hans-Christoph Eckstein, Uwe D. Zeitner, Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Christian Lauer, Uwe Strauss, OSRAM Opto Semiconductors GmbH (Germany) . . . . . [9382-50]

11:20 am: **Generation of spectrally-stable continuous-wave emission and ns pulses at 800nm and 975nm with a peak power of 4W using a distributed Bragg reflector laser and a ridge-waveguide power amplifier**, Andreas Klehr, Hans Wenzel, Jörg Fricke, Frank Bugge, Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany) . . . . . [9382-51]

11:40 am: **New approach for high-peak power lasing based on epitaxially-integrated AlGaAs/GaAs laser-thyristor heterostructure**, Sergey O. Slipchenko, Alexsandr Podoskin, Alexsandr Rozhkov, Nikita A. Pikhtin, Il`ya S. Tarasov, Ioffe Physical-Technical Institute (Russian Federation); Timur Bagaev, Maxim Ladugin, Alexsandr Marmalyuk, Anatolii A. Padalitsa, Vladimir Simakov, POLYUS Research and Development Institute (Russian Federation). . . [9382-52]

12:00 pm: **975 nm high-peak power ns-diode laser based MOPA system suitable for water vapor DIAL applications**, Bernd Sumpf, Andreas Klehr, Ferdinand-Braun-Institut (Germany); Thi Nghiem Vu, Ferdinand-Braun-Institut (Germany) and Vietnam Academy of Science and Technology (Viet Nam); Götz Erbert, Günther Tränkle, Ferdinand-Braun-Institut (Germany) . . . . . [9382-54]

Lunch/Exhibition Break . . . . . Thu 12:20 pm to 1:50 pm

SESSION 13
LOCATION: ROOM 252 (MEZZANINE) . . . . . .THU 1:50 PM TO 3:30 PM

QCLs and Applications

Session Chair: **Tobias S. Mansuripur,** Harvard Univ. (USA)

1:50 pm: **Above-threshold numerical modeling of high-index-contrast photonic-crystal quantum cascade lasers**, Anatoly P. Napartovich, Nikolay N. Elkin, Dmitry V. Vysotsky, Troitsk Institute for Innovation and Fusion Research (Russian Federation); Jeremy D. Kirch, Christopher A. Sigler, Dan Botez, Luke J. Mawst, Univ. of Wisconsin-Madison (USA); Alexey A. Belyanin, Texas A&M Univ. (USA) . . . . . [9382-55]

2:10 pm: **Broadband external cavity-QCL with MOEMS diffraction grating for spectral scan rates in the kHz range**, Ralf Ostendorf, Daniela Bleh, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); André Merten, Jan Grahmann, Fraunhofer-Institut für Photonische Mikrosysteme (Germany); Stefan Hugger, Hans-Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany) . . . . . [9382-56]

2:30 pm: **Open-path atmospheric spectroscopy using widely-tunable quantum cascade lasers**, Anish K. Goyal, Erik R. Deutsch, Ninghui Zhu, Petros Kotidis, Mark Norman, Jim Ye, Kostas Zafiriou, Alexander Mazurenko, Raymond F. Connors, Block Engineering, LLC (USA) . . . . . [9382-57]

2:50 pm: **Characterization of an InGaAs/InP-based echelle mirror multiplexer for widely-tunable mid-IR sources based on quantum cascade lasers**, Luis Jorge Orbe Nava, Guillermo Carpintero del Barrio, Univ. Carlos III de Madrid (Spain); Gregory Maisons, Clément Gilles, Fahem Boulila, Mathieu Carras, III-V Lab. (France) . . . . . [9382-58]

3:10 pm: **Destructive physical analysis of degraded quantum cascade lasers**, Yongkun Sin, Zachary Lingley, Miles Brodie, Nathan Presser, Steven C. Moss, The Aerospace Corp. (USA); Jeremy D. Kirch, Chun-Chieh Chang, Colin Boyle, Luke J. Mawst, Dan Botez, Univ. of Wisconsin-Madison (USA); D. Lindberg III, Thomas Earles, Intraband, LLC (USA). . . . . [9382-59]

CONFERENCE 9383
LOCATION: ROOM 250 (MEZZANINE)

Tuesday–Thursday 10–12 February 2015 • Proceedings of SPIE Vol. 9383

Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XIX

Conference Chairs: **Klaus P. Streubel,** OSRAM AG (Germany); **Heonsu Jeon,** Seoul National Univ. (Korea, Republic of); **Li-Wei Tu,** National Sun Yat-Sen Univ. (Taiwan)

Conference Co-Chair: **Martin Strassburg,** OSRAM Opto Semiconductors GmbH (Germany)

Program Committee: **Gerd Bacher,** Univ. Duisburg-Essen (Germany); **Mitch M. C. Chou,** National Sun Yat-Sen Univ. (Taiwan); **Michael Heuken,** AIXTRON SE (Germany); **Satoshi Kamiyama,** Meijo Univ. (Japan); **Jong Kyu Kim,** Pohang Univ. of Science and Technology (Korea, Republic of); **Markus Klein,** OSRAM Opto Semiconductors GmbH (Germany); **Michael R. Krames,** Soraa, Inc. (USA); **Hao-Chung Kuo,** National Chiao Tung Univ. (Taiwan); **Kei May Lau,** Hong Kong Univ. of Science and Technology (Hong Kong, China); **Kurt J. Linden,** N2 Biomedical (USA); **Hans Nikol,** Philips Lighting B.V. (Netherlands); **Joongseo Park,** LG Electronics Inc. (Korea, Republic of); **E. Fred Schubert,** Rensselaer Polytechnic Institute (USA); **Ross P. Stanley,** Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland); **Dong-Sing Wuu,** National Chung Hsing Univ. (Taiwan)

Tuesday 10 February

SESSION 1

LOCATION: ROOM 250 (MEZZANINE) . . . . . TUE 1:30 PM TO 3:00 PM

LED Applications and Solid-State Lighting I

Session Chair: **Klaus P. Streubel,** OSRAM AG (Germany)

1:30 pm: **Pathways to ultra-efficient solid-state lighting** *(Invited Paper)*, Mary H. Crawford, Sandia National Labs. (USA). . . . . [9383-1]

2:00 pm: **Synthesis and characterization of red emitting Eu3+:K3Y3(BO3)4 phosphor**, Basavapoornima Ch, Sowjanya G., Chalicheemalapalli K. Jayasankar, Rama Moorthy L, Sri Venkateswara Univ. (India); Venkata Krishnaiah, Ecole Polytechnique de Montréal (Canada) . . . . . [9383-2]

2:20 pm: **Application of airy beams to bending functions of automotive headlights**, Ceren Altingöz, Magneti Marelli Mako Elektrik Sanayi Ticaret A.S (Turkey) . . . . . [9383-3]

2:40 pm: **Rapid prototyping of reflectors for vehicle lighting using laser activated remote phosphor**, Roland Lachmayer, Gerolf Kloppenburg, Roman Danov, Alexander G. Wolf, Leibniz Univ. Hannover (Germany) . . [9383-4]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 2

LOCATION: ROOM 250 (MEZZANINE) . . . . . TUE 3:30 PM TO 5:40 PM

Nanomaterials and Nanostructures for LEDs I

Session Chair: **Andreas Waag,**
Technische Univ. Braunschweig (Germany)

3:30 pm: **Regularly-patterned non-polar InGaN/GaN quantum-well nanorod light-emitting diode array** *(Invited Paper)*, Charng-Gan Tu, Che-Hao Liao, Chia-Ying Su, Yu-Feng Yao, Horng-Shyang Chen, Chieh Hsieh, Hao-Tsung Chen, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) . . . . . [9383-5]

4:00 pm: **High-power phosphor-free InGaN/AlGaN dot-in-a-wire core-shell white light-emitting diodes**, Hieu P. Nguyen, New Jersey Institute of Technology (USA); Mehrdad Djavid, Xianhe Liu, Qi Wang, Zetian Mi, McGill Univ. (Canada) . . . . . [9383-6]

4:20 pm: **Group III-nitride semiconductor nanostructures for LEDs and novel photonic devices** *(Invited Paper)*, Yong-Hoon Cho, KAIST (Korea, Republic of) . . . . . [9383-7]

4:50 pm: **Optical properties and efficiency of nonpolar/semipolar InGaN QWs on GaN core-shell microrods for solid-state-lighting**, Christian Mounir, Ulrich T. Schwarz, Univ. of Freiburg (Germany); Tilman Schimpke, Martin Mandl, Martin Strassburg, OSRAM Opto Semiconductors GmbH (Germany) . . . [9383-8]

5:10 pm: **Selective-area growth of InGaN/GaN nanocolumnar structures for classical and quantum light sources** *(Invited Paper)*, Enrique Calleja, Ana Bengoechea-Encabo, Steven Albert, Žarko Gačević, Miguel Angel Sanchez-Garcia, David Lopez-Romero, Univ. Politécnica de Madrid (Spain) . . . . [9383-9]

Wednesday 11 February

SESSION 3

LOCATION: ROOM 250 (MEZZANINE) . . . . . WED 8:00 AM TO 10:00 AM

Novel Technologies for LED Design and Fabrication I

Session Chair: **Chih-Chung Yang,** National Taiwan Univ. (Taiwan)

8:00 am: **Fabrication of nitride LEDs on amorphous substrates by pulsed sputtering** *(Invited Paper)*, Hiroshi Fujioka, The Univ. of Tokyo (Japan) and JST, CREST (Japan) . . . . . [9383-10]

8:30 am: **Flip-chip multiple-active-region AlGaInP light-emitting-diodes with transferred sapphire substrate**, Guang-di Shen, Li Ma, Peng Lian, Beijing Univ. of Technology (China) . . . . . [9383-11]

8:50 am: **Aluminum-doped zinc oxide current spreading layer on P-side up thin-film AlGaInP-based light-emitting diodes by ALD**, Ming-Chun Tseng, Chi-Lu Chen, Nan-Kai Lai Lai, Ray-Hua Horng Horng, Dong-Sing Wuu, National Chung Hsing Univ. (Taiwan); Hsin-Ying Lee, National Cheng Kung Univ. (Taiwan); Yu-Chang Lin, National Chung Hsing Univ. (Taiwan) . . . . . [9383-12]

9:10 am: **Green (In,Ga,Al)P-GaP light-emitting diodes grown on high-index GaAs surfaces**, Nikolay N. Ledentsov, Vitaly A. Shchukin, VI Systems GmbH (Germany); Jari Lyytikäinen, Oleg Okhotnikov, Tampere Univ. of Technology (Finland); Yuri Shernyakov, Alexey Payusov, Nikita Y. Gordeev, Mikhail Maximov, Ioffe Physical-Technical Institute (Russian Federation) . . . . . [9383-13]

9:30 am: **A novel design and process for improving the efficiency and reliability of an AC direct LED chip** *(Invited Paper)*, Yongil Kim, Chan M. Lim, Wanho Lee, Jin-Young Choi, Seunghwan Lee, Gi Bum Kim, Young Sun Kim, Yoon Joon Choi, SAMSUNG Electronics Co., Ltd. (Korea, Republic of) [9383-14]

Coffee Break . . . . . Wed 10:00 am to 10:30 am

SESSION 4

LOCATION: ROOM 250 (MEZZANINE) . . . . . WED 10:30 AM TO 12:20 PM

High Current Performance and Droop in InGan LEDs I

Session Chair: **Joachim Piprek,** NUSOD Institute LLC (USA)

10:30 am: **Defects in GaN-based LEDs and lasers: impact on internal quantum efficiency and on reliability** *(Invited Paper)*, Matteo Meneghini, Gaudenzio Meneghesso, Enrico Zanoni, Univ. degli Studi di Padova (Italy) . . . . . [9383-15]

11:00 am: **Structural investigation of the deep-green InGaN LEDs by transmission electron microscopy**, Maxim Korytov, Nikolay Cherkashin, Ctr. d'Elaboration de Matériaux et d'Etudes Structurales (France); Andrei F. Tsatsulnikov, Alexey V. Sakharov, Andrey Nikolaev, Wsevolod V. Lundin, Martin Hytch, Ioffe Physical-Technical Institute (Russian Federation) . . [9383-16]

11:20 am: **Blue luminescence and quantum-confined Stark effect in green InGaN/GaN quantum wells**, Felix Nippert, Technische Univ. Berlin (Germany); Anna Nirschl, Ines Pietzonka, OSRAM Opto Semiconductors GmbH (Germany); Tobias Schulz, Martin Albrecht, Leibniz-Institut für Kristallzüchtung (Germany); Thomas Kure, Christian Nenstiel, Steffen Westerkamp, Gordon Callsen, Technische Univ. Berlin (Germany); Martin Strassburg, OSRAM Opto Semiconductors GmbH (Germany); Axel Hoffmann, Technische Univ. Berlin (Germany) . . . . . [9383-17]

OPTO

11:40 am: **Trap-assisted tunneling in InGaN/GaN single-quantum-well LEDs**, Matthias Auf der Maur, Univ. degli Studi di Roma "Tor Vergata" (Italy); Bastian Galler, Ines Pietzonka, Martin Strassburg, Hans-Juergen Lugauer, OSRAM Opto Semiconductors GmbH (Germany); Aldo Di Carlo, Univ. degli Studi di Roma "Tor Vergata" (Italy) . . . . . [9383-18]

12:00 pm: **Nanolasers as solution to efficiency droop in solid-state lighting**, Weng W. Chow, Sandia National Labs. (USA) . . . . . [9383-19]

Lunch/Exhibition Break . . . . . .Wed 12:20 pm to 1:40 pm

SESSION 5

LOCATION: ROOM 250 (MEZZANINE) . . . . . WED 1:40 PM TO 3:20 PM

LED Applications and Solid-State Lighting II

Session Chair: **Mary H. Crawford,** Sandia National Labs. (USA)

1:40 pm: **GaN native substrate full-visible-spectrum LEDs for illumination** *(Invited Paper)*, Michael R. Krames, Soraa, Inc. (USA) . . . . . [9383-20]

2:10 pm: **Flexible tandem organic light-emitting diodes with graphene anode** *(Invited Paper)*, Tae-Hee Han, Min-Ho Park, Pohang Univ. of Science and Technology (Korea, Republic of); Sang-Hoon Bae, Yonsei Univ. (Korea, Republic of); Hong-Kyu Seo, Pohang Univ. of Science and Technology (Korea, Republic of); Jong-Hyun Ahn, Yonsei Univ. (Korea, Republic of); Tae-Woo Lee, Pohang Univ. of Science and Technology (Korea, Republic of). . . . . [9383-23]

2:40 pm: **Flexible optical system for large-area LED luminaires with excellent light uniformity and efficiency**, Oscar Fernandez, Rolando Ferrini, Fréderic Zanella, Martin Stalder, Benjamin Gallinet, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland) . . . . . [9383-21]

3:00 pm: **Large area lighting applications with organic dye embedded flexible film**, Huang Yu Lin, National Chiao Tung Univ. (Taiwan). . . . . [9383-22]

Coffee Break . . . . . .Wed 3:20 pm to 3:50 pm

SESSION 6

LOCATION: ROOM 250 (MEZZANINE) . . . . . WED 3:50 PM TO 5:50 PM

UV-emitting LEDs

Session Chair: **Michael R. Krames,** Soraa, Inc. (USA)

3:50 pm: **Deep UV LEDs for sensing applications** *(Invited Paper)*, Michael Kneissl, Technische Univ. Berlin (Germany) and Ferdinand-Braun-Institut (Germany) and Leibniz Institut für Höchstfrequenztechnik (Germany) . . . . . [9383-24]

4:20 pm: **Numerical study of current spreading and light extraction in deep UV light-emitting diode**, Xinhui Chen, Yuh-Renn Wu, National Taiwan Univ. (Taiwan) . . . . . [9383-25]

4:40 pm: **Improved UV LED performance using transparent conductive films embedded with plasmonic structures**, Shih-Hao Chuang, Cheng-Yi Lin, Sin-Liang Ou, Cheng-Sheng Tsung, Ching-Ho Chen, National Chung Hsing Univ. (Taiwan); Dong-Sing Wuu, National Chung Hsing Univ. (Taiwan) and Da-Yeh Univ. (Taiwan). . . . . [9383-26]

5:00 pm: **Investigation of uniformity field generated from freeform lens with UV LED exposure system**, Fong-Yi Ciou, Yi-Chian Chen, Cheng-Tang Pan, Po-Hung Lin, Po-Hsun Lin, Feng-tzu Hsu, National Sun Yat-Sen Univ. (Taiwan) . . . . . [9383-27]

5:20 pm: **Development of high-performance UV-C LEDs and potential applications** *(Invited Paper)*, S. David Roh, LG Innotek (Korea, Republic of) . . . . . [9383-28]

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Development of environmentally friendly LED light source module for photoacoustic imaging system, Toshitaka Agano, Naoto Sato, Hitoshi Nakatsuka, XTrillion, Inc. (Japan) . . . . . [9383-48]

Enhanced brightness from all solution processable biopolymer LED, Pradeep Chandran, Cochin Univ. of Science & Technology (India); Manoj A. Namboothiry, Indian Institute of Science Education & Research (India); C. P. Girijavallabhan, Cochin Univ. of Science & Technology (India); P. Radhakrishnan, International School of Photonics (India); V. P. N. Nampoori, Cochin Univ. of Science & Technology (India) . . . . . [9383-49]

Lateral thin-film grating structure for enhanced phosphorescence, Kyungtaek Min, Serok Choi, Heonsu Jeon, Seoul National Univ. (Korea, Republic of) . . . . . [9383-50]

Design of a new cheaper high-performance optical imaging system using commercial LED sources, Mohamed Darwiesh, Military Technical College (Egypt) . . . . . [9383-51]

Temperature dependence of efficiency in GaInN/GaN light-emitting diodes with a strain-control layer, Hyun Seok Song, Jaehee Cho, Chonbuk National Univ. (Korea, Republic of); David S. Meyaard, Guan-Bo Lin, E. Fred Schubert, Rensselaer Polytechnic Institute (USA); Jong Kyu Kim, Pohang Univ. of Science and Technology (Korea, Republic of) . . . . . [9383-52]

Improved thermal and optical performance of chip-on-board light-emitting-diode panel lamps, Wing Shing Cheung, Antony H. W. Choi, The Univ. of Hong Kong (Hong Kong, China) . . . . . [9383-53]

Failure mechanisms for InGaN light-emitting diode chips with patterned sapphire substrates, Chia-Hung Sun, Optoelectronic Technology Lab. (Taiwan) . . . . . [9383-54]

Characteristics of nonpolar GaN:Mn grown by plasma-assisted molecular beam epitaxy, Yu-Jung Cheng, Yuan-Ting Lin, Ching-Wen Chang, Song-Sain Guo, National Sun Yat-Sen Univ. (Taiwan); Mu-Xin Ma, Wei-Chih Lai, National Cheng Kung Univ. (Taiwan); Li-Wei Tu, National Sun Yat-Sen Univ. (Taiwan) . . . . . [9383-55]

Thursday 12 February

SESSION 7

LOCATION: ROOM 250 (MEZZANINE) . . . . . THU 8:00 AM TO 10:00 AM

LED Manufacturing and Novel Substrates for LED Epistructure Growth

Session Chair: **Stephanie Fritze,** LayTec AG (Germany)

8:00 am: **X-ray scattering methods for R&D and process control of nitride LED and LD structures** *(Invited Paper)*, Lars Grieger, Joachim F. Woitok, PANalytical B.V. (Netherlands) . . . . . [9383-29]

8:30 am: **Improvement of GaN epitaxial quality and LED performance by incorporating alumina cavity pattern into substrate**, Yongjo Park, Advanced Institute of Convergence Technology (Korea, Republic of); Daeyoung Moon, Jeonghwan Jang, Hyo-Jeong Lee, Seoul National Univ. (Korea, Republic of); Duk-Kyu Bae, Hexa Solution (Korea, Republic of); Euijoon Yoon, Seoul National Univ. (Korea, Republic of) . . . . . [9383-30]

8:50 am: **Robust diffuser and roughness metrology tool for LED manufacturing**, Peter Walecki, Wojciech Walecki, Sunrise Optical LLC (USA) . . . . . [9383-31]

9:10 am: **High-performance epitaxial-lifted-off micro-GaN-LEDs for optoelectronics integration**, Hsien-Yu Liao, Ahmed Ben Slimane, Tien Khee Ng, Boon Siew Ooi, King Abdullah Univ. of Science and Technology (Saudi Arabia) . . . . . [9383-32]

9:30 am: **In-situ monitoring during epitaxial growth of light emitters** *(Invited Paper)*, André Strittmatter, Otto-von-Guericke-Univ. Magdeburg (Germany) . . . . . [9383-33]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 8

LOCATION: ROOM 250 (MEZZANINE) . . . . . THU 10:30 AM TO 12:10 PM

High Current Performance and Droop in InGan LEDs II

Session Chair: **Matteo Meneghini,** Univ. degli Studi di Padova (Italy)

10:30 am: **Recent progress in the understanding of the efficiency droop in GaN-based LEDs** *(Invited Paper)*, Bastian Galler, Anna Nirschl, Michael Binder, Hans-Juergen Lugauer, Marina Schmid, Roland Zeisel, Berthold Hahn, OSRAM Opto Semiconductors GmbH (Germany); Joachim Wagner, Fraunhofer-Institut für Angewandte Festkörperphysik (Germany); Matthias Sabathil, OSRAM Opto Semiconductors GmbH (Germany) . . . . . [9383-34]

11:00 am: **Nitride heterostructure influence on efficiency droop**, Oleg I. Rabinovich, Sergei Didenko, Sergei Legotin, National Univ. of Science and Technology "MISiS" (Russian Federation) . . . . . [9383-35]

11:20 am: **Probing inhomogeneous absorption linewidth of purely disordered InGaN alloy**, Lise Lahourcade, Marlene Glauser, Georg Rossbach, Raphaël Butté, Nicolas Grandjean, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . . . [9383-36]

11:40 am: **GaN-based tunnel-junction LED with 250% peak quantum efficiency** *(Invited Paper)*, Joachim Piprek, NUSOD Institute LLC (USA) . . . . . [9383-37]

Lunch/Exhibition Break . . . . . Thu 12:10 pm to 1:30 pm

SESSION 9

LOCATION: ROOM 250 (MEZZANINE) . . . . . THU 1:30 PM TO 3:30 PM

Nanomaterials and Nanostructures for LEDs II

Session Chair: **Martin Strassburg,**
OSRAM Opto Semiconductors GmbH (Germany)

1:30 pm: **3D NanoLEDs: status and prospectives** *(Invited Paper)*, Andreas Waag, Jana Hartmann, Johannes Ledig, Matin S. Mohajerani, Xue Wang, Hao Zhou, Frederik Steib, Sönke Fündling, Hergo-Heinrich Wehmann, Technische Univ. Braunschweig (Germany); Daniel Bichler, Barbara Huckenbeck, OSRAM GmbH (Germany); Tilman Schimpke, Ion Stoll, Martin Mandl, Hans-Jürgen Lugauer, Martin Strassburg, OSRAM Opto Semiconductors GmbH (Germany). . . . . [9383-38]

2:00 pm: **Investigation of optimal silver nanowires film as conductive wires for LED**, Cheng-Tang Pan, I-Chou Wu, Tsung-Lin Yang, Yi-Chian Chen, Kun-Hao Hung, National Sun Yat-Sen Univ. (Taiwan) . . . . . [9383-39]

2:20 pm: **Efficiency droop improvement for tip-free InGaN/GaN core-shell nanorods green light-emitting diodes**, Da-wei Lin, An-Jye Tzou, Wei-Chi Hsu, Tzu-Pei Chen, Jia-Min Shieh, Chun-Yen Chang, Hao-Chung Kuo, National Chiao Tung Univ. (Taiwan). . . . . [9383-40]

2:40 pm: **Effective efficiency improvement and droop effect reduction of a blue-emitting light-emitting diode with localized surface plasmon coupling**, Chun-Han Lin, Yu-Feng Yao, Chung-Hui Chen, Chia-Ying Su, Pei-Ying Shih, Horng-Shyang Chen, Chieh Hsieh, National Taiwan Univ. (Taiwan); Yang Kuo, Tung Nan Univ. (Taiwan); Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) . . . . . [9383-41]

3:00 pm: **InGaN/GaN core-shell LEDs** *(Invited Paper)*, Nathan F. Gardner, GLO-USA, Inc. (USA) . . . . . [9383-42]

Coffee Break . . . . . Thu 3:30 pm to 4:00 pm

SESSION 10

LOCATION: ROOM 250 (MEZZANINE) . . . . . THU 4:00 PM TO 6:00 PM

Novel Technologies for LED Design and Fabrication II

Session Chair: **Hiroshi Fujioka,** The Univ. of Tokyo (Japan)

4:00 pm: **In-situ metrology: key enabling technology for LED and LD production** *(Invited Paper)*, Stephanie Fritze, Oliver Schulz, Marcello Binetti, LayTec AG (Germany) . . . . . [9383-43]

4:30 pm: **Robust noncontact surface roughness meterology based on range from focus method**, Wojciech Walecki, Peter Walecki, Sunrise Optical LLC (USA) . . . . . [9383-44]

4:50 pm: **Large area LED package**, Lena Goullon, Jörg Bauer, Tanja Braun, Rafael Jordan, Matthias Hutter, Karl Friedrich Becker, Hermann Oppermann, Martin Schneider-Ramelow, Klaus-Dieter Lang, Fraunhofer-Institut für Zuverlässigkeit und Mikrointegration (Germany). . . . . [9383-45]

5:10 pm: **Customized homogenization and shaping of LED light by micro cells arrays**, Daniel Asoubar, Friedrich-Schiller-Univ. Jena (Germany) and LightTrans VirtualLab UG (Germany); Christian Hellmann, Hagen Schweitzer, Michael Kuhn, LightTrans (Germany); Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9383-46]

5:30 pm: **Enhanced optical output power of InGaN/GaN LEDs with ferromagnetic films on LEDs** *(Invited Paper)*, Seong-Ju Park, Jae-Joon Kim, Young-Chul Leem, Gwangju Institute of Science and Technology (Korea, Republic of) . . . . . [9383-47]

CONFERENCE 9384
LOCATION: ROOM 234 (MEZZANINE)

Monday–Wednesday 9–11 February 2015 • Proceedings of SPIE Vol. 9384

Emerging Liquid Crystal Technologies X

Conference Chair: **Liang-Chy Chien,** Kent State Univ. (USA)

Conference Co-Chairs: **Harry J. Coles,** Univ. of Cambridge (United Kingdom); **Hirotsugu Kikuchi,** Kyushu Univ. (Japan); **Ivan I. Smalyukh,** Univ. of Colorado at Boulder (USA)

Program Committee: **Dick J. Broer,** Technische Univ. Eindhoven (Netherlands); **Vladimir G. Chigrinov,** Hong Kong Univ. of Science and Technology (Hong Kong, China); **Antonio Martins Figueiredo Neto,** Univ. de São Paulo (Brazil); **Andy Y. G. Fuh,** National Cheng Kung Univ. (Taiwan); **Heinz S. Kitzerow,** Univ. Paderborn (Germany); **Jan P. Lagerwall,** Seoul National Univ. (Korea, Republic of); **Yi-Hsin Lin,** National Chiao Tung Univ. (Taiwan); **Yan-Qing Lu,** Nanjing Univ. (China); **Kristiaan Neyts,** Univ. Gent (Belgium); **Masanori Ozaki,** Osaka Univ. (Japan); **Ci-Ling Pan,** National Tsing Hua Univ. (Taiwan); **Miha Ravnik,** Univ. of Ljubljana (Slovenia); **Richard Sutherland,** Mount Vernon Nazarene Univ. (USA); **Nelson V. Tabiryan,** BEAM Engineering for Advanced Measurements Co. (USA); **Timothy J. White,** Air Force Research Lab. (USA); **Ming Hsien Wu,** Hamamatsu Corp. (USA); **Shin-Tson Wu,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Huai Yang,** Peking Univ. (China); **Hiroshi Yokoyama,** Kent State Univ. (USA); **Tae-Hoon Yoon,** Pusan National Univ. (Korea, Republic of); **Yanlei Yu,** Fudan Univ. (China)

Monday 9 February

OPTO PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA) . . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA) . . . . . [9371-202]

SESSION 1
LOCATION: ROOM 234 (MEZZANINE) . . . . . .MON 1:30 PM TO 3:10 PM

Nanoparticles Doped Systems
Session Chair: **Ivan I. Smalyukh,** Univ. of Colorado at Boulder (USA)

1:30 pm: **Nematic topological line defects as optical waveguides** *(Keynote Presentation)*, Slobodan Žumer, Miha Čančula, Miha Ravnik, Univ. of Ljubljana (Slovenia) . . . . . [9384-1]

2:10 pm: **Laser manipulation of colloids dispersed in an azo dye-doped liquid crystal cell** *(Invited Paper)*, Andy Y. G. Fuh, Te-Wei Chang, Ming-Shian Li, Shing-Trong Wu, National Cheng Kung Univ. (Taiwan) . . . . . [9384-2]

2:40 pm: **Self-assembly and self-alignment of plasmonic particles with complex shape and non-trivial topology in liquid crystalline dispersions**, Ye Yuan, Univ. of Colorado at Boulder (USA); Ivan I. Smalyukh, Univ. of Colorado at Boulder (USA) and National Renewable Energy Lab. (USA) . [9384-3]

2:55 pm: **Plasmonic nanocomposites of gold nanorods and cellulose nanocrystals**, Qingkun Liu, Michael G. Campbell, Ivan I. Smalyukh, Univ. of Colorado at Boulder (USA) . . . . . [9384-4]

Coffee Break . . . . . .Mon 3:10 pm to 3:40 pm

SESSION 2
LOCATION: ROOM 234 (MEZZANINE) . . . . . MON 3:40 PM TO 5:55 PM

Soft Mechanics and Metamaterials
Session Chair: **Slobodan Žumer,** Univ. of Ljubljana (Slovenia)

3:40 pm: **Surface dynamics and mechanics in liquid crystal polymer coatings** *(Invited Paper)*, Danqing Liu, Dirk Broer, Technische Univ. Eindhoven (Netherlands) . . . . . [9384-5]

4:10 pm: **Plasmon-exciton resonant energy transfer in soft optical metamaterials** *(Invited Paper)*, Giuseppe Strangi, Case Western Reserve Univ. (USA) . . . . . [9384-6]

4:40 pm: **Properties and applications of nano-pore dispersed liquid crystals** *(Invited Paper)*, Hiroyuki Yoshida, Junji Kobashi, Hoekyung Kim, Osaka Univ. (Japan); Yo Inoue, Kyoto Univ. (Japan); Yasutaka Maeda, Masanori Ozaki, Osaka Univ. (Japan) . . . . . [9384-7]

5:10 pm: **Probing helical nanostructures in B4 and TGB phases with resonant x-ray scattering at carbon k-edge**, Chenhui Zhu, Cheng Wang, Anthony T. Young, Feng Liu, Ilja Gunkel, Lawrence Berkeley National Lab. (USA); Wim Bras, ESRF - The European Synchrotron (France); David M. Walba, Noel Clark, Univ. of Colorado at Boulder (USA); Alexander Hexemer, Lawrence Berkeley National Lab. (USA) . . . . . [9384-8]

5:25 pm: **Single-photon experiments with liquid crystals for quantum science and quantum engineering applications** *(Invited Paper)*, Svetlana G. Lukishova, Univ. of Rochester (USA); Andreas C. Liapis, Brookhaven National Lab. (USA); Luke J. Bissell, Air Force Research Lab. (USA); Justin M. Winkler, George M. Gehring, Univ. of Rochester (USA); Robert W. Boyd, Univ. of Rochester (USA) and Univ. of Ottawa (Canada) . . . . . [9384-46]

Tuesday 10 February

SESSION 3
LOCATION: ROOM 234 (MEZZANINE) . . . . . TUE 8:05 AM TO 10:00 AM

New Materials and Effects
Session Chair: **Hirotsugu Kikuchi,** Kyushu Univ. (Japan)

8:05 am: **Light-directing chiral liquid crystalline nanostructures: from 1D to 3D** *(Keynote Presentation)*, Quan Li, Kent State Univ. (USA) . . . . . [9384-9]

8:45 am: **The helical nanofilament phase for organic photovoltaics** *(Invited Paper)*, David M. Walba, Rebecca A. Callahan, Michael T. Springer, Eva D. Korblova, Ranfan Shao, Univ. of Colorado at Boulder (USA); David Coffey, Garry Rumbles, National Renewable Energy Lab. (USA); Noel A. Clark, Univ. of Colorado at Boulder (USA) . . . . . [9384-10]

9:15 am: **Chiral nano-pore arrays with bent-core liquid crystals and their applications**, Dong Ki Yoon, Hanim Kim, Kiback Choe, Seong Ho Ryu, Sunhee Lee, KAIST (Korea, Republic of); Tae Joo Shin, Pohang Univ. of Science and Technology (Korea, Republic of); Eva D. Korblova, David M. Walba, Noel A. Clark, Univ. of Colorado at Boulder (USA); Sang Bok Lee, Univ. of Maryland, College Park (USA); Pilhan Kim, KAIST (Korea, Republic of) . [9384-11]

9:30 am: **Thin film polariser and color filter based on photo-polymerizable nematic liquid crystal**, Mohammad Mohammadimasoudi, Jeroen Beeckman, Kristiaan Neyts, Univ. Gent (Belgium) . . . . . [9384-12]

9:45 am: **Zero-orientational birefringence polymer with no temperature dependence**, Mio D. Shikanai, Akihiro Tagaya, Yasuhiro Koike, Keio Univ. (Japan) . . . . . [9384-13]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 4

LOCATION: ROOM 234 (MEZZANINE) . . . . . TUE 10:30 AM TO 12:10 PM

Chiral Phases and Applications

Session Chair: **Lachezar Komitov,** Univ. of Gothenburg (Sweden)

10:30 am: **Dynamics of liquid crystal blue phases** *(Keynote Presentation)*, Hirotsugu Kikuchi, Kyushu Univ. (Japan) . . . . . [9384-14]

11:10 am: **Stabilizing blue phase liquid crystals with linearly polarized UV light** *(Invited Paper)*, Daming Xu, Jiamin Yuan, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Martin Schadt, MS High-Tech Consulting (Switzerland); Jing Yan, Southeast Univ. (China) and CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Shin-Tson Wu, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) . . . . . [9384-15]

11:40 am: **Electro-optical behavior of polymer dispersed blue phase liquid crystals**, Emine Kemiklioglu, Liang-Chy Chien, Kent State Univ. (USA) [9384-16]

11:55 am: **Field-induced Bragg diffraction in polymer stabilized cholesteric liquid crystal bubbles**, Andrii Varanytsia, Liang-Chy Chien, Kent State Univ. (USA) . . . . . [9384-17]

Lunch/Exhibition Break . . . . . Tue 12:10 pm to 1:20 pm

SESSION 5

LOCATION: ROOM 234 (MEZZANINE) . . . . . TUE 1:20 PM TO 3:00 PM

Waveguides and Spatial Light Modulators

Session Chair: **Michael J. Escuti,** North Carolina State Univ. (USA)

1:20 pm: **Dynamic LC/polymer systems** *(Keynote Presentation)*, Timothy J. Bunning, Air Force Research Lab. (USA); Luciano De Sio, Svetlana V. Serak, BEAM Engineering for Advanced Measurements Co. (USA); C. Umeton, Univ. della Calabria (Italy); E. Ouskova, BEAM Engineering for Advanced Measurements Co. (USA); V. Tondiglia, Timothy J. White, Air Force Research Lab. (USA); Nelson V. Tabiryan, BEAM Engineering for Advanced Measurements Co. (USA). . . . . [9384-18]

2:00 pm: **Liquid crystal waveguide technologies for a new generation of low-power photonic-integrated circuits** *(Invited Paper)*, Antonio d'Alessandro, Rita Asquini, Luca Martini, Univ. degli Studi di Roma La Sapienza (Italy) . . . . . [9384-19]

2:30 pm: **Emerging liquid crystal waveguide technology for low SWaP active short-wave infrared imagers**, Sean D. Keller, Gerald P. Uyeno, Ted Lynch, Raytheon Missile Systems (USA); Scott R. Davis, Scott D. Rommel, Juan M. Pino, Vescent Photonics Inc. (USA) . . . . . [9384-20]

2:45 pm: **Fast-response IR spatial light modulators with a polymer network liquid crystal**, Fenglin Peng, Haiwei Chen, Shin-Tson Wu, Univ. of Central Florida (USA); Suvagata Tripathi, Robert J. Twieg, Kent State Univ. (USA) . . . . . [9384-21]

Coffee Break . . . . . Tue 3:00 pm to 3:30 pm

SESSION 6

LOCATION: ROOM 234 (MEZZANINE) . . . . . TUE 3:30 PM TO 6:00 PM

Active Filters and Retarders

Session Chairs: **Andy Ying-Guey Fuh,** National Cheng Kung Univ. (Taiwan); **Timothy J. Bunning,** Air Force Research Lab. (USA)

3:30 pm: **Voltage-tunable liquid-crystal-based filters, resonators, and lasers** *(Invited Paper)*, Kristiaan Neyts, Mohammad Mohammadimasoudi, Yi Xie, Inge Nys, Jeroen Beeckman, Univ. Gent (Belgium) . . . . . [9384-22]

4:00 pm: **Liquid crystal THz photonics with indium tin oxide nanowhiskers and graphene as functional electrodes** *(Invited Paper)*, Ci-Ling Pan, National Tsing Hua Univ. (Taiwan). . . . . [9384-23]

4:30 pm: **Multi-twist retarders in homogeneous and inhomogeneous alignment** *(Invited Paper)*, Michael J. Escuti, Kathryn J. Hornburg, North Carolina State Univ. (USA) . . . . . [9384-24]

5:00 pm: **Electrically-regulated bandwidth broadening in polymer stabilized negative dielectric anisotropy cholesteric liquid crystals as color-tunable mirrors**, Kyung Min Lee, Vincnt P. Tondiglia, Chad Keister, Timothy J. Bunning, Timothy J. White, Air Force Research Lab. (USA). . . . . [9384-25]

5:15 pm: **Filtration and modulation of infrared radiation by the small particles: dual-frequency liquid crystal system**, Tahir D. Ibragimov, Gazanfar M. Bayramov, Abbas R. Imamaliyev, Institute of Physics (Azerbaijan) . . [9384-27]

5:30 pm: **Dynamic and complex optical patterns from colloids of cholesteric liquid crystal droplets** *(Invited Paper)*, Junghyun Noh, Univ. du Luxembourg (Luxembourg); Irena Drevensek-Olenik, Univ. of Ljubljana (Slovenia); Jun Yamamoto, Kyoto Univ. (Japan); Jan P. Lagerwall, Univ. du Luxembourg (Luxembourg) . . . . . [9384-45]

Wednesday 11 February

SESSION 7

LOCATION: ROOM 234 (MEZZANINE) . . . . . WED 8:10 AM TO 9:50 AM

Fast-Switching and Bistable Devices

Session Chair: **Tae-Hoon Yoon,** Pusan National Univ. (Korea, Republic of)

8:10 am: **Nanosecond electric modification of nematic order parameter** *(Keynote Presentation)*, Oleg D. Lavrentovich, Volodymyr Borshch, Bing-Xiang Li, Dergij Shiyanovskij, Kent State Univ. (USA) . . . . . [9384-28]

8:50 am: **Fast bistable switching of a chiral nematic liquid crystal cell induced by applying an in-plane electric field**, Seung-Won Oh, Tae-Hoon Yoon, Pusan National Univ. (Korea, Republic of) . . . . . [9384-39]

9:05 am: **Wide-color gamut multi-twist retarders**, Kathryn J. Hornburg, Leandra L. Brickson, Michael J. Escuti, North Carolina State Univ. (USA) . . . . . [9384-30]

9:20 am: **Epidermal photonic devices for quantitative imaging of temperature and thermal transport characteristics of the skin**, Li Gao, Univ. of Illinois at Urbana-Champaign (USA); Yihui Zhang, Northwestern Univ. (USA); Viktor Malyarchuk, Lin Jia, Kyung-In Kang, Chad Webb, Univ. of Illinois at Urbana-Champaign (USA); Haoran Fu, Yan Shi, Guoyan Zhou, Northwestern Univ. (USA); Luke Shi, Deesha Shah, Xian Huang, Baoxing Xu, Univ. of Illinois at Urbana-Champaign (USA); Cunjiang Yu, Univ. of Houston (USA); Yonggang Huang, Northwestern Univ. (USA); John A. Rogers, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [9384-31]

9:35 am: **Ferroelectric liquid crystal for photonics and display**, Abhishek K. Srivastava, Vladimir G. Chigrinov, H. S. Kwok, Hong Kong Univ. of Science and Technology (Hong Kong, China) . . . . . [9384-32]

Coffee Break . . . . . Wed 9:50 am to 10:20 am

SESSION 8

LOCATION: ROOM 234 (MEZZANINE) . . . . . WED 10:20 AM TO 12:20 PM

Lens and 3D Displays

Session Chair: **Kristiaan Neyts,** Univ. Gent (Belgium)

10:20 am: **Large-aperture adaptive liquid crystal lenses for vision care** *(Invited Paper)*, Guoqiang Li, The Ohio State Univ. (USA); Thomas Mauger, The Ohio State Univ. Havener Eye Institute (USA). . . . . [9384-33]

10:50 am: **A liquid crystal and polymer composite film for liquid crystal lenses** *(Invited Paper)*, Yi-Hsin Lin, Hung-Shan Chen, Yu-Jen Wang, Chia-Ming Chang, National Chiao Tung Univ. (Taiwan) . . . . . [9384-34]

11:20 am: **An electrically-tunable liquid crystal lens coupler for the fiber communication systems**, Chyong-Hua Chen, Michael Chen, Yi-Hsin Lin, National Chiao Tung Univ. (Taiwan) . . . . . [9384-35]

11:35 am: **Super-fast refresh holographic liquid crystals for holographic 3D video display**, Hongyue Gao, Yingjie Yu, Jicheng Liu, Shanghai Univ. (China) . . . . . [9384-36]

11:50 am: **A polarized liquid crystal lens with electrically-switching mode and optically-written mode**, Hung-Shan Chen, Yi-Hsin Lin, Chia-Ming Chang, Yu-Jen Wang, National Chiao Tung Univ. (Taiwan); Abhishek K. Srivastava, Jia-Tong Sun, Vladimir G. Chigrinov, Hong Kong Univ. of Science and Technology (Hong Kong, China). . . . . [9384-37]

12:05 pm: **The progress of light field real 3D display**, Xu Liu, Haifeng Li, Zhejiang Univ. (China) . . . . . [9384-38]

OPTO

CONFERENCE 9384
LOCATION: ROOM 234 (MEZZANINE)

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

CONFERENCE 9385
LOCATION: ROOM 220 (MEZZANINE)

Wednesday–Thursday 11–12 February 2015 • Proceedings of SPIE Vol. 9385

Advances in Display Technologies V

Conference Chairs: **Liang-Chy Chien,** Kent State Univ. (USA); **Sin-Doo Lee,** Seoul National Univ. (Korea, Republic of); **Ming Hsien Wu,** Hamamatsu Corp. (USA)

Program Committee: **Karlheinz Blankenbach,** Pforzheim Univ. (Germany); **Pierre M. Boher,** ELDIM (France); **Cheng-Huan Chen,** National Tsing Hua Univ. (Taiwan); **Chin Hsin Chen,** National Chiao Tung Univ. (Taiwan); **Janglin Chen,** Industrial Technology Research Institute (Taiwan); **Jurgen H. Daniel,** Palo Alto Research Center, Inc. (USA); **Paul S. Drzaic,** Apple Inc. (USA); **Mark Fihn,** Veritas et Visus (USA); **Norbert Fruehauf,** Univ. Stuttgart (Germany); **Nobuyuki Hashimoto,** Citizen Holdings Co., Ltd. (Japan); **Klaus Hecker,** VDMA (Germany); **Jason C. Heikenfeld,** Univ. of Cincinnati (USA); **Alex Henzen,** IRX-Innovations B.V. (Netherlands); **Yi-Pai Huang,** National Chiao Tung Univ. (Taiwan); **Lachezar Komitov,** Univ. of Gothenburg (Sweden); **Byoungho Lee,** Seoul National Univ. (Korea, Republic of); **Kars-Michiel H. Lenssen,** Philips Research Nederland B.V. (Netherlands); **Akihiro Mochizuki,** i-CORE Technology, LLC (USA); **Keith Rollins,** DuPont Teijin Films U.K. Ltd. (United Kingdom); **Ryo Sakurai,** Bridgestone Corp. (Japan); **Robert A. Sprague,** SiPix Imaging Inc. (USA); **Andrew J. Steckl,** Univ. of Cincinnati (USA); **Qiong-Hua Wang,** Sichuan Univ. (China); **Michael Wittek,** Merck KGaA (Germany); **Tae-Hoon Yoon,** Pusan National Univ. (Korea, Republic of)

Wednesday 11 February

SESSION 1

LOCATION: ROOM 220 (MEZZANINE) . . . . . WED 1:20 PM TO 3:40 PM

Liquid Crystal Technologies

Session Chair: **Sin-Doo Lee,** Seoul National Univ. (Korea, Republic of)

1:20 pm: **Investigation of response time of vertically-aligned in-plane-switching LCD mode** *(Invited Paper)*, Tien-Lun Ting, Cheng-Wei Lai, Yen-Ying Kung, Cho-Yan Chen, Wen-Hao Hsu, Jenn-Jia Su, AU Optronics Corp. (Taiwan) . . . . . [9385-1]

1:50 pm: **Elimination of off-axis light leakage in a homogeneously-aligned liquid crystal cell** *(Invited Paper)*, Tae-Hoon Yoon, Byung Wok Park, Seung-Won Oh, Pusan National Univ. (Korea, Republic of) . . . . . [9385-2]

2:20 pm: **High-contrast LCD mode** *(Invited Paper)*, Lachezar Komitov, Univ. of Gothenburg (Sweden) . . . . . [9385-3]

2:50 pm: **Control of pre-tilt angle of liquid crystal alignment by polymerized surfaces**, Libo Weng, Kent State Univ. (USA); Pei-Chun Liao, Chen-Chun Lin, Tien-Lun Ting, Wen-Hao Hsu, Jenn-Jia Su, AU Optronics Corp. (Taiwan); Liang-Chy Chien, Kent State Univ. (USA) . . . . . [9385-4]

3:10 pm: **Low-power and high-quality reflective LCD with achromatic polarizer and novel anisotropic diffusion layers** *(Invited Paper)*, Takahiro Ishinabe, Hideo Fujikake, Tohoku Univ. (Japan) . . . . . [9385-5]

Coffee Break . . . . . .Wed 3:40 pm to 4:10 pm

SESSION 2

LOCATION: ROOM 220 (MEZZANINE) . . . . . WED 4:10 PM TO 5:10 PM

Laser and Projection Displays

Session Chair: **Ming Hsien Wu,** Hamamatsu Corp. (USA)

4:10 pm: **Viewing angle dependence of speckle contrast ratio in laser projection system**, Qianli Ma, Changqing Xu, McMaster Univ. (Canada); Hai Ming, Univ. of Science and Technology of China (China). . . . . [9385-6]

4:30 pm: **Suppression of speckle patterns based on temporal angular decorrelation induced by a reflective diffuser**, Sunduck Kim, Oh-Jang Kwon, Min-Seok Yoon, Young-Geun Han, Hanyang Univ. (Korea, Republic of) . [9385-7]

4:50 pm: **Combining, homogenizing, and shaping beams from multiple laser emitters using multimode optical fibers and waveguides used in display systems**, Hadi Baghsiahi, David Selviah, Univ. College London (United Kingdom) . . . . . [9385-8]

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Challenges in realizing a wind-driven mechanoluminescent display, Soon Moon Jeong, Seongkyu Song, Jaewook Jeong, Hyunmin Kim, Daegu Gyeongbuk Institute of Science & Technology (Korea, Republic of) . . . [9385-27]

Analysis of outcoupling efficiency of OLED device incorporating a wrinkled polymer layer, Jun-Hwan Park, Min-Cheol Oh, Pusan National Univ. (Korea, Republic of). . . . . [9385-28]

A novel computer-generated hologram (CGH) achieved scheme using point cloud data based on integral imaging, Wei-Na Li, Mei-Lan Piao, Chungbuk National Univ. (Korea, Republic of); Seok-Hee Jeon, Incheon National Univ. (Korea, Republic of); Jong-Rae Jeong, Suwon Science College (Korea, Republic of); Nam Kim, Chungbuk National Univ. (Korea, Republic of). . . . . [9385-29]

Thursday 12 February

SESSION 3

LOCATION: ROOM 220 (MEZZANINE) . . . . . THU 8:10 AM TO 10:00 AM

3D and 2D/3D Convertible Displays

Session Chair: **Akihiro Mochizuki,** i-CORE Technology, LLC (USA)

8:10 am: **Front and rear projection autostereoscopic 3D displays based on lenticular sheets** *(Invited Paper)*, Qiong-Hua Wang, Shang-fei Zang, Sichuan Univ. (China) . . . . . [9385-9]

8:40 am: **30-view projection 3D display**, Junejei Huang, Yuchang Wang, Delta Electronics, Inc. (Taiwan) . . . . . [9385-10]

9:00 am: **Diffractive optics in large sizes: computer-generated holograms (CGH) based on Bayfol® HX film**, Günther Walze, Bayer MaterialScience AG (Germany) . . . . . [9385-11]

9:20 am: **Depth-enhanced integral imaging display system with time-multiplexed depth planes using a varifocal liquid lens array**, Cheoljoong Kim, Muyoung Lee, Junoh Kim, Jin su Lee, Yonghyub Won, KAIST (Korea, Republic of) . . . . . [9385-12]

9:40 am: **Wide-angle color holographic 3D display with multi-source-based holographic content**, Malgorzata Kujawinska, Weronika Zaperty, Tomasz Kozacki, Bartosz Wisniowski, Warsaw Univ. of Technology (Poland) . . [9385-13]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

OPTO

CONFERENCE 9385
LOCATION: ROOM 220 (MEZZANINE)

SESSION 4
LOCATION: ROOM 220 (MEZZANINE) . . . . . THU 10:30 AM TO 12:10 PM

Emerging Systems and Displays I
Session Chair: **Ming Hsien Wu,** Hamamatsu Corp. (USA)

10:30 am: **Quantum-dot-enabled high color gamut LCDs** *(Keynote Presentation)*, Jian Chen, Shihai Kan, Ernie Lee, Steve Gensler, Jason Hartlove, Nanosys, Inc. (USA) . . . . . [9385-14]

11:10 am: **A glasses-free random dot stereoacuity test using a multi-view display system**, Jonghyun Kim, Keehoon Hong, Seoul National Univ. (Korea, Republic of); Hee Kyung Yang, Jeong-Min Hwang, Seoul National Univ. College of Medicine (Korea, Republic of); Byoungho Lee, Seoul National Univ. (Korea, Republic of) . . . . . [9385-15]

11:30 am: **Colorful holographic display of 3D object based on scaled diffraction by using non-uniform fast Fourier transform**, Chenliang Chang, Jun Xia, Wei Lei, Southeast Univ. (China) . . . . . [9385-16]

11:50 am: **Holographic 3D video display of super-fast response liquid crystal film**, Hongyue Gao, Yingjie Yu, Shanghai Univ. (China) . . . . . [9385-17]

Lunch/Exhibition Break . . . . . Thu 12:10 pm to 1:30 pm

SESSION 5
LOCATION: ROOM 220 (MEZZANINE) . . . . . THU 1:30 PM TO 3:10 PM

Holographic Displays
Session Chair: **Qiong-Hua Wang,** Sichuan Univ. (China)

1:30 pm: **Video-rate optical holographic display based on nonlinear doped liquid crystals** *(Invited Paper)*, Yikai Su, Shanghai Jiao Tong Univ. (China) . . . . . [9385-18]

2:00 pm: **Three-dimensional display based on refreshable volume holograms in photochromic diarylethene polymer** *(Invited Paper)*, Zheng Wang, Liangcai Cao, Hao Zhang, Guofan Jin, Tsinghua Univ. (China) . . . . . [9385-19]

2:30 pm: **Novel volumetric 3D display based on point light source optical reconstruction using multi focal lens array**, Jin su Lee, Muyoung Lee, Junoh Kim, Cheoljoong Kim, Yong Hyub Won, KAIST (Korea, Republic of) . . . . . [9385-20]

2:50 pm: **Video-based 3D scanning integrated with a hand-held configuration of light-field photography**, Chia-Ming Jan, Metal Industries Research & Development Ctr. (Taiwan). . . . . [9385-21]

Coffee Break . . . . . Thu 3:10 pm to 3:40 pm

SESSION 6
LOCATION: ROOM 220 (MEZZANINE) . . . . . THU 3:40 PM TO 5:30 PM

Emerging Systems and Displays II
Session Chair: **Yikai Su,** Shanghai Jiao Tong Univ. (China)

3:40 pm: **Viewing angle and imaging multispectral analysis of OLED display light emission** *(Invited Paper)*, Pierre M. Boher, Thierry Leroux, Thibault Bignon, Véronique Collomb-Patton, ELDIM (France) . . . . . [9385-22]

4:10 pm: **Anti-ambient light reflective type projection screen with angle-selective absorber**, Liao Tianju, Qiao Junfeng, Li Xian, Zhaoyu Zhang, Peking Univ. (China) . . . . . [9385-23]

4:30 pm: **Low cost of ownership large area annealing of amorphous silicon films**, Nick Hay, Ian A. Baker, Young Kwon, Powerlase Photonics Ltd. (United Kingdom) . . . . . [9385-24]

4:50 pm: **360-degree table-top display with rotating transmissive screen**, Kwang-Soo Kim, Hosung Jeon, Kyungpook National Univ. (Korea, Republic of); Sang Kil Lee, A-Optics Co., Ltd. (Korea, Republic of); Hwi Kim, Korea Univ. Sejong Campus (Korea, Republic of); Joonku Hahn, Kyungpook National Univ. (Korea, Republic of). . . . . [9385-25]

5:10 pm: **High-efficient photonic crystal embedded polymer light-emitting diodes with inkjet-printed conductive polymer anodes**, Jaeheung Ha, Donghyun Kim, Jongjang Park, Seunghwan Lee, Heonsu Jeon, Changhee Lee, Yongtaek Hong, Seoul National Univ. (Korea, Republic of) . . . . . [9385-26]

CONFERENCE 9386
LOCATION: ROOM 125 (EXHIBIT LEVEL)

Sunday–Wednesday 8–11 February 2015 • Proceedings of SPIE Vol. 9386

Practical Holography XXIX: Materials and Applications

Conference Chairs: **Hans I. Bjelkhagen,** Glyndwr Univ. (United Kingdom), Hansholo Consulting Ltd. (United Kingdom); **V. Michael Bove Jr.,** MIT Media Lab. (USA)

Program Committee: **Frank C. Fan,** Shenzhen AFC Technology Co., Ltd. (China); **Gerald L. Heidt,** Wasatch Photonics, Inc. (USA); **Toshio Honda,** Toppan Printing Co., Ltd. (Japan); **Fujio Iwata,** Toppan Printing Co., Ltd. (Japan); **Tung H. Jeong,** Lake Forest College (USA); **Michael A. Klug,** Zebra Imaging, Inc. (USA); **Alkiviadis Lembessis,** The Hellenic Institute of Holography (Greece); **Martina L. Mrongovius,** RMIT Univ. (Australia), Ctr. for the Holographic Arts (United States), Academy of Media Arts, Cologne KHM (Germany); **Martin J. Richardson,** De Montfort Univ. (United Kingdom); **Hiroshi Yoshikawa,** Nihon Univ. (Japan)

Sunday 8 February

SESSION 1

LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . .SUN 8:40 AM TO 10:00 AM

Materials and Processes

8:40 am: **Edge-lit volume holograms recorded by free space exposure: diffraction by 2nd Harmonics in Bayfol® HX film**, Friedrich-Karl Bruder, Thomas Faecke, Rainer Hagen, Dennis Hönel, Bayer MaterialScience AG (Germany); David Jurbergs, Bayer MaterialScience LLC (USA); Enrico Orselli, Christian Rewitz, Thomas Roelle, Guenther Walze, Brita Wewer, Bayer MaterialScience AG (Germany) . . . . . [9386-1]

9:00 am: **Beam propagation ratios measurement based on transmissive liquid crystal spatial light modulator**, Lei Zhang, Dong Li, Jindong Tian, Shenzhen Univ. (China) . . . . . [9386-2]

9:20 am: **Everything you need to know about resin interactions with PDMS as a window material and some new window materials for SLA 3D printers**, Michael C. Cole, Univ. of Colorado at Boulder (USA) and Colorado Photopolymer Solutions (USA); Robert McLeod, Univ. of Colorado at Boulder (USA) . . . . . [9386-3]

9:40 am: **Hyperspectral digital holography of microobjects**, Georgy S. Kalenkov, Moscow State Technical Univ. MAMI (Russian Federation); Georgy S. Kalenkov, Moscow Institute of Physics and Technology (Russian Federation); Alexander E. Shtanko, Moscow State Univ. of Technology Stankin (Russian Federation) and Moscow Institute of Physics and Technology (Russian Federation) . . . . . [9386-4]

Coffee Break . . . . . Sun 10:00 am to 10:30 am

SESSION 2

LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . .SUN 10:30 AM TO 11:50 AM

Digital Holography I

10:30 am: **Generalized experimental phase extraction algorithm for speckle interferometry**, Antonio Barcelata-Pinzón, Rigoberto Juárez-Salazar, Carlos Ignacio Robledo-Sánchez, Cruz Meneses-Fabián, Benemérita Univ. Autónoma de Puebla (Mexico); Manuel Durán-Sánchez, Univ. Tecnológica de Puebla (Mexico) and Instituto Nacional de Astrofísica Óptica y Electrónica (Mexico); Ricardo I. Álvarez-Tamayo, Univ. Tecnológica de Puebla (Mexico) . . . . . [9386-5]

10:50 am: **Differentiation methods for phase recovery.**, Meriç Özcan, Sabanci Univ. (Turkey). . . . . [9386-6]

11:10 am: **Diffraction pattern of gratings with erosion**, Arturo Olivares-Pérez, Israel Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico). . . . . [9386-7]

11:30 am: **Spatial domain Fraunhofer computer hologram**, Jian-Wen Dong, Yigui Chen, Sun Yat-Sen Univ. (China) . . . . . [9386-8]

Lunch Break . . . . . Sun 11:50 am to 1:20 pm

SESSION 3

LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . . SUN 1:20 PM TO 2:20 PM

Digital Holography II

1:20 pm: **Distortion-free broadband holograms: A novel class of elements utilizing the wavelength-independent geometric phase**, Xiao Xiang, Matthew N. Miskiewicz, Michael J. Escuti, North Carolina State Univ. (USA) . . . . . [9386-10]

1:40 pm: **Computation of Fresnel holograms and diffraction-specific coherent panoramagrams for full-color holographic displays based on anisotropic leaky-mode modulators**, Sundeep Jolly, Ermal Dreshaj, V. Michael Bove Jr., MIT Media Lab. (USA) . . . . . [9386-11]

2:00 pm: **Improved real-time holographic video display using a super-fast-refresh liquid crystal film**, Hongyue Gao, Yingjie Yu, Jicheng Liu, Huadong Zheng, Shanghai Univ. (China) . . . . . [9386-12]

SESSION 4

LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . . SUN 2:20 PM TO 3:20 PM

Holography, Art, and Perception

2:20 pm: **Time within time: 3D printed sculptures within holographic art practice**, Yin-Ren Chang, Martin J. Richardson, De Montfort Univ. (United Kingdom). . . . . [9386-13]

2:40 pm: **Seeing yourself seeing**, Maria Isabel Azevedo, Martin J. Richardson, Elizabeth Sandford-Richardson, De Montfort Univ. (United Kingdom); Luís Miguel Bernardo, Helder Crespo, Univ. do Porto (Portugal). . . . . [9386-14]

3:00 pm: **Archiving Saudi heritage using the holographic medium**, Amani D. Althagafi, Martin J. Richardson, De Montfort Univ. (United Kingdom). . . . . [9386-15]

Coffee Break . . . . . Sun 3:20 pm to 3:50 pm

SESSION 5

LOCATION: ROOM 125 (EXHIBIT LEVEL) . . . . . SUN 3:50 PM TO 6:00 PM

Applications

3:50 pm: **Holography: past, present, and future** *(Invited Paper)*, Ian M. Lancaster, Reconnaissance International Ltd. (United Kingdom) [9386-16]

4:20 pm: **Holographic data storage at 2+ Tbit/in$_2$**, Mark R. Ayres, Ken E. Anderson, Fred Askham, Brad Sissom, Akonia Holographics, LLC (USA) . . . . . [9386-17]

4:40 pm: **Compensation of laser wavelength drift in collinear holographic storage system**, Xiaotong Li, Yabin Cheng, Xiao Lin, Guoguo Kang, Xiaodi Tan, Beijing Institute Of Technology (China) . . . . . [9386-18]

5:00 pm: **Automated empirical determination of volume phase hologram parameters using Kogelnik's equations and a laser scan system**, Robert D. Brown, Rockwell Collins Aerospace & Electronics Inc. (USA); James H. Stanley, Rockwell Collins, Inc. (USA); Alan D. Cheng, Saturday Academy Apprenticeships in Science and Engineering (USA) and Southridge High School (USA). . . . . [9386-19]

5:20 pm: **Applied digital holography for evaluating hard metal chip**, José Luis V. Valin Rivera, Univ. de São Paulo (Brazil); Jaime M. Monteiro, Mario A. P. Vaz, Univ. do Porto (Portugal); H. M. Lopes, Institute Politecnico de Braganca (Portugal); Reginaldo T. Coelho, Meylí V. Fernández, Edison Goncalves, Univ. de São Paulo (Brazil). . . . . [9386-20]

5:40 pm: **Design of wide angle holographic waveguide monocular head-mounted display using photopolymer**, Meilan Piao, Chungbuk National Univ. (Korea, Republic of); Sangkeun Gil, Univ. of Suwon (Korea, Republic of); Nam Kim, Chungbuk National Univ. (Korea, Republic of) . . . . . [9386-21]

CONFERENCE 9386
LOCATION: ROOM 125 (EXHIBIT LEVEL)

Monday 9 February

OPTO PLENARY SESSION
LOCATION: ROOM 134 (EXHIBIT LEVEL) . MON 8:00 AM TO 10:10 AM

Session Chairs : **David L. Andrews**, Univ. of East Anglia Norwich (United Kingdom); **Alexei L. Glebov**, OptiGrate Corp. (USA)

8:00 am: **Welcome and Opening Remarks**
David L. Andrews, Univ. of East Anglia Norwich (United Kingdom)

8:05 am: **Announcement of the Green Photonics Awards**
Stephen J. Eglash, Executive Director, Stanford Data Science Initiative, Stanford Univ. (USA)

8:10 am: **Silicon integrated nanophotonics: from fundamental science to manufacturable technology**
Yurii A. Vlasov, IBM Thomas J. Watson Research Ctr. (USA). . . . . [9367-200]

8:50 am: **Ultrafast coherent charge transfer in solar cells and artificial light harvesting systems: toward movies of electronic motion**
Christoph Lienau, Institute of Physics, Carl von Ossietzky Univ. Oldenburg (Germany) and Ctr. of Inferface Science, Carl von Ossietzky Univ. Oldenburg (Germany) . . . . . [9361-201]

9:30 am: **Tunable and quantum metaphotonics**
Harry A. Atwater Jr., DOE Light-Material Interactions Energy Frontier Research Ctr. (USA) and Resnick Institute (USA) and California Institute of Technology (USA). . . . . [9371-202]

Tuesday 10 February

TECHNICAL GROUP
LOCATION: INTERCONTINENTAL HOTEL, BALLROOM B
7:30 PM TO 9:00 PM

Holography

Session Chair: **V. Michael Bove**, MIT Media Lab. (USA)

The Holography Technical Group is involved with the whole record of research, engineering, recording materials, and applications of holography. The main fields of interest are display holograms, commercial and artistic, holographic optical elements (HOEs), holographic interferometry and holographic non-destructive testing (HNDT), computer-generated holography (CGH), electro and digital holography, holographic microscopy, and holographic data storage (HDS). This meeting will focus on recent developments and directions, in particular, in regard to new materials, color display holography, digital holography, CGHs and HOEs.

Wednesday 11 February

POSTERS-WEDNESDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

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Optimization of the switch-back technique used for fast occlusion-processing in computer holography, Sachio Masuda, Kyoji Matsushima, Sumio Nakahara, Kansai Univ. (Japan) . . . . . [9386-22]

Holographic gratings with NOA65® adhesives with edible colorant, Arturo Olivares-Pérez, Israel Fuentes-Tapia, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Santa Toxqui-López, Benemérita Univ. Autónoma de Puebla (Mexico) . . . . . [9386-23]

Optimization of design wavelength for unobtrusive chromatic aberration in high-definition color computer holography, Takashi Miyaoka, Kyoji Matsushima, Sumio Nakahara, Kansai Univ. (Japan). . . . . [9386-24]

Holographic gratings in dichromated gelatin with edible dyes, Arturo Olivares-Pérez, Israel Fuentes-Tapia, Yessenia Jauregui-Sanchez, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); Santa Toxqui-López, Benemérita Univ. Autónoma de Puebla (Mexico); Rosario Juárez-Néstor, CONALEP (Mexico) . . . . . [9386-25]

Optimum phase-shift for off-axis digital holographic microscopy in phase volume measurement, Mohammad Reza Jafarfard, Yonsei Univ. (Korea, Republic of) . . . . . [9386-26]

Stability of holographic gratings recorded on photopolymer films using acrylamide as monomer and N,N'-methylenebisacrylamide, Keiichi Osabe, Nagaoka Univ. of Technology (Japan); Hiroshi Saito, TDK-Lambda Corp. (Japan). . . . . [9386-27]

Increasing reconstruction quality of diffractive optical elements displayed with LC SLM, Vitaly V. Krasnov, Pavel A. Cheremkhin, Nikolay N. Evtikhiev, Vladislav G. Rodin, Sergey N. Starikov, National Research Nuclear Univ. MEPhI (Russian Federation) . . . . . [9386-28]

UV recording with ethyl acetate and muicle dye film, Santa Toxqui-López, Benemérita Univ. Autónoma de Puebla (Mexico); A. Olivares-Pérez, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); V. Santacruz-Vazquez, Benemérita Univ. Autónoma de Puebla (Mexico); Israel Fuentes-Tapia, J. Ordóñez-Padilla, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico). . . . . [9386-29]

Improved hidden surface removal method for computer-generated alcove hologram, Takeshi Yamaguchi, Hiroshi Yoshikawa, Nihon Univ. (Japan). . . . . [9386-30]

Security enhanced optical one-time password authentication method by using digital holography, Sangkeun Gil, Univ. of Suwon (Korea, Republic of); Seok-Hee Jeon, Incheon National Univ. (Korea, Republic of); Jong-Rae Jung, Suwon Science College (Korea, Republic of) . . . . . [9386-31]

Hologram-like interactive three-dimensional display using LED array type persistence of vision, Youngmin Kim, Jisoo Hong, Sunghee Hong, Sangkyun Kim, Hoonjong Kang, Korea Electronics Technology Institute (Korea, Republic of). . . . . [9386-32]

Non-destructive testing of an original XVI century painting on wood by ESPI system, Giovanni Arena, Pasquale Memmolo, Istituto Nazionale di Ottica (Italy); Giancarlo Fatigati, Mariangela Grilli, Univ. degli Studi Suor Orsola Benincasa (Italy); Melania Paturzo, Luca Pezzati, Pietro Ferraro, Istituto Nazionale di Ottica (Italy). . . . . [9386-33]

Recovering data from noisy fringe patterns from a portable digital speckle pattern interferometer for in-situ inspection of painting hanging on the wall, Giovanni Arena, Pasquale Memmolo, Istituto Nazionale di Ottica (Italy); Giancarlo Fatigati, Mariangela Grilli, Univ. degli Studi Suor Orsola Benincasa (Italy); Melania Paturzo, Luca Pezzati, Pietro Ferraro, Istituto Nazionale di Ottica (Italy) . . . . . [9386-34]

Experiment on three-dimensional display using spatial cross modulation method, Yuta Kan, Atsushi Okamoto, Akihisa Tomita, Atsushi Shibukawa, Hokkaido Univ. (Japan); Hisatoshi Funakoshi, Gifu Univ. (Japan) . . . . . [9386-35]

Interferometric study on Gouy phase anomaly of microlens array, Myun-Sik Kim, SUSS MicroOptics SA (Switzerland) and Ecole Polytechnique Fédérale de Lausanne (Switzerland); Toralf Scharf, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Wilfried Noell, SUSS MicroOptics SA (Switzerland); Hans Peter Herzig, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Reinhard Völkel, SUSS MicroOptics SA (Switzerland) . . . . . [9386-36]

CONFERENCE 9387
LOCATION: ROOM 200 (MEZZANINE)

Tuesday–Thursday 10–12 February 2015 • Proceedings of SPIE Vol. 9387

Broadband Access Communication Technologies IX

Conference Chairs: **Benjamin B. Dingel,** Nasfine Photonics, Inc. (USA); **Katsutoshi Tsukamoto,** Osaka Institute of Technology (Japan)

Program Committee: **Frank Deicke,** Fraunhofer-Institut für Photonische Mikrosysteme (Germany); **David W. Faulkner,** British Telecom Research Labs. (United Kingdom); **Harald Haas,** The Univ. of Edinburgh (United Kingdom); **Mohsen Kavehrad,** The Pennsylvania State Univ. (USA); **Rangaraj Madabhushi,** Madabhushi Consultants, LLC (USA); **Nicholas Madamopoulos,** The City College of New York (USA); **Spiros Mikroulis,** Univ. College London (United Kingdom); **Ken-ichi Sato,** Nagoya Univ. (Japan); **Chakchai So-In,** Khon Kaen Univ. (Thailand); **Atul K. Srivastava,** NEL America, Inc. (USA); **Peter Van Daele,** Univ. Gent (Belgium)

Tuesday 10 February

SESSION 1

LOCATION: ROOM 200 (MEZZANINE) . . . . . TUE 8:20 AM TO 10:20 AM

Optical Communication Plenary Session

Joint Session with Conferences 9387, 9388, 9389, and 9390

Session Chairs: **Guifang Li,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Benjamin B. Dingel,** Nasfine Photonics, Inc. (USA)

8:20 am: **SDM technologies for flexible networks** *(Invited Paper)*, Dimitra E. Simeonidou, Univ. of Bristol (United Kingdom) . . . . . [9389-1]

8:50 am: **Prospects for millimetre-wave-over-fibre and THz-over-fibre systems** *(Invited Paper)*, Alwyn J. Seeds, Haymen Shams, Martyn J. Fice, Katarzyna Balakier, Lalitha Ponnampalam, Cyril Renaud, Univ. College London (United Kingdom) . . . . . [9387-1]

9:20 am: **High-speed silicon photonics links over LX multimode fibers** *(Invited Paper)*, Hai-Feng Liu, Intel Corp. (USA); Scott R. Bickham, Corning Incorporated (USA) . . . . . [9390-1]

9:50 am: **Novel devices for low-power silicon-photonics-based optical links** *(Invited Paper)*, Philippe P. Absil, IMEC (Belgium) . . . . . [9390-2]

Coffee Break . . . . . Tue 10:20 am to 10:30 am

SESSION 2

LOCATION: ROOM 200 (MEZZANINE) . . . . . TUE 10:30 AM TO 12:00 PM

Multidimensional Multiplexing Technologies for Advanced Optical Networks

Joint Session with Conferences 9387, 9388, 9389, and 9390

Session Chairs: **Atul K. Srivastava,** NEL America, Inc. (USA); **Guifang Li,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

10:30 am: **MIMO signal processing in mode-division multiplexing systems** *(Invited Paper)*, Sercan O. Arik, Daulet Askarov, Joseph M. Kahn, Stanford Univ. (USA) . . . . . [9388-1]

11:00 am: **Key technologies for energy and spectral efficient flexible optical networks** *(Invited Paper)*, Satoshi Shimizu, National Institute of Information and Communications Technology (Japan); Gabriella Cincotti, Univ. degli Studi di Roma Tre (Italy); Naoya Wada, National Institute of Information and Communications Technology (Japan) . . . . . [9389-2]

11:30 am: **Adaptive multidimensional modulation and multiplexing for next-generation optical networks** *(Invited Paper)*, Milorad Cvijetic, College of Optical Sciences, The Univ. of Arizona (USA) . . . . . [9388-2]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:00 pm

SESSION 3

LOCATION: ROOM 200 (MEZZANINE) . . . . . TUE 1:00 PM TO 3:30 PM

Workshop on High-Speed Transport in Datacenters

Joint Session with Conferences 9387, 9388, 9389, and 9390

Session Chairs: **Akimasa Kaneko,** NEL America, Inc. (USA); **Atul K. Srivastava,** NEL America, Inc. (USA)

1:00 pm: **Should optical links be parallel or serial?** *(Invited Paper)*, Karen Liu, Kaiam Corp. (USA) . . . . . [9390-3]

1:30 pm: **Optical technologies for >25 Gb/s short-reach high-bandwidth interconnects** *(Invited Paper)*, Mitchell H. Fields, Avago Technologies Ltd. (USA) . . . . . [9390-4]

2:00 pm: **50-Gb/s vertical illumination APD for 400GbE** *(Invited Paper)*, Masahiro Nada, Nippon Telegraph and Telephone Corp. (Japan) . . . . . [9390-5]

2:30 pm: **Recent advances in high-data-rate optical transceivers** *(Invited Paper)*, Julie A. Sheridan Eng, Finisar Corp. (USA) . . . . . [9390-6]

3:00 pm: **A global standardization trend for high-speed client and line-side transceivers** *(Invited Paper)*, Hideki Isono, Fujitsu Ltd. (Japan) . . . . . [9390-7]

Coffee Break . . . . . Tue 3:30 pm to 3:40 pm

SESSION 4

LOCATION: ROOM 200 (MEZZANINE) . . . . . TUE 3:40 PM TO 5:40 PM

Optical Wireless and Advanced Fiber Technologies for Data Center and Access Network

Joint Session with Conferences 9387, 9388, 9389, and 9390

Session Chairs: **Benjamin B. Dingel,** Nasfine Photonics, Inc. (USA); **Atul K. Srivastava,** NEL America, Inc. (USA)

3:40 pm: **Next-generation optical wireless communications for data centers** *(Invited Paper)*, Shlomi Arnon, Ben-Gurion Univ. of the Negev (Israel) . . . [9387-2]

4:10 pm: **Space division multiplexing in access networks** *(Invited Paper)*, Frank J. Effenberger, FutureWei Technologies, Inc. (USA) . . . . . [9387-3]

4:40 pm: **New development in optical fiber for data center applications** *(Invited Paper)*, Yi Sun, Roman shubochkin, Benyuan Zhu, OFS Fitel LLC (USA) . . . . . [9387-4]

5:10 pm: **High-speed bidirectional dual-core fiber transmission system for high-density short-reach optical interconnects** *(Invited Paper)*, Douglas L. Butler, Ying Geng, Shenping Li, Ming-Jun Li, Clifford G. Sutton, Corning Incorporated (USA); Robert McCollum, L-3 Communications (USA); Randy L. McClure, Corning Incorporated (USA); Alexander V. Koklyushkin, Corning Incorporated (Russian Federation); Karen I. Matthews, Corning Incorporated (USA) . . . . . [9390-8]

OPTO

CONFERENCE 9387
LOCATION: ROOM 200 (MEZZANINE)

Wednesday 11 February

SESSION 5
LOCATION: ROOM 200 (MEZZANINE) ..... WED 8:30 AM TO 10:20 AM

Special Session on Millimeter-Wave Technologies and Radio-Over-Fiber Systems for Access I

Session Chairs: **Spiros Mikroulis,** Univ. College London (United Kingdom); **Manoj P. Thakur,** Univ. College London (United Kingdom)

8:30 am: **SDN based millimetre wave radio-over-fibre (RoF) network** *(Invited Paper)*, Pandelis Kourtessis, Milos Milosavljevic, John M. Senior, Ahmed Mohammed Amate, Matthew Robinson, Univ. of Hertfordshire (United Kingdom) . . . . . [9387-5]

9:00 am: **Investigation of the SIW technology for low cost 60 GHz radio over fiber based array antenna units** *(Invited Paper)*, Dimitrios Makris, Panagiotis K. Tsiakas, Konstantinos Voudouris, Technological Educational Institute of Athens (Greece); Manoj P. Thakur, Spiros Mikroulis, Univ. College London (United Kingdom) . . . . . [9387-6]

9:30 am: **Deep optical access on multi-core and multi-mode fiber for integrated wireless applications** *(Invited Paper)*, Roberto Llorente, Maria Morant, Marta Beltrán, Andrés Macho, Univ. Politècnica de València (Spain) . . . . . [9387-7]

10:00 am: **Class AB radio-over-fiber link based on highly-linear ring resonator modulators**, Stavros Iezekiel, Univ. of Cyprus (Cyprus) . . . . . [9387-8]

Coffee Break . . . . . .Wed 10:20 am to 10:40 am

SESSION 6
LOCATION: ROOM 200 (MEZZANINE) .....WED 10:40 AM TO 12:30 PM

Special Session on Millimeter-Wave Technologies and Radio-Over-Fiber Systems for Access II

Session Chairs: **Spiros Mikroulis,** Univ. College London (United Kingdom); **Manoj P. Thakur,** Univ. College London (United Kingdom)

10:40 am: **Integrated coherent radio-over-fiber units for millimeter-wave wireless access** *(Invited Paper)*, Andreas Stöhr, Sebastian Babiel, Rattana Chuenchom, Matthias Steeg, Univ. Duisburg-Essen (Germany); John E. Mitchell, Cyril Renaud, Manoj Thakur, Univ. College London (United Kingdom); Frederic van Dijk, Alcatel-Thales III/V-Lab. (France); Andreas Steffan, Finisar Corp. (Germany); Matthew O'Keefe, Finisar Corp. (United Kingdom); Yigal Leiba, SIKLU Communications (Israel); Pawel Polis, Pawel Parol, Orange Polska (Poland); Juan J. Vegas Olmos, Technical Univ. of Denmark (Denmark); Idelfonso T. Monroy, DTU Fotonik (Denmark) . . . . . [9387-9]

11:10 am: **Fiber-wireless system techniques for millimeter-wave wireless access** *(Invited Paper)*, Anthony Ng'oma, Corning Incorporated (USA) . [9387-10]

11:40 am: **Waveform over fiber: DSP-aided coherent fiber-wireless transmission using millimeter and terahertz waves** *(Invited Paper)*, Atsushi Kanno, Pham Tien Dat, Toshiaki Kuri, Iwao Hosako, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan); Yuki Yoshida, Ken'ichi Kitayama, Osaka Univ. (Japan) . . . . . [9387-11]

12:10 pm: **Laser-phase-fluctuation-insensitive offset-frequency-spaced two-tone optical coherent detection scheme with digital-signal-processing technique for radio-over-fiber systems**, Toshiaki Kuri, Takahide Sakamoto, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan) . . . . . [9387-12]

Lunch/Exhibition Break . . . . . .Wed 12:30 pm to 1:30 pm

SESSION 7
LOCATION: ROOM 200 (MEZZANINE) ..... WED 1:30 PM TO 3:20 PM

Advanced Optical Access Technologies

Session Chairs: **Katsumi Iwatsuki,** Tohoku Univ. (Japan); **Frank J. Effenberger,** FutureWei Technologies, Inc. (USA)

1:30 pm: **Wavelength shift tolerance of a heterodyne detection scheme for cost-efficient DWDM-PON / 60 GHz wireless integration** *(Invited Paper)*, Maria C. R. Medeiros, Univ. de Coimbra (Portugal); Manoj P. Thakur, Spiros Mikroulis, John E. Mitchell, Univ. College London (United Kingdom) . . . [9387-13]

2:00 pm: **All-optical virtual private network system in OFDM based long-reach PON using RSOA re-modulation technique**, Chang-hun Kim, Soo-Min Kang, Sang-Min Jung, Sang-Kook Han, Yonsei Univ. (Korea, Republic of) . . . . . [9387-14]

2:20 pm: **Visible CWDM system design for Multi-Gbit/s transmission over SI-POF**, Carmen Vázquez García, Plinio Jesús Pinzón Castillo, Isabel A. Pérez Garcilópez, Univ. Carlos III de Madrid (Spain) . . . . . [9387-15]

2:40 pm: **A colorless remote node for metro-access converged optical network**, Simiao Xiao, Zhensen Gao, Kaibin Zhang, Alcatel-Lucent Shanghai Bell Co. Ltd. (China) . . . . . [9387-16]

3:00 pm: **Secure bidirectional transmission in a WDM-PON architecture employing RSOA-based remodulation scheme**, Ardhendu S. Patra, Anindya S. Das, Sidho-Kanho-Birsha Univ. (India) . . . . . [9387-18]

Coffee Break . . . . . .Wed 3:20 pm to 3:50 pm

SESSION 8
LOCATION: ROOM 200 (MEZZANINE) .....WED 3:50 PM TO 5:40 PM

Special Session on Resilient and Green Wireless Access Networks for Future Mobile

Session Chairs: **Katsutoshi Tsukamoto,** Osaka Institute of Technology (Japan); **Pandelis Kourtessis,** Univ. of Hertfordshire (United Kingdom)

3:50 pm: **Next-generation resilient access networks** *(Invited Paper)*, Katsumi Iwatsuki, Tohoku Univ. (Japan); Katsutoshi Tsukamoto, Osaka Institute of Technology (Japan) . . . . . [9387-17]

4:20 pm: **Hybrid optical fiber-wireless sensor and communication networks for environmental monitoring and disaster prevention**, Ferney O. Amaya Fernández, Leonardo Betancur-Agudelo, Univ. Pontificia Bolivariana (Colombia); Idelfonso Tafur Monroy, DTU Fotonik (Denmark) . . . . . [9387-22]

4:40 pm: **An approach to resilient wireless communication systems research for massive disasters** *(Invited Paper)*, Kiyoshi Hamaguchi, National Institute of Information and Communications Technology (Japan) . . . . [9387-19]

5:10 pm: **STBC AF relay for unmanned aircraft system** *(Invited Paper)*, Fumiyuki Adachi , Hiroyuki Miyazaki, Chikara Endo, Tohoku Univ. (Japan) . . . . . [9387-21]

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Radio-over-fiber transport system employing free-space optical communication scheme with parabolic reflector, Ardhendu S. Patra, Anindya S. Das, Sidho-Kanho-Birsha Univ. (India) . . . . . [9387-31]

Ultra-broadband GaInNAs semiconductor optical amplifier incorporating N compositional fluctuations for the next generation passive optical network, Xiao Sun, Qingjiang Chang, Alcatel-Lucent Shanghai Bell Co. Ltd. (China) . . . . . [9387-32]

Software design of segment optical transmitter for indoor free-space optical networks, Jan Latal, Jan Vitasek, Petr Koudelka, Petr Siska, Andrej Liner, Lukas Hajek, Aleš Vanderka, Vladimír Vašinek, VŠB-Technical Univ. of Ostrava (Czech Republic); Michal Lucki, Czech Technical Univ. in Prague (Czech Republic) . . . . . [9387-34]

Analysis of an optical wireless transceiver using subcarrier intensity modulation in indoor visible light communications, Petr Koudelka, Andrej Liner, Radek Martinek, Jan Latal, Petr Siska, Stanislav Kepak, Vladimír Vašinek, VŠB-Technical Univ. of Ostrava (Czech Republic) . . [9387-35]

Software design of optical link for indoor wireless optical communication network used LEDs as source visible light communication, Andrej Liner, Martin Papes, Jakub Jaros, Lukas Hajek, Petr Koudelka, Jan Vitasek, Jan Latal, Vladimír Vašinek, VŠB-Technical Univ. of Ostrava (Czech Republic) . . . [9387-36]

Secure transmission of static and dynamic images via chaotic encryption in acousto-optic hybrid feedback with profiled light beams, Monish R. Chatterjee, Fares S. Almehmadi, Univ. of Dayton (USA). . . . . [9387-37]

Thursday 12 February

SESSION 9

LOCATION: ROOM 200 (MEZZANINE) . . . . . THU 8:30 AM TO 10:10 AM

Novel Visible Light Communications Systems and Optical Wireless Applications I

Session Chairs: **Steve Hranilovic,** McMaster (Canada); **Katsumi Iwatsuki,** Tohoku Univ. (Japan)

8:30 am: **Organic semiconductors for visible light communication** *(Invited Paper)*, Ifor D. W. Samuel, Pavlos Manousiadis, Univ. of St. Andrews (United Kingdom); Hyunchae Chun, Sujan Rajbhandari, Univ. of Oxford (United Kingdom); Jonathan D. McKendry, Univ. of Strathclyde (United Kingdom); Shuyu Zhang, Univ. of St. Andrews (United Kingdom); Dobroslav Tsonev, The Univ. of Edinburgh (United Kingdom); Dimali C. V. Amarasinghe, Univ. of St. Andrews (United Kingdom); Martin D. Dawson, Univ. of Strathclyde (United Kingdom); Harald Haas, The Univ. of Edinburgh (United Kingdom); Dominic C. O'Brien, Univ. of Oxford (United Kingdom); Graham A. Turnbull, Univ. of St. Andrews (United Kingdom) . . . . . [9387-23]

9:00 am: **Three dimensional indoor positioning based on visible light with Gaussian mixture sigma-point particle filter technique**, Wenjun Gu, Weizhi Zhang, The Pennsylvania State Univ. (USA); Jin Wang, China Univ. of Geosciences (China); Mohammadreza Aminikashani, Mohsen Kavehrad, The Pennsylvania State Univ. (USA). . . . . [9387-24]

9:20 am: **Integrated multiple-input multiple-output visible light communications systems: recent progress and results**, Dominic C. O'Brien, Univ. of Oxford (United Kingdom); Harald Haas, The Univ. of Edinburgh (United Kingdom); Sujan Rajbhandari, Hyunchae Chun, Grahame E. Faulkner, Univ. of Oxford (United Kingdom); Katherine Cameron, Aravind Jalajakumari, Robert K. Henderson, Dobroslav Tsonev, Muhammad Ijaz, Zhe Chen, The Univ. of Edinburgh (United Kingdom); Enyuan Xie, Jonathan D. McKendry, Johannes Herrnsdorf, Erdan Gu, Martin D. Dawson, Univ. of Strathclyde (United Kingdom) . . . . . [9387-25]

9:40 am: **Novel channel models for visible light communications** *(Invited Paper)*, Farshad Miramirkhani, Murat Uysal, Ozyegin Univ. (Turkey); Erdal Panayirci, Kadir Has Üniv. (Turkey) . . . . . [9387-26]

Coffee Break . . . . . Thu 10:10 am to 10:30 am

SESSION 10

LOCATION: ROOM 200 (MEZZANINE) . . . . . THU 10:30 AM TO 12:20 PM

Novel Visible Light Communications Systems and Optical Wireless Applications II

Session Chair: **Steve Hranilovic,** McMaster (Canada)

10:30 am: **Turn on the lights! Leveraging visible light for communications and positioning** *(Invited Paper)*, Steve Hranilovic, McMaster Univ. (Canada) . . . . . [9387-27]

11:00 am: **Visible light communication links using organic semiconductors**, Shuyu Zhang, Univ. of St. Andrews (United Kingdom); Dobroslav Tsonev, Stefan Videv, The Univ. of Edinburgh (United Kingdom); Sanjay Ghosh, Pavlos Manousiadis, Muhammad T. Sajjad, Dimali C. V. Amarasinghe, Guohua Xie, Univ. of St. Andrews (United Kingdom); Sujan Rajbhandari, Hyunchae Chun, Grahame E. Faulkner, Univ. of Oxford (United Kingdom); Clara Orofino-Pena, Diego Cortizo-Lacalle, Alexander L. Kanibolotsky, Peter J. Skabara, Univ. of Strathclyde (United Kingdom); Dominic C. O'Brien, Univ. of Oxford (United Kingdom); Harald Haas, The Univ. of Edinburgh (United Kingdom); Graham A. Turnbull, Ifor D. W. Samuel, Univ. of St. Andrews (United Kingdom) . . . [9387-28]

11:20 am: **Modulation bandwidth enhancement of white-LED-based visible light communications using electrical equalizations**, Do-Hoon Kwon, Se-Hoon Yang, Sang-Kook Han, Yonsei Univ. (Korea, Republic of) . . . [9387-29]

11:40 am: **Differential pulse amplitude modulation for multiple-input single-output OWVLC**, Se-Hoon Yang, Do-Hoon Kwon, Sung-Jin Kim, Yong-Hwan Son, Sang-Kook Han, Yonsei Univ. (Korea, Republic of) . . . . . [9387-30]

12:00 pm: **The performance of space shift keying for free-space optical communications over turbulent channels**, Mohamed R. Abaza, Raed Mesleh, Univ. of Tabuk (Saudi Arabia); Ali Mansour, ENSTA Bretagne (France); El-Had M. Aggoune, Univ. of Tabuk (Saudi Arabia) . . . . . [9387-20]

OPTO

CONFERENCE 9388
LOCATION: ROOM 200 (MEZZANINE) AND ROOM 202 (MEZZANINE)

Tuesday–Thursday 10–12 February 2015 • Proceedings of SPIE Vol. 9388

Optical Metro Networks and Short-Haul Systems VII

Conference Chairs: **Atul K. Srivastava,** NEL America, Inc. (USA); **Benjamin B. Dingel,** Nasfine Photonics, Inc. (USA); **Achyut K. Dutta,** Banpil Photonics, Inc. (USA)

Program Committee: **Youichi Akasaka,** Fujitsu Network Communications Inc. (USA); **Júlio César R. F. de Oliveira,** CpqD (Brazil); **Ivan B. Djordjevic,** The Univ. of Arizona (USA); **Ronald Freund,** Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); **Kiyo Ishii,** National Institute of Advanced Industrial Science and Technology (Japan); **Franko Küppers,** Technische Univ. Darmstadt (Germany); **Bishnu P. Pal,** Indian Institute of Technology Delhi (India); **Takashi Saida,** NTT Photonics Labs. (Japan); **Krishna Swaminathan,** Intel Corp. (USA); **Idelfonso Tafur Monroy,** DTU Fotonik (Denmark); **Toshiki Tanaka,** Fujitsu Labs., Ltd. (Japan); **Jianjun Yu,** ZTE USA (USA)

Tuesday 10 February

SESSION 1

LOCATION: ROOM 200 (MEZZANINE) . . . . . TUE 8:20 AM TO 10:20 AM

Optical Communication Plenary Session

Joint Session with Conferences 9387, 9388, 9389, and 9390

Session Chairs: **Guifang Li,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Benjamin B. Dingel,** Nasfine Photonics, Inc. (USA)

8:20 am: **SDM technologies for flexible networks** *(Invited Paper)*, Dimitra E. Simeonidou, Univ. of Bristol (United Kingdom) . . . . . [9389-1]

8:50 am: **Prospects for millimetre-wave-over-fibre and THz-over-fibre systems** *(Invited Paper)*, Alwyn J. Seeds, Haymen Shams, Martyn J. Fice, Katarzyna Balakier, Lalitha Ponnampalam, Cyril Renaud, Univ. College London (United Kingdom). . . . . [9387-1]

9:20 am: **High-speed silicon photonics links over LX multimode fibers** *(Invited Paper)*, Hai-Feng Liu, Intel Corp. (USA); Scott R. Bickham, Corning Incorporated (USA) . . . . . [9390-1]

9:50 am: **Novel devices for low-power silicon-photonics-based optical links** *(Invited Paper)*, Philippe P. Absil, IMEC (Belgium). . . . . [9390-2]

Coffee Break . . . . . Tue 10:20 am to 10:30 am

SESSION 2

LOCATION: ROOM 200 (MEZZANINE) . . . . . TUE 10:30 AM TO 12:00 PM

Multidimensional Multiplexing Technologies for Advanced Optical Networks

Joint Session with Conferences 9387, 9388, 9389, and 9390

Session Chairs: **Atul K. Srivastava,** NEL America, Inc. (USA); **Guifang Li,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

10:30 am: **MIMO signal processing in mode-division multiplexing systems** *(Invited Paper)*, Sercan O. Arik, Daulet Askarov, Joseph M. Kahn, Stanford Univ. (USA) . . . . . [9388-1]

11:00 am: **Key technologies for energy and spectral efficient flexible optical networks** *(Invited Paper)*, Satoshi Shimizu, National Institute of Information and Communications Technology (Japan); Gabriella Cincotti, Univ. degli Studi di Roma Tre (Italy); Naoya Wada, National Institute of Information and Communications Technology (Japan). . . . . [9389-2]

11:30 am: **Adaptive multidimensional modulation and multiplexing for next-generation optical networks** *(Invited Paper)*, Milorad Cvijetic, College of Optical Sciences, The Univ. of Arizona (USA). . . . . [9388-2]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:00 pm

SESSION 3

LOCATION: ROOM 200 (MEZZANINE) . . . . . TUE 1:00 PM TO 3:30 PM

Workshop on High-Speed Transport in Datacenters

Session Chairs: **Akimasa Kaneko,** NEL America, Inc. (USA); **Atul K. Srivastava,** NEL America, Inc. (USA)

Joint Session with Conferences 9387, 9388, 9389, and 9390

1:00 pm: **Should optical links be parallel or serial?** *(Invited Paper)*, Karen Liu, Kaiam Corp. (USA) . . . . . [9390-3]

1:30 pm: **Optical technologies for >25 Gb/s short-reach high-bandwidth interconnects** *(Invited Paper)*, Mitchell H. Fields, Avago Technologies Ltd. (USA) . . . . . [9390-4]

2:00 pm: **50-Gb/s vertical illumination APD for 400GbE** *(Invited Paper)*, Masahiro Nada, Nippon Telegraph and Telephone Corp. (Japan) . . . . . [9390-5]

2:30 pm: **Recent advances in high-data-rate optical transceivers** *(Invited Paper)*, Julie A. Sheridan Eng, Finisar Corp. (USA). . . . . [9390-6]

3:00 pm: **A global standardization trend for high-speed client and line-side transceivers** *(Invited Paper)*, Hideki Isono, Fujitsu Ltd. (Japan). . . . . [9390-7]

Coffee Break . . . . . Tue 3:30 pm to 3:40 pm

SESSION 4

LOCATION: ROOM 200 (MEZZANINE) . . . . . TUE 3:40 PM TO 5:40 PM

Optical Wireless and Advanced Fiber Technologies for Data Center and Access Network

Joint Session with Conferences 9387, 9388, 9389, and 9390

Session Chairs: **Benjamin B. Dingel,** Nasfine Photonics, Inc. (USA); **Atul K. Srivastava,** NEL America, Inc. (USA)

3:40 pm: **Next-generation optical wireless communications for data centers** *(Invited Paper)*, Shlomi Arnon, Ben-Gurion Univ. of the Negev (Israel) . . . [9387-2]

4:10 pm: **Space division multiplexing in access networks** *(Invited Paper)*, Frank J. Effenberger, FutureWei Technologies, Inc. (USA). . . . . [9387-3]

4:40 pm: **New development in optical fiber for data center applications** *(Invited Paper)*, Yi Sun, Roman shubochkin, Benyuan Zhu, OFS Fitel LLC (USA) . . . . . [9387-4]

5:10 pm: **High-speed bidirectional dual-core fiber transmission system for high-density short-reach optical interconnects** *(Invited Paper)*, Douglas L. Butler, Ying Geng, Shenping Li, Ming-Jun Li, Clifford G. Sutton, Corning Incorporated (USA); Robert McCollum, L-3 Communications (USA); Randy L. McClure, Corning Incorporated (USA); Alexander V. Koklyushkin, Corning Incorporated (Russian Federation); Karen I. Matthews, Corning Incorporated (USA) . . . . . [9390-8]

Wednesday 11 February

SESSION 5

LOCATION: ROOM 202 (MEZZANINE) . . . . . WED 4:00 PM TO 5:50 PM

NOTE ROOM CHANGE

Novel Components for Short-Reach Networks

Session Chairs: **Youichi Akasaka,** Fujitsu Network Communications Inc. (USA); **Jianjun Yu,** ZTE USA (USA)

4:00 pm: **Coherent receiver architectures for secure key distribution using faint optical multilevel signals** *(Invited Paper)*, Sebastian Kleis, Reinhold Herschel, Christian G. Schäffer, Helmut-Schmidt Univ. (Germany) . . . . . [9388-3]

4:30 pm: **Sliceable transponders for metro-access transmission links** *(Invited Paper)*, Christoph Wagner, Peter Madsen, Technical Univ. of Denmark (Denmark); Sandis Spolitis, Riga Technical Univ. (Latvia); Juan Jose J. Vegas Olmos, Idelfonso Tafur Monroy, Technical Univ. of Denmark (Denmark) . [9388-4]

5:00 pm: **Comprehensive photonics-electronics convergent simulation and its application to high-speed electronic circuit integration on a Si/Ge photonic chip** *(Invited Paper)*, Kotaro Takeda, Kentaro Honda, Tsutomu Takeya, Kota Okazaki, Tatsurou Hiraki, Tai Tsuchizawa, Hidetaka Nishi, Rai Kou, Hiroshi Fukuda, Mitsuo Usui, Hideyuki Nosaka, Tsuyoshi Yamamoto, Koji Yamada, Nippon Telegraph and Telephone Corp. (Japan) . . . . . [9388-5]

5:30 pm: **Wavelength-tunable filter utilizing non-cyclic arrayed waveguide grating to create colorless/directionless/contentionless ROADMs**, Masaki Niwa, Shoichi Takashina, Yojiro Mori, Hiroshi Hasegawa, Ken-ichi Sato, Nagoya Univ. (Japan); Toshio Watanabe, NTT Photonics Labs. (Japan) . . . . . [9388-6]

POSTERS-WEDNESDAY

LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Optical-electrical hybrid signal equalizer for ultra-high-speed transmission, Shinya Maruyama, Aoyama Gakuin Univ. (Japan) and National Institute of Information and Communications Technology (Japan); Hideyuki Sotobayashi, Aoyama Gakuin Univ. (Japan); Atsushi Kanno, Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan); Kazunari Tomishige, Aoyama Gakuin Univ. (Japan). . . . . [9388-22]

A novel optical path routing network that combines coarse granularity optical multicast with fine granularity add/drop and block, Mauro M. Soares, Yojiro Mori, Hiroshi Hasegawa, Ken-ichi Sato, Nagoya Univ. (Japan) . . [9388-23]

FPGA implementation of high-performance QC-LDPC decoder for optical communications, Ding Zou, Ivan B. Djordjevic, The Univ. of Arizona (USA) . . . . . [9388-24]

High-performance broadband photodetector and its array for optical communication, Jeremy Bregman, Robert Olah, Achyut K. Dutta, Banpil Photonics, Inc. (USA) . . . . . [9388-25]

RFoG deployment into the next-generation networks, Petr Siska, Tomáš Hlavinka, Petr Koudelka, Jan Latal, Jan Vitasek, Lukas Hajek, Radek Poboril, VŠB-Technical Univ. of Ostrava (Czech Republic) . . . . [9388-26]

Thursday 12 February

SESSION 6

LOCATION: ROOM 202 (MEZZANINE) . . . . . THU 8:00 AM TO 9:50 AM

Advanced Signal Processing Techniques

Session Chair: **Ivan B. Djordjevic,** The Univ. of Arizona (USA)

8:00 am: **All-optical implementation of signal processing functions** *(Invited Paper)*, Amirhossein Mohajerin Ariaei, Morteza Ziyadi, Mohammad R. Chitgarha, Alan E. Willner, The Univ. of Southern California (USA) . . . . . [9388-7]

8:30 am: **Laser characterization with advanced digital signal processing**, Molly Piels, Idelfonso Tafur Monroy, Darko Zibar, DTU Fotonik (Denmark) . . . . . [9388-8]

8:50 am: **Digital signal processing approaches for semiconductor phase noise tolerant coherent transmission systems** *(Invited Paper)*, Miguel Iglesias Olmedo, KTH Royal Institute of Technology (Sweden); Xiaodan Pang, Acreo Swedish ICT AB (Sweden); Richard Schatz, KTH Royal Institute of Technology (Sweden); Darko Zibar, Idelfonso Tafur Monroy, Technical Univ. of Denmark (Denmark); Gunnar Jacobsen, Acreo Swedish ICT AB (Sweden) and KTH Royal Institute of Technology (Sweden); Sergei Popov, KTH Royal Institute of Technology (Sweden) . . . . . [9388-9]

9:20 am: **Advanced digital signal processing for high-speed access networks** *(Invited Paper)*, Anna Tatarczak, Jose Estaran, Miguel Iglesias Olmedo, Jesper B. Jensen, Juan Jose J. Vegas Olmos, Idelfonso Tafur Monroy, DTU Fotonik (Denmark) . . . . . [9388-10]

Coffee Break . . . . . Thu 9:50 am to 10:05 am

SESSION 7

LOCATION: ROOM 202 (MEZZANINE) . . . . . THU 10:05 AM TO 12:45 PM

Advanced and Efficient Transmission and Signal Monitoring Techniques

Session Chairs: **Idelfonso Tafur Monroy,** DTU Fotonik (Denmark); **Julio C. R. F. de Oliveira,** CpqD (Brazil)

10:05 am: **100Gbps transmission with CFP coherent transceiver with power-optimized DSP** *(Invited Paper)*, Hiroshi Onaka, Photonics Electronics Technology Research Association (Japan) . . . . . [9388-11]

10:35 am: **20-Gb/s QPSK transmission over 10 km-long holey fiber using a wavelength tunable quantum dot light source in O band**, Akihiro Murano, Aoyama Gakuin Univ. (Japan) and National Institute of Information and Communications Technology (Japan); Humiya Yagi, Aoyama Gakuin Univ. (Japan); Naokatsu Yamamoto, Atsushi Kanno, National Institute of Information and Communications Technology (Japan); Tetsuya Kawanishi, National Institute of Information and Communications Technology (Japan) and Aoyama Gakuin Univ. (Japan); Hideyuki Sotobayashi, Aoyama Gakuin Univ. (Japan) . . . . . [9388-12]

10:55 am: **Optical performance monitoring for dynamic and flexible photonic networks** *(Invited Paper)*, Shoichiro Oda, Fujitsu Ltd. (Japan); Jeng-Yuan Yang, Youichi Akasaka, Olga Vassilieva, Fujitsu Network Communications Inc. (USA); Tomohiro Yamauchi, Fujitsu Labs., Ltd. (Japan); Yasuhiko Aoki, Fujitsu Ltd. (Japan); Motoyoshi Sekiya, Fujitsu Labs. of America, Inc. (USA); Jens C. Rasmussen, Fujitsu Labs., Ltd. (Japan) . . . . . [9388-13]

11:25 am: **Optimized signal constellations for ultra-high-speed optical transport** *(Invited Paper)*, Shaoliang Zhang, NEC Labs. America, Inc. (USA); Tao Liu, Yequn Zhang, The Univ. of Arizona (USA); Fatih Yaman, NEC Labs. America, Inc. (USA); Ivan B. Djordjevic, The Univ. of Arizona (USA); Ting Wang, NEC Labs. America (USA) . . . . . [9388-14]

11:55 am: **Investigation of fiber dispersion impairment in 400GbE discrete multi-tone system for reach enhancement up to 40 km**, Ryo Okabe, Toshiki Tanaka, Masato Nishihara, Yutaka Kai, Tomoo Takahara, Fujitsu Labs., Ltd. (Japan); Hao Chen, Weizhen Yan, Zhenning Tao, Fujitsu Research and Development Center Co., Ltd. (China); Jens C. Rasmussen, Fujitsu Labs., Ltd. (Japan) . . . . . [9388-15]

12:15 pm: **Realization of real-time 100G 16QAM OFDM signal detection** *(Invited Paper)*, Fan Li, ZTE USA (USA) . . . . . [9388-16]

Lunch/Exhibition Break . . . . . Thu 12:45 pm to 1:45 pm

CONFERENCE 9388
LOCATION: ROOM 202 (MEZZANINE)

SESSION 8
LOCATION: ROOM 202 (MEZZANINE) . . . . . THU 1:45 PM TO 3:25 PM

SDN and Energy Efficient Future Short Reach Networks

Session Chairs: **Takashi Saida,** NTT Photonics Labs. (Japan); **Krishna Swaminathan,** Intel Corp. (USA)

1:45 pm: **Design of a stateless low-latency router architecture for green software-defined networking** *(Invited Paper)*, Silvia Saldaña Cercós, Technical Univ. of Denmark (Denmark); Ramon M. Ramos, Ana C. Ewald Eller, Federal Univ. of Espírito Santo (Brazil); Magnos Martinello, Moisés R. N. Ribeiro, UFES (Brazil); Anna V. Manolova Fagertun, Idelfonso Tafur Monroy, Technical Univ. of Denmark (Denmark). . . . . [9388-17]

2:15 pm: **Energy-Efficient p^m-ary signaling for ultra-high-speed optical transport** *(Invited Paper)*, Ivan B. Djordjevic, Tao Liu, The Univ. of Arizona (USA) . . . . . [9388-18]

2:45 pm: **Toward green next-generation passive optical networks**, Anand Srivastava, Indian Institute of Technology Mandi (India) . . . . . [9388-19]

3:05 pm: **Machine learning techniques in optical fibre communication networks**, Darko Zibar, DTU Fotonik (Denmark); Luis Carvalho, CpqD (Brazil); Molly Piels, DTU Fotonik (Denmark); Julio Diniz, Carolina Francisangelis, Jose Estaran, Neil Guerreiro Gonzalez, Julio C. R. F. de Oliveira, CpqD (Brazil); Idelfonso Tafur Monroy, DTU Fotonik (Denmark) . . . . . [9388-20]

CONFERENCE 9389

LOCATION: ROOM 228 (MEZZANINE) AND ROOM 200 (MEZZANINE)

Tuesday–Thursday 10–12 February 2015 • Proceedings of SPIE Vol. 9389

Next-Generation Optical Communication: Components, Sub-Systems, and Systems IV

Conference Chairs: **Guifang Li,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Xiang Zhou,** Google (USA)

Program Committee: **Yi Cai,** ZTE USA (USA); **Gabriella Cincotti,** Univ. degli Studi di Roma Tre (Italy); **Benjamin B. Dingel,** Nasfine Photonics, Inc. (USA); **John D. Downie,** Corning Incorporated (USA); **Ronald Freund,** Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); **Takahiro Kodama,** Mitsubishi Electric Corp. (Japan); **Shoichiro Matsuo,** Fujikura Ltd. (Japan); **Zhongqi Pan,** Univ. of Louisiana at Lafayette (USA); **Jayanta K. Sahu,** Univ. of Southampton (United Kingdom); **Kunimasa Saitoh,** Hokkaido Univ. (Japan); **Mark Shtaif,** Tel Aviv Univ. (Israel); **Atul K. Srivastava,** NEL America, Inc. (USA); **Junqiang Sun,** Huazhong Univ. of Science and Technology (China), Wuhan National Lab. for Optoelectronics (China); **Fatih Yaman,** NEC Labs. America, Inc. (USA); **Xinliang Zhang,** Wuhan National Lab. for Optoelectronics (China)

Tuesday 10 February

SESSION 1

LOCATION: ROOM 200 (MEZZANINE) . . . . . TUE 8:20 AM TO 10:20 AM

Optical Communication Plenary Session

Joint Session with Conferences 9387, 9388, 9389, and 9390

Session Chairs: **Guifang Li,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); **Benjamin B. Dingel,** Nasfine Photonics, Inc. (USA)

8:20 am: **SDM technologies for flexible networks** *(Invited Paper)*, Dimitra E. Simeonidou, Univ. of Bristol (United Kingdom). . . . . [9389-1]

8:50 am: **Prospects for millimetre-wave-over-fibre and THz-over-fibre systems** *(Invited Paper)*, Alwyn J. Seeds, Haymen Shams, Martyn J. Fice, Katarzyna Balakier, Lalitha Ponnampalam, Cyril Renaud, Univ. College London (United Kingdom). . . . . [9387-1]

9:20 am: **High-speed silicon photonics links over LX multimode fibers** *(Invited Paper)*, Hai-Feng Liu, Intel Corp. (USA); Scott R. Bickham, Corning Incorporated (USA) . . . . . [9390-1]

9:50 am: **Novel devices for low-power silicon-photonics-based optical links** *(Invited Paper)*, Philippe P. Absil, IMEC (Belgium). . . . . [9390-2]

Coffee Break . . . . . Tue 10:20 am to 10:30 am

SESSION 2

LOCATION: ROOM 200 (MEZZANINE) . . . . . TUE 10:30 AM TO 12:00 PM

Multidimensional Multiplexing Technologies for Advanced Optical Networks

Joint Session with Conferences 9387, 9388, 9389, and 9390

Session Chairs: **Atul K. Srivastava,** NEL America, Inc. (USA); **Guifang Li,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

10:30 am: **MIMO signal processing in mode-division multiplexing systems** *(Invited Paper)*, Sercan O. Arik, Daulet Askarov, Joseph M. Kahn, Stanford Univ. (USA) . . . . . [9388-1]

11:00 am: **Key technologies for energy and spectral efficient flexible optical networks** *(Invited Paper)*, Satoshi Shimizu, National Institute of Information and Communications Technology (Japan); Gabriella Cincotti, Univ. degli Studi di Roma Tre (Italy); Naoya Wada, National Institute of Information and Communications Technology (Japan). . . . . [9389-2]

11:30 am: **Adaptive multidimensional modulation and multiplexing for next-generation optical networks** *(Invited Paper)*, Milorad Cvijetic, College of Optical Sciences, The Univ. of Arizona (USA). . . . . [9388-2]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:00 pm

SESSION 3

LOCATION: ROOM 200 (MEZZANINE) . . . . . TUE 1:00 PM TO 3:30 PM

Workshop on High-Speed Transport in Datacenters

Joint Session with Conferences 9387, 9388, 9389, and 9390

Session Chairs: **Akimasa Kaneko,** NEL America, Inc. (USA); **Atul K. Srivastava,** NEL America, Inc. (USA)

1:00 pm: **Should optical links be parallel or serial?** *(Invited Paper)*, Karen Liu, Kaiam Corp. (USA) . . . . . [9390-3]

1:30 pm: **Optical technologies for >25 Gb/s short-reach high-bandwidth interconnects** *(Invited Paper)*, Mitchell H. Fields, Avago Technologies Ltd. (USA) . . . . . [9390-4]

2:00 pm: **50-Gb/s vertical illumination APD for 400GbE** *(Invited Paper)*, Masahiro Nada, Nippon Telegraph and Telephone Corp. (Japan) . . . . . [9390-5]

2:30 pm: **Recent advances in high-data-rate optical transceivers** *(Invited Paper)*, Julie A. Sheridan Eng, Finisar Corp. (USA). . . . . [9390-6]

3:00 pm: **A global standardization trend for high-speed client and line-side transceivers** *(Invited Paper)*, Hideki Isono, Fujitsu Ltd. (Japan). . . . . [9390-7]

Coffee Break . . . . . Tue 3:30 pm to 3:40 pm

SESSION 4

LOCATION: ROOM 200 (MEZZANINE) . . . . . TUE 3:40 PM TO 5:40 PM

Optical Wireless and Advanced Fiber Technologies for Data Center and Access Network

Joint Session with Conferences 9387, 9388, 9389, and 9390

Session Chairs: **Benjamin B. Dingel,** Nasfine Photonics, Inc. (USA); **Atul K. Srivastava,** NEL America, Inc. (USA)

3:40 pm: **Next-generation optical wireless communications for data centers** *(Invited Paper)*, Shlomi Arnon, Ben-Gurion Univ. of the Negev (Israel) . . . [9387-2]

4:10 pm: **Space division multiplexing in access networks** *(Invited Paper)*, Frank J. Effenberger, FutureWei Technologies, Inc. (USA). . . . . [9387-3]

4:40 pm: **New development in optical fiber for data center applications** *(Invited Paper)*, Yi Sun, Roman shubochkin, Benyuan Zhu, OFS Fitel LLC (USA) . . . . . [9387-4]

5:10 pm: **High-speed bidirectional dual-core fiber transmission system for high-density short-reach optical interconnects** *(Invited Paper)*, Douglas L. Butler, Ying Geng, Shenping Li, Ming-Jun Li, Clifford G. Sutton, Corning Incorporated (USA); Robert McCollum, L-3 Communications (USA); Randy L. McClure, Corning Incorporated (USA); Alexander V. Koklyushkin, Corning Incorporated (Russian Federation); Karen I. Matthews, Corning Incorporated (USA) . . . . . [9390-8]

OPTO

CONFERENCE 9389
LOCATION: ROOM 228 (MEZZANINE)

Wednesday 11 February

SESSION 5
LOCATION: ROOM 228 (MEZZANINE) . . . . . WED 8:30 AM TO 10:10 AM

NOTE ROOM CHANGE

SDM Components
Session Chair: **Tsuyoshi Konishi,** Osaka Univ. (Japan)

8:30 am: **Multicore erbium-doped fiber amplifiers** *(Invited Paper)*, Kazi S. Abedin, Thierry F. Taunay, John M. Fini, Lalitkumar Bansal, Man F. Yan, Benyuan Zhu, Eric M. Monberg, David J. DiGiovanni, OFS Labs. (USA) . [9389-3]

9:00 am: **Multicore fiber-based mode multiplexer/demultiplexer** *(Invited Paper)*, Yusuke Sasaki, Hitoshi Uemura, Katsuhiro Takenaga, Fujikura Ltd. (Japan); Takui Uematsu, Shoko Nishimoto, Hokkaido Univ. (Japan); Koji Omichi, Ryuichiro Goto, Shoichiro Matsuo, Fujikura Ltd. (Japan); Kunimasa Saitoh, Hokkaido Univ. (Japan) . . . . . [9389-4]

9:30 am: **Spatial mode rotator based on mechanically-induced twisting and bending in few-mode fibers**, Songnian Fu, Dawei Yu, Ming Tang, Huazhong Univ. of Science and Technology (China); Perry Ping Shum, Nanyang Technological Univ. (Singapore); Deming Liu, Huazhong Univ. of Science and Technology (China) . . . . . [9389-5]

9:50 am: **Integration approaches for space-division multiplexing using parallelism of free space**, Guifang Li, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Jian Zhao, Ningbo Zhao, Tianjin Univ. (China) . . . . . [9389-6]

Coffee Break . . . . . .Wed 10:10 am to 10:40 am

SESSION 6
LOCATION: ROOM 228 (MEZZANINE) . . . . . WED 10:40 AM TO 11:50 AM

Optical Signal Processing
Session Chair: **Xiang Zhou,** Google (USA)

10:40 am: **Photonic analog-to-digital conversion with emphasis on parallel-configuration-free aspect** *(Invited Paper)*, Tsuyoshi Konishi, Makoto Hasegawa, Tomotaka Nagashima, Osaka Univ. (Japan) . . . . . [9389-7]

11:10 am: **The optical capacitor: Processing signals with an extended broad-band mode cavity**, Sébastien Loranger, Mathieu Gagné, Raman Kashyap, Ecole Polytechnique de Montréal (Canada) . . . . . [9389-8]

11:30 am: **Six mode multi-plane light converter for mode-selective space-division multiplexing**, Pu Jian, Guillaume Labroille, Bertrand Denolle, CAILabs (France); Philippe Genevaux, Alcatel-Lucent Bell Labs. (France); Nicolas Barré, Olivier Pinel, Jean-François Morizur, CAILabs (France) . . . . . [9389-9]

Lunch/Exhibition Break . . . . . .Wed 11:50 am to 1:00 pm

SESSION 7
LOCATION: ROOM 228 (MEZZANINE) . . . . . WED 1:00 PM TO 2:10 PM

Enabling Technology for Next-Gen Networks
Session Chair: **Guifang Li,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

1:00 pm: **Roles of spectral and spatial aggregation in optical network scaling** *(Invited Paper)*, Sercan O. Arik, Stanford Univ. (USA); Keang-Po Ho, Silicon Image, Inc. (USA); Joseph M. Kahn, Stanford Univ. (USA) . . . . . [9389-10]

1:30 pm: **Densely-packed NxN wavelength cross-connect switch module**, Hisato Uetsuka, Masao Tachikura, Hitoshi Kawashima, National Institute of Advanced Industrial Science and Technology (Japan); Hiroyuki Tsuda, Keio Univ. (Japan); Kazuhiko Ikeda, AIST (Japan); Keisuke Sorimoto, Keio Univ. (Japan); Keiichi Sasaki, Yuto Yamashita, Kitanihon Electric Cable Corp. (Japan) . . . . . [9389-11]

1:50 pm: **Ultra-stable optical amplifier technologies for dynamic optical switching networks**, Masaki Shiraiwa, National Institute of Information and Communications Technology (Japan); K. S. Tsang, Ray Man, Amonics Ltd. (Hong Kong, China); Benjamin J. Puttnam, Yoshinari Awaji, Naoya Wada, National Institute of Information and Communications Technology (Japan) . . . . . [9389-12]

SESSION 8
LOCATION: ROOM 228 (MEZZANINE) . . . . . WED 2:10 PM TO 3:50 PM

Advanced Components and Coherent Systems
Session Chair: **Kazi S. Abedin,** OFS Fitel LLC (USA)

2:10 pm: **High symbol rate coherent transmission systems for data rates above 400 Gb/s** *(Invited Paper)*, Gregory Raybon, Alcatel-Lucent (USA); Sebastian Randel, Andrew Adamiecki, Alcatel-Lucent Bell Labs. (USA); Peter J. Winzer, Alcatel-Lucent (USA) . . . . . [9389-13]

2:40 pm: **Investigation of receiver contraints on the transmission performance of 1 Tbps WDM-Nyquist and CO-OFDM signals**, Hraghi Abir, Mourad Menif, SUP'COM (Tunisia) . . . . . [9389-14]

3:00 pm: **Advanced unrepeatered systems using novel Raman amplification schemes** *(Invited Paper)*, Do-Il Chang, Wayne Pelouch, Sergey Burtsev, Philippe Perrier, Herve Fevrier, Xtera Communications, Inc. (USA) . . . . [9389-15]

3:30 pm: **Parallel and simultaneous spatial mode conversion using photorefractive crystal for photonic cross-connect**, Yanfeng Zhao, Atsushi Okamoto, Tomohiro Maeda, Yuki Hirasaki, Akihisa Tomita, Hokkaido Univ. (Japan); Masatoshi Bunsen, Fukuoka Univ. (Japan) . . . . . [9389-16]

Coffee Break . . . . . .Wed 3:50 pm to 4:00 pm

SESSION 9
LOCATION: ROOM 228 (MEZZANINE) . . . . . WED 4:00 PM TO 5:40 PM

Advanced Modulation and DSP
Session Chair: **Gregory Raybon,** Alcatel-Lucent (USA)

4:00 pm: **Nonlinear compensation technologies for future optical communication systems** *(Invited Paper)*, Tomofumi Oyama, Fujitsu Labs., Ltd. (Japan); Takeshi Hoshida, Hisao Nakashima, Fujitsu Ltd. (Japan); Shoichiro Oda, Tomohiro Yamauchi, Takahito Tanimura, Fujitsu Labs., Ltd. (Japan); Liang Dou, Ying Zhao, Zhenning Tao, Fujitsu Research and Development Center Co., Ltd. (China); Jens C. Rasmussen, Fujitsu Ltd. (Japan) . . . . . [9389-17]

4:30 pm: **Optical OFDM signal generation using integrated-optic multiplexer based on optical IFFT**, Koichi Takiguchi, Takaaki Miwa, Ritsumeikan Univ. (Japan) . . . . . [9389-18]

4:50 pm: **DSP-based optical modulation technique for long-haul transmission** *(Invited Paper)*, Tsuyoshi Yoshida, Takashi Sugihara, Kenichi Uto, Mitsubishi Electric Corp. (Japan) . . . . . [9389-19]

5:20 pm: **Offset-16QAM-based coherent WDM with multi-carrier group detection**, Songnian Fu, Meng Xiang, Ming Tang, Huazhong Univ. of Science and Technology (China); Perry Ping Shum, Nanyang Technological Univ. (Singapore); Deming Liu, Huazhong Univ. of Science and Technology (China) . . . . . [9389-20]

POSTERS-WEDNESDAY
LOCATION: ROOM 103 (EXHIBIT LEVEL) . . . . . WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at http://spie.org/PWPosterGuidelines.

Photodiodes integration on a suspended ridge structure VOA using 2-step flip-chip bonding method, Seon Hoon Kim, Tae Un Kim, Hyun Chul Ki, Doo-Gun Kim, Hwe Jong Kim, Jung Woon Lim, Dong Yeol Lee, Korea Photonics Technology Institute (Korea, Republic of); Chul Hee Park, Wooriro Optical Telecom Co. Ltd. (Korea, Republic of) . . . . . [9389-28]

Ageing of fiber optical devices, Vladimír Vašinek, Petr Siska, Jan Latal, Petr Koudelka, Lukas Bednarek, Ondrej Marcinka, VŠB-Technical Univ. of Ostrava (Czech Republic) . . . . . [9389-29]

Thursday 12 February

SESSION 10

LOCATION: ROOM 228 (MEZZANINE) . . . . . THU 8:50 AM TO 10:00 AM

SDM Components, Systems, and Networks

Session Chair: **Xiang Zhou,** Google (USA)

8:50 am: **Photonics technologies for orbital angular momentum multiplexing data transmission in short-haul systems** *(Invited Paper)*, Mario A. Usuga Castaneda, Karsten Rottwitt, Idelfonso Tafur Monroy, Technical Univ. of Denmark (Denmark) . . . . . [9389-21]

9:20 am: **Rapid measurement of the fiber's mode transmission matrix**, Robert Brüning, Daniel Flamm, Friedrich-Schiller-Univ. Jena (Germany); Sandile S. Ngcobo, Council for Scientific and Industrial Research (South Africa); Andrew Forbes, CSIR National Laser Ctr. (South Africa); Michael Duparrè, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9389-22]

9:40 am: **Determination of the physical fiber modes**, Robert Brüning, Daniel Flamm, Luise Lukas, Julian Lenz, Michael Duparré, Friedrich-Schiller-Univ. Jena (Germany) . . . . . [9389-24]

Coffee Break . . . . . Thu 10:00 am to 10:30 am

SESSION 11

LOCATION: ROOM 228 (MEZZANINE) . . . . . THU 10:30 AM TO 11:40 AM

Coherent Detection and Access Network

Session Chair: **Tomofumi Oyama,** Fujitsu Labs., Ltd. (Japan)

10:30 am: **Coherent detection in self-homodyne systems with single and multi-core transmission** *(Invited Paper)*, Ruben S. Luis, Benjamin J. Puttnam, Jose M. D. Mendinueta, National Institute of Information and Communications Technology (Japan); Ali Shahpari, Zoran Vujicic, Instituto de Telecomunicacoes (Portugal); Werner Klaus, Jun Sakaguchi, Yoshinari Awaji, National Institute of Information and Communications Technology (Japan); Antonio Teixeira, Instituto de Telecomunicacoes (Portugal); Naoya Wada, Tetsuya Kawanishi, Atsushi Kanno, National Institute of Information and Communications Technology (Japan). . . . . [9389-25]

11:00 am: **Adaptation of AMO-FBMC-OQAM in optical access network for accommodating asynchronous multiple access in OFDM-based uplink transmission**, Sun-Young Jung, Sang-Min Jung, Sang-Kook Han, Yonsei Univ. (Korea, Republic of). . . . . [9389-26]

11:20 am: **Individually-n-addressable GaN-based micro-LED arrays for high-speed visible light communications at over 1 m**, Enyuan Xie, Jonathan D. McKendry, Ricardo Ferreira, Johannes Herrnsdorf, Univ. of Strathclyde (United Kingdom); Sujan Rajbhandari, Hyunchae Chun, Grahame E. Faulkner, Univ. of Oxford (United Kingdom); Erdan Gu, Univ. of Strathclyde (United Kingdom); Dominic C. O'Brien, Univ. of Oxford (United Kingdom); Martin D. Dawson, Univ. of Strathclyde (United Kingdom) . . . . . [9389-27]

CONFERENCE 9390
LOCATION: ROOM 202 (MEZZANINE) AND ROOM 200 (MEZZANINE)

Tuesday–Wednesday 10–11 February 2015 • Proceedings of SPIE Vol. 9390

Next-Generation Optical Networks for Data Centers and Short-Reach Links II

Conference Chair: **Atul K. Srivastava,** NEL America, Inc. (USA)

Program Committee: **Philippe P Absil,** IMEC (Belgium); **Júlio César R. F. de Oliveira,** CpqD (Brazil); **Benjamin B. Dingel,** Nasfine Photonics, Inc. (USA); **Mitchell H. Fields,** Avago Technologies Ltd. (USA); **Harald Haas,** The Univ. of Edinburgh (United Kingdom); **Hideki Isono,** Fujitsu Ltd. (Japan); **Takashi Saida,** NTT Photonics Labs. (Japan); **Ivan Shubin,** Oracle (USA); **Takashi Takemoto,** Hitachi, Ltd. (Japan)

Tuesday 10 February

SESSION 1

LOCATION: ROOM 200 (MEZZANINE) . . . . . TUE 8:20 AM TO 10:20 AM

Optical Communication Plenary Session

Joint Session with Conferences 9387, 9388, 9389, and 9390

Session Chairs: **Guifang Li,** CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA);
Benjamin B. Dingel, Nasfine Photonics, Inc. (USA)

8:20 am: **SDM technologies for flexible networks** *(Invited Paper)*, Dimitra E. Simeonidou, Univ. of Bristol (United Kingdom). . . . . [9389-1]

8:50 am: **Prospects for millimetre-wave-over-fibre and THz-over-fibre systems** *(Invited Paper)*, Alwyn J. Seeds, Haymen Shams, Martyn J. Fice, Katarzyna Balakier, Lalitha Ponnampalam, Cyril Renaud, Univ. College London (United Kingdom). . . . . [9387-1]

9:20 am: **High-speed silicon photonics links over LX multimode fibers** *(Invited Paper)*, Hai-Feng Liu, Intel Corp. (USA); Scott R. Bickham, Corning Incorporated (USA) . . . . . [9390-1]

9:50 am: **Novel devices for low-power silicon-photonics-based optical links** *(Invited Paper)*, Philippe P. Absil, IMEC (Belgium). . . . . [9390-2]

Coffee Break . . . . . Tue 10:20 am to 10:30 am

SESSION 2

LOCATION: ROOM 200 (MEZZANINE) . . . . . TUE 10:30 AM TO 12:00 PM

Multidimensional Multiplexing Technologies for Advanced Optical Networks

Joint Session with Conferences 9387, 9388, 9389, and 9390

Session Chairs: **Atul K. Srivastava,** NEL America, Inc. (USA);
Guifang Li, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA)

10:30 am: **MIMO signal processing in mode-division multiplexing systems** *(Invited Paper)*, Sercan O. Arik, Daulet Askarov, Joseph M. Kahn, Stanford Univ. (USA) . . . . . [9388-1]

11:00 am: **Key technologies for energy and spectral efficient flexible optical networks** *(Invited Paper)*, Satoshi Shimizu, National Institute of Information and Communications Technology (Japan); Gabriella Cincotti, Univ. degli Studi di Roma Tre (Italy); Naoya Wada, National Institute of Information and Communications Technology (Japan). . . . . [9389-2]

11:30 am: **Adaptive multidimensional modulation and multiplexing for next-generation optical networks** *(Invited Paper)*, Milorad Cvijetic, College of Optical Sciences, The Univ. of Arizona (USA). . . . . [9388-2]

Lunch/Exhibition Break . . . . . Tue 12:00 pm to 1:00 pm

SESSION 3

LOCATION: ROOM 200 (MEZZANINE) . . . . . TUE 1:00 PM TO 3:30 PM

Workshop on High-Speed Transport in Datacenters

Joint Session with Conferences 9387, 9388, 9389, and 9390

Session Chairs: **Akimasa Kaneko,** NEL America, Inc. (USA);
Atul K. Srivastava, NEL America, Inc. (USA)

1:00 pm: **Should optical links be parallel or serial?** *(Invited Paper)*, Karen Liu, Kaiam Corp. (USA) . . . . . [9390-3]

1:30 pm: **Optical technologies for >25 Gb/s short-reach high-bandwidth interconnects** *(Invited Paper)*, Mitchell H. Fields, Avago Technologies Ltd. (USA) . . . . . [9390-4]

2:00 pm: **50-Gb/s vertical illumination APD for 400GbE** *(Invited Paper)*, Masahiro Nada, Nippon Telegraph and Telephone Corp. (Japan) . . . . . [9390-5]

2:30 pm: **Recent advances in high-data-rate optical transceivers** *(Invited Paper)*, Julie A. Sheridan Eng, Finisar Corp. (USA). . . . . [9390-6]

3:00 pm: **A global standardization trend for high-speed client and line-side transceivers** *(Invited Paper)*, Hideki Isono, Fujitsu Ltd. (Japan). . . . . [9390-7]

Coffee Break . . . . . Tue 3:30 pm to 3:40 pm

SESSION 4

LOCATION: ROOM 200 (MEZZANINE) . . . . . TUE 3:40 PM TO 5:40 PM

Optical Wireless and Advanced Fiber Technologies for Data Center and Access Network

Joint Session with Conferences 9387, 9388, 9389, and 9390

Session Chairs: **Benjamin B. Dingel,** Nasfine Photonics, Inc. (USA);
Atul K. Srivastava, NEL America, Inc. (USA)

3:40 pm: **Next-generation optical wireless communications for data centers** *(Invited Paper)*, Shlomi Arnon, Ben-Gurion Univ. of the Negev (Israel) . . . [9387-2]

4:10 pm: **Space division multiplexing in access networks** *(Invited Paper)*, Frank J. Effenberger, FutureWei Technologies, Inc. (USA). . . . . [9387-3]

4:40 pm: **New development in optical fiber for data center applications** *(Invited Paper)*, Yi Sun, Roman shubochkin, Benyuan Zhu, OFS Fitel LLC (USA) . . . . . [9387-4]

5:10 pm: **High-speed bidirectional dual-core fiber transmission system for high-density short-reach optical interconnects** *(Invited Paper)*, Douglas L. Butler, Ying Geng, Shenping Li, Ming-Jun Li, Clifford G. Sutton, Corning Incorporated (USA); Robert McCollum, L-3 Communications (USA); Randy L. McClure, Corning Incorporated (USA); Alexander V. Koklyushkin, Corning Incorporated (Russian Federation); Karen I. Matthews, Corning Incorporated (USA) . . . . . [9390-8]

Wednesday 11 February

SESSION 5

LOCATION: ROOM 202 (MEZZANINE) . . . . . WED 8:40 AM TO 10:00 AM

NOTE ROOM CHANGE

Datacenter and Access Networks

Session Chair: **Julio C. R. F. de Oliveira,** CpqD (Brazil)

8:40 am: **Multi-core fiber technology for highly-reliable optical network in access areas** *(Invited Paper)*, Kenichi Tanaka, Yong Lee, Etsuko Nomoto, Hitachi, Ltd. (Japan) . . . . . [9390-9]

9:10 am: **Recent advances in indium phosphide based transceivers for 100G and 200G DWDM transmission** *(Invited Paper)*, Robert Blum, Oclaro, Inc. (USA) . . . . . [9390-10]

9:40 am: **850nm single mode VCSEL-based 25Gx16 transmitter/receiver boards for parallel signal transmission over 600m of multimode fiber**, Joerg–Reinhardt Kropp, George Schaefer, Vitaly A. Shchukin, Nikolay N. Ledentsov, VI Systems GmbH (Germany); Jarek P. Turkiewicz, Warsaw Univ. of Technology (Poland); Bo Wu, Shaofeng Qiu, Yanan Ma, Zhiyong Feng, Huawei Technologies Co., Ltd. (China) . . . . . [9390-11]

Coffee Break . . . . . Wed 10:00 am to 10:30 am

SESSION 6

LOCATION: ROOM 202 (MEZZANINE) . . . . . WED 10:30 AM TO 12:10 PM

Integrated Photonics for Datacenter Networks

Session Chairs: **Yutaka Urino,** Photonics Electronics Technology Research Association (Japan); **Ivan Shubin,** Oracle (USA)

10:30 am: **High-speed integrated photonic devices for telecommunication applications** *(Invited Paper)*, Alexandre P. Freitas, Giovanni B. Farias, Fellipe G. Peternella, Yesica R. R. Bustamante, Julio C. R. F. de Oliveira, CpqD (Brazil) . . . . . [9390-12]

11:00 am: **OAM-enhanced transmission for multimode short-range links**, Anna Tatarczak, Technical Univ. of Denmark (Denmark); Mario A. Usuga Castaneda, Idelfonso Tafur Monroy, DTU Fotonik (Denmark) . . . . . [9390-13]

11:20 am: **Monolithic integration of high-bandwidth waveguide-coupled Ge photodiode in a photonic BiCMOS process** *(Invited Paper)*, Stefan Lischke, Dieter Knoll, Lars Zimmermann, IHP GmbH (Germany) . . . . . [9390-14]

11:50 am: **Function transformable photonic integrated circuits: Alternative approach toward compact monolithic integration for data center applications**, Benjamin B. Dingel, Nasfine Photonics, Inc. (USA) . . . . . [9390-15]

Lunch/Exhibition Break . . . . . Wed 12:10 pm to 1:30 pm

SESSION 7

LOCATION: ROOM 202 (MEZZANINE) . . . . . WED 1:30 PM TO 3:00 PM

Advanced Components in Datacenter Networks

Session Chairs: **Hideki Isono,** Fujitsu Ltd. (Japan); **Takashi Saida,** NTT Photonics Labs. (Japan)

1:30 pm: **Athermal silicon optical interposers operating up to 125 °C** *(Invited Paper)*, Yutaka Urino, Nobuaki Hatori, Kenji Mizutani, Tatsuya Usuki, Junichi Fujikata, Koji Yamada, Photonics Electronics Technology Research Association (Japan); Tsuyoshi Horikawa, National Institute of Advanced Industrial Science and Technology (Japan); Takahiro Nakamura, Photonics Electronics Technology Research Association (Japan); Yasuhiko Arakawa, The Univ. of Tokyo (Japan). . . . . [9390-17]

2:00 pm: **Micron-scale silicon photonics for WDM optical links** *(Invited Paper)*, Dazeng Feng, Mellanox Technologies, Inc. (USA) . . . . . [9390-18]

2:30 pm: **Integrated silicon photonic WDM cross-connect chip** *(Invited Paper)*, Young-Kai Chen, Po Dong, Lawrence L. Buhl, David T. Neilson, Jeffrey H. Sinsky, Alcatel-Lucent Bell Labs. (USA) . . . . . [9390-19]

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GREEN PHOTONICS

SYMPOSIUM CHAIR

Stephen J. Eglash
Stanford Data Science Initiative,
Stanford Univ. (USA)

Contents.

TOPIC AREAS

GREEN PHOTONICS AWARDS

Awards will be presented at the OPTO Plenary SESSION on Monday morning, and the LASE Plenary SESSION on Wednesday morning.

Awards presented at the OPTO Plenary SESSION:
- Renewable Energy Generation: Fusion and Photovoltaics
- Communications

Award presented at the LASE Plenary SESSION:
- Laser-assisted Manufacturing and Micro/Nano Fabrication

Laser-assisted Manufacturing and Micro/Nano Fabrication

(ORDERED BY PRESENTATION DATE AND TIME)

SUNDAY 8 FEBRUARY • 10:50 AM

Conference 9341: Bioinspired, Biointegrated, Bioengineered Photonic Devices III
SESSION 6: Biointegrated Devices

Towards a multi-functional disposable microneedle based probe

PAPER 9341-22

Clement Yuen, Nanyang Technological Univ. (Singapore), et al.

SUNDAY 8 FEBRUARY • 1:50 PM

Conference 9342: Solid State Lasers XXIV: Technology and Devices
SESSION 3: Eye-Safe and Mid-IR Lasers

Multi-wavelength resonant pumping of Er:YAG lasers for energy efficient trace gas detection systems

PAPER 9342-11

Haro Fritsche, Technische Univ. Berlin (Germany), et al.

SUNDAY 8 FEBRUARY • 3:40 PM

Conference 9352: Synthesis and Photonics of Nanoscale Materials XII
SESSION 4: Nanophotonic Designs for PV and Bio-applications

Nanophotonic designs for photovoltaics

PAPER 9352-13

Vivian Ferry, Univ. of Minnesota, Twin Cities (USA), et al.

TUESDAY 10 FEBRUARY • 9:00 AM

Conference 9349: Vertical External Cavity Surface Emitting Lasers (VECSELs) V
SESSION 5: Industry Developments

Latest achievements of NECSEL visible extended cavity surface emitting lasers

PAPER 9349-20

Gregory T. Niven, Necsel (USA), et al.

TUESDAY 10 FEBRUARY • 10:30 AM

Conference 9346: Components and Packaging for Laser Systems
SESSION 3: LD Components and Packaging II

Universal solders for direct bonding and packaging of optical devices

PAPER 9346-8

Sungho Jin, Univ. of California, San Diego (USA), et al.

TUESDAY 10 FEBRUARY • 2:00 PM

Conference 9351: Laser-based Micro- and Nanoprocessing IX
SESSION 3: Laser Micro-Structuring and Processing II

Enhancing vapor generation at a liquid-solid interface using micro/nanoscale surface structures fabricated by femtosecond laser surface processing

PAPER 9351-13

Troy P. Anderson, Univ. of Nebraska-Lincoln (USA), et al.

TUESDAY 10 FEBRUARY • 3:50 PM

Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
SESSION 10: Diffractive Optical Elements II

Finely control groove-depth variations of large-area diffraction gratings

PAPER 9374-36

Lixiang Wu, Univ. of Science and Technology of China (China), et al.

TUESDAY 10 FEBRUARY • 6:00 PM

Conference 9351: Laser-based Micro- and Nanoprocessing IX
SESSION PTue: Posters-Tuesday

Electrochemical and kinetic studies of ultrafast laser structured LiFePO4 electrodes

PAPER 9351-65

Melanie Mangang, Karlsruher Institut für Technologie (Germany), et al.

WEDNESDAY 11 FEBRUARY • 4:40 PM

Conference 9350: Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XX
SESSION 10: Processing of Photovoltaics
Evaluation of electrical shunt resistance in laser scribed thin-films for CIGS solar cells on flexible substrates

PAPER 9350-27

Etgaras Markauskas, Ctr. for Physical Sciences and Technology (Lithuania), et al.

WEDNESDAY 11 FEBRUARY • 6:00 PM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
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Laser-assisted manufacturing of micro-optical volume elements for improving the amount of light absorbed by solar cells in photovoltaic modules

PAPER 9358-46

Gerhard Peharz, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria), et al.

THURSDAY 12 FEBRUARY • 9:20 AM

Conference 9351: Laser-based Micro- and Nanoprocessing IX
SESSION 8: Large Area Micro/Nano Structuring, Laser Interference Patterning
To use or not to use (direct laser interference patterning), that is the question

PAPER 9351-40

Andres F. Lasagni, Fraunhofer IWS Dresden (Germany), et al.

THURSDAY 12 FEBRUARY • 9:40 AM

Conference 9351: Laser-based Micro- and Nanoprocessing IX
SESSION 8: Large Area Micro/Nano Structuring, Laser Interference Patterning
Fabrication of highly efficient transparent metal thin film electrodes using direct laser interference patterning

PAPER 9351-41

Sebastian Eckhardt, Fraunhofer IWS Dresden (Germany), et al.

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Conference 9347: Nonlinear Frequency Generation and Conversion: Materials, Devices, and Applications XIV
SESSION 11: Raman and Brillouin Processes
Enhanced stimulated Brillouin scattering in chalcogenide elliptical photonic crystal fibres

PAPER 9347-43

Imen Abidi, SUP'COM (Tunisia), et al.

THURSDAY 12 FEBRUARY • 2:30 PM

Conference 9351: Laser-based Micro- and Nanoprocessing IX
SESSION 10: Advanced Laser Structuring for Energy Storage and Conversion
Laser-induced breakdown spectroscopy for chemical characterization of laser structured Li(NiMnCo)O2 electrodes for lithium-ion batteries

PAPER 9351-49

Peter Smyrek, Karlsruher Institut für Technologie (Germany), et al.

THURSDAY 12 FEBRUARY • 2:50 PM

Conference 9351: Laser-based Micro- and Nanoprocessing IX
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Surface micro-structuring of intercalation cathode materials for lithium-ion batteries: A study of laser-assisted cone formation

PAPER 9351-50

Wilhelm Pfleging, Karlsruher Institut für Technologie (Germany), et al.

THURSDAY 12 FEBRUARY • 3:10 PM

Conference 9351: Laser-based Micro- and Nanoprocessing IX
SESSION 10: Advanced Laser Structuring for Energy Storage and Conversion
Femtosecond laser patterning of lithium-ion battery separator materials: Impact on liquid electrolyte wetting and cell performance

PAPER 9351-51

Johannes Pröll, Karlsruher Institut für Technologie (Germany), et al.

Renewable Energy Generation: Fusion and Photovoltaics

(ORDERED BY PRESENTATION DATE AND TIME)

MONDAY 9 FEBRUARY • 10:55 AM

Conference 9364: Oxide-based Materials and Devices VI
SESSION 5: Oxide-based Energy Harvester and Solar Cells II
ZnO-based semiconductors with tunable band gap for 3rd-generation solar cells

PAPER 9364-24

Naho Itagaki, Kyushu Univ. (Japan), et al.

MONDAY 9 FEBRUARY • 11:00 AM

Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
SESSION 4: Light Harvesting
Integrating III-V compound semiconductors with silicon for advanced multijunction solar cells

PAPER 9374-17

Gregory N. Nielson, Sandia National Labs. (USA), et al.

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Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
SESSION 1: Plasmonics for Sub-Wavelength Light Trapping
Light-trapping in ultra-thin solar cells: a new paradigm based on multi-resonant absorption

PAPER 9358-1

Stéphane Collin, Lab. de Photonique et de Nanostructures (France), et al.

TUESDAY 10 FEBRUARY • 9:40 AM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
SESSION 1: Plasmonics for Sub-Wavelength Light Trapping
Optimal subwavelength light trapping textures for photovoltaics

PAPER 9358-4

Vidya Ganapati, Univ. of California, Berkeley (USA), et al.

TUESDAY 10 FEBRUARY • 10:30 AM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
SESSION 2: Advanced Light Management for Si Cells
Advanced light trapping approaches in thin-film silicon solar cells

PAPER 9358-5

Arno H. M. Smets, Technische Univ. Delft (Netherlands), et al.

TUESDAY 10 FEBRUARY • 11:00 AM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
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Nanofrustum hexagonal array solar cells for ultrathin crystalline silicon devices

PAPER 9358-6

Yunae Cho, Ewha Womans Univ. (Korea, Republic of), et al.

TUESDAY 10 FEBRUARY • 11:40 AM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
SESSION 2: Advanced Light Management for Si Cells
Angle selective light management in photovoltaics using self assembled anodized aluminum oxide nanopatterns

PAPER 9358-8

Brian Roberts, Univ. of Michigan (USA), et al.

GREEN PHOTONICS PAPERS

TUESDAY 10 FEBRUARY • 2:00 PM

Conference 9371: Photonic and Phononic Properties of Engineered Nanostructures V
SESSION 6: Plasmonic Metamaterials
High temperature applications enabled by refractory plasmonic materials

PAPER 9371-25

Urcan Guler, Nano-Meta Technologies, Inc. (USA), et al.

TUESDAY 10 FEBRUARY • 2:30 PM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
SESSION 3: Advanced Light Management for III-V and Multi-Junction Cells
Light management of quantum wells in thin GaAs solar cells with coherent back reflection

PAPER 9358-11

Wei Wang, Univ. of Houston (USA), et al.

TUESDAY 10 FEBRUARY • 3:45 PM

Conference 9363: Gallium Nitride Materials and Devices X
SESSION 7: Nanostructures and Devices II
Prospects and problems for III-N solar cells: theoretical and experimental

PAPER 9363-30

Akihiko Yoshikawa, Chiba Univ. (Japan), et al.

WEDNESDAY 11 FEBRUARY • 11:00 AM

Conference 9372: High Contrast Metastructures IV
SESSION 2: VCSELs
High-speed high-contrast grating VCSELs

PAPER 9372-4

Werner H. Hofmann, Technische Univ. Berlin (Germany), et al.

WEDNESDAY 11 FEBRUARY • 11:00 AM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
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Optoelectronic characterization of polycrystalline solar cells using time-resolved biased luminescence techniques

PAPER 9358-21

Gilbert El Hajje, Electricité de France (France), et al.

WEDNESDAY 11 FEBRUARY • 1:30 PM

Conference 9370: Quantum Sensing and Nanophotonic Devices XII
SESSION 19: Interband Cascade Lasers
Interband cascade lasers with high CW power and brightness

PAPER 9370-69

Mijin Kim, Sotera Defense Solutions, Inc. (USA), et al.

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Conference 9357: Physics and Simulation of Optoelectronic Devices XXIII
SESSION 10: Solar Cell Simulation: Joint Session with Conferences 9357 and 9358
Surface photo-voltage properties near grain boundaries in Cu2ZnSn(S,Se)4 thin-films solar cells

PAPER 9357-40

Gee Yeong Kim, Ewha Womans Univ. (Korea, Republic of), et al.

WEDNESDAY 11 FEBRUARY • 3:40 PM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
SESSION 8: Hybrid and Nanowire Materials for Solar Energy Conversion
Improved photovoltaic performance of hybrid organic/silicon-nanowire heterojunction solar cells via interface engineering

PAPER 9358-26

Yi-Chun Lai, National Chiao Tung Univ. (Taiwan), et al.

WEDNESDAY 11 FEBRUARY • 4:20 PM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
SESSION 8: Hybrid and Nanowire Materials for Solar Energy Conversion
Simulation of exciton diffusion in carbon nanotube-based photovoltaics

PAPER 9358-28

Amirhossein Davoody, Univ. of Wisconsin-Madison (USA), et al.

WEDNESDAY 11 FEBRUARY • 4:40 PM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
SESSION 8: Hybrid and Nanowire Materials for Solar Energy Conversion
High-efficiency photoelectrochemical water splitting using InGaN/GaN nanowires grown directly on Si

PAPER 9358-29

Bandar M. Alotaibi, McGill Univ. (Canada), et al.

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Conference 9364: Oxide-based Materials and Devices VI
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PAPER 9364-64

Dipal B. Patel, Pandit Deendayal Petroleum Univ. (India), et al.

WEDNESDAY 11 FEBRUARY • 6:00 PM

Conference 9360: Organic Photonic Materials and Devices XVII
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PAPER 9360-46

Y. N. Sudhakar, Manipal Institute of Technology (India), et al.

WEDNESDAY 11 FEBRUARY • 6:00 PM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
SESSION PWed: Posters-Wednesday
Density-controlled ZnO/TiO2 nanocomposite photoanode for improving dye-sensitized solar cells performance

PAPER 9358-44

Jimmy Yao, The Pennsylvania State Univ. (USA), et al.

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Conference 9360: Organic Photonic Materials and Devices XVII
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Charge separation in OPV bulk heterojunctions

PAPER 9360-43

Andrew B. Matheson, Univ. of St. Andrews (United Kingdom), et al.

THURSDAY 12 FEBRUARY • 8:40 AM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
SESSION 9: Advanced Photovoltaic Concepts: IBSC
Extreme broadband photocurrent spectroscopy on InAs quantum dot solar cells

PAPER 9358-30

Ryo Tamaki, The Univ. of Tokyo (Japan), et al.

THURSDAY 12 FEBRUARY • 9:40 AM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
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Investigation of carrier collection and open-circuit voltage of multi-quantum well solar cells by luminescence

PAPER 9358-33

Amaury Delamarre, The Univ. of Tokyo (Japan), et al.

THURSDAY 12 FEBRUARY • 10:30 AM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
SESSION 10: Advanced Photovoltaic Concepts: Hot Carriers

Hot carriers at elevated temperatures in InAs/AlAsSb quantum wells: an interesting system for practical hot-carrier solar cells

PAPER 9358-34

Jinfeng Tang, The Univ. of Oklahoma (USA), et al.

THURSDAY 12 FEBRUARY • 11:00 AM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
SESSION 10: Advanced Photovoltaic Concepts: Hot Carriers

A metallic hot carrier photovoltaic cell

PAPER 9358-35

James A. R. Dimmock, Sharp Labs. of Europe Ltd. (United Kingdom), et al.

THURSDAY 12 FEBRUARY • 11:20 AM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
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Below band edge light recovery with plasmonics

PAPER 9358-36

Scott K. Cushing, West Virginia Univ. (USA), et al.

THURSDAY 12 FEBRUARY • 11:40 AM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
SESSION 10: Advanced Photovoltaic Concepts: Hot Carriers

Molecular-plasmonics and hot electrons: merging photovoltaics and thermoelectrics

PAPER 9358-37

Ahmet A. Yanik, Univ. of California, Santa Cruz (USA), et al.

THURSDAY 12 FEBRUARY • 2:00 PM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
SESSION 11: Advanced Photovoltaic Concepts: Photon Conversion and Spectral Shaping

Radiative cooling for solar cells

PAPER 9358-39

Linxiao Zhu, Stanford Univ. (USA), et al.

THURSDAY 12 FEBRUARY • 2:40 PM

Conference 9358: Physics, Simulation, and Photonic Engineering of Photovoltaic Devices IV
SESSION 11: Advanced Photovoltaic Concepts: Photon Conversion and Spectral Shaping

GaSb thermophotovoltaics: current challenges and solutions

PAPER 9358-41

Nassim Rahimi, Virginia Polytechnic Institute and State Univ. (USA), et al.

THURSDAY 12 FEBRUARY • 3:15 PM

Conference 9372: High Contrast Metastructures IV
SESSION 7: Reflectors and Resonators

Photonic crystal membranes for the coherent control of thermal radiation: application to narrow-band and directive sources

PAPER 9372-30

Cedric Blanchard, Ecole Centrale de Lyon (France), et al.

Solid State Lighting and Displays

(ORDERED BY PRESENTATION DATE AND TIME)

TUESDAY 10 FEBRUARY • 11:50 AM

Conference 9357: Physics and Simulation of Optoelectronic Devices XXIII
SESSION 5: Plasmonics

Effects of surface plasmon localization and grating shape on the light emission enhancement in quantum-well emitters

PAPER 9357-20

Toufik Sadi, Aalto Univ. (Finland), et al.

TUESDAY 10 FEBRUARY • 2:20 PM

Conference 9383: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XIX
SESSION 1: LED Applications and Solid-State Lighting I

Application of airy beams to bending functions of automotive headlights

PAPER 9383-3

Ceren Altingöz, Magneti Marelli Mako Elektrik Sanayi Ticaret A.S (Turkey), et al.

WEDNESDAY 11 FEBRUARY • 3:00 PM

Conference 9383: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XIX
SESSION 5: LED Applications and Solid-State Lighting II

Large area lighting applications with organic dye embedded flexible film

PAPER 9383-22

Huang Yu Lin, National Chiao Tung Univ. (Taiwan), et al.

WEDNESDAY 11 FEBRUARY • 6:00 PM

Conference 9363: Gallium Nitride Materials and Devices X
SESSION PWed: Posters-Wednesday

Nonradiative recombination mechanisms in InGaN/GaN light-emitting diodes analyzed by various device characterization techniques

PAPER 9363-89

Dong-Soo Shin, Hanyang Univ. (Korea, Republic of), et al.

WEDNESDAY 11 FEBRUARY • 6:00 PM

Conference 9363: Gallium Nitride Materials and Devices X
SESSION PWed: Posters-Wednesday

Formation of reflective Ag ohmic contacts to semipolar GaN for high-power GaN-based light-emitting diodes

PAPER 9363-99

Jae-Seong Park, Korea Univ. (Korea, Republic of), et al.

WEDNESDAY 11 FEBRUARY • 6:00 PM

Conference 9384: Emerging Liquid Crystal Technologies X
SESSION PWed: Posters-Wednesday

Green display: In-plane switching cholesteric liquid crystal devices with long-lived metastable display mode

PAPER 9384-26

Guan-Jhong Lin, National Taiwan Univ. (Taiwan), et al.

WEDNESDAY 11 FEBRUARY • 6:00 PM

Conference 9384: Emerging Liquid Crystal Technologies X
SESSION PWed: Posters-Wednesday

Effect of surface polymer networks on electrical and optical characteristics of vertically aligned liquid crystal displays

PAPER 9384-43

Guan-Jhong Lin, National Taiwan Univ. (Taiwan), et al.

THURSDAY 12 FEBRUARY • 9:30 AM

Conference 9363: Gallium Nitride Materials and Devices X
SESSION 12: LEDs I

UVC LEDs on bulk aluminum nitride

PAPER 9363-58

Leo J. Schowalter, Crystal IS, Inc. (USA), et al.

THURSDAY 12 FEBRUARY • 11:45 AM

Conference 9363: Gallium Nitride Materials and Devices X
SESSION 13: LEDs II

Hot carrier transport and efficiency droop in III-N LEDs

PAPER 9363-63

Pyry Kivisaari, Aalto Univ. School of Science and Technology (Finland), et al.

THURSDAY 12 FEBRUARY • 1:30 PM

Conference 9383: Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XIX
SESSION 9: Nanomaterials and Nanostructures for LEDs II

3D NanoLEDs: status and prospectives

PAPER 9383-38

Andreas Waag, Technische Univ. Braunschweig (Germany), et al.

THURSDAY 12 FEBRUARY • 5:00 PM

Conference 9363: Gallium Nitride Materials and Devices X
SESSION 15: LEDs IV

Enhancement of internal quantum efficiency in InGaN-based light-emitting diodes by additional growth of the p-ZnO layer

PAPER 9363-74

Jong-In Shim, Hanyang Univ. (Korea, Republic of), et al.

Communications

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MONDAY 9 FEBRUARY • 11:40 AM

Conference 9359: Optical Components and Materials XII
SESSION 1: Optical Nonlinearity Based Devices

Ultra-long fiber Raman lasers: design considerations

PAPER 9359-4

Igor Koltchanov, VPIphotonics GmbH (Germany), et al.

MONDAY 9 FEBRUARY • 1:30 PM

Conference 9382: Novel In-Plane Semiconductor Lasers XIV
SESSION 1: Comms: Materials to Devices

GaAsBi lasers: Progress towards telecoms wavelengths

PAPER 9382-1

Stephen J. Sweeney, Univ. of Surrey (United Kingdom), et al.

TUESDAY 10 FEBRUARY • 11:00 AM

Conference 9368: Optical Interconnects XV
SESSION 5: Optical Interconnect Devices and Modulators

Broadband energy-efficient optical modulation by hybrid integration of silicon nanophotonics and organic electro-optic polymer

PAPER 9368-20

Xingyu Zhang, The Univ. of Texas at Austin (USA), et al.

TUESDAY 10 FEBRUARY • 4:00 PM

Conference 9368: Optical Interconnects XV
SESSION 7: Optical Interconnect Systems

Towards energy-efficient photonic interconnects

PAPER 9368-29

Yigit Demir, Northwestern Univ. (USA), et al.

TUESDAY 10 FEBRUARY • 5:00 PM

Conference 9368: Optical Interconnects XV
SESSION 7: Optical Interconnect Systems

International standardisation of optical circuit board measurement and fabrication procedures

PAPER 9368-32

Richard C. Pitwon, Seagate Technology LLC (United Kingdom), et al.

WEDNESDAY 11 FEBRUARY • 9:30 AM

Conference 9363: Gallium Nitride Materials and Devices X
SESSION 8: Electron Devices I

GaN power switches based on cascode configuration

PAPER 9363-38

Yifeng Wu, Transphorm, Inc. (USA), et al.

WEDNESDAY 11 FEBRUARY • 2:20 PM

Conference 9387: Broadband Access Communication Technologies IX
SESSION 7: Advanced Optical Access Technologies

Visible CWDM system design for Multi-Gbit/s transmission over SI-POF

PAPER 9387-15

Carmen Vázquez García, Univ. Carlos III de Madrid (Spain), et al.

WEDNESDAY 11 FEBRUARY • 2:30 PM

Conference 9367: Silicon Photonics X
SESSION 9: Waveguide-based Devices III

Silicon photonics athermal Mach-Zehnder interferometer with wide thermal and spectral operating range

PAPER 9367-45

Jaime Viegas, Masdar Institute of Science & Technology (United Arab Emirates), et al.

WEDNESDAY 11 FEBRUARY • 4:20 PM

Conference 9387: Broadband Access Communication Technologies IX
SESSION 8: Special SESSION on Resilient and Green Wireless Access Networks for Future Mobile

Hybrid optical fiber-wireless sensor and communication networks for environmental monitoring and disaster prevention

PAPER 9387-22

Ferney O. Amaya Fernández, Univ. Pontificia Bolivariana (Colombia), et al.

WEDNESDAY 11 FEBRUARY • 4:40 PM

Conference 9387: Broadband Access Communication Technologies IX
SESSION 8: Special SESSION on Resilient and Green Wireless Access Networks for Future Mobile

An approach to resilient wireless communication systems research for massive disasters

PAPER 9387-19

Kiyoshi Hamaguchi, National Institute of Information and Communications Technology (Japan), et al.

WEDNESDAY 11 FEBRUARY • 5:20 PM

Conference 9381: Vertical-Cavity Surface-Emitting Lasers XIX
SESSION 4: Digital VCSEL Modulation

Extraction and analysis of high-frequency response and impedance of 980-nm VCSELs as a function of temperature and oxide aperture diameter

PAPER 9381-16

Philip Wolf, Technische Univ. Berlin (Germany), et al.

THURSDAY 12 FEBRUARY • 8:30 AM

Conference 9380: Laser Refrigeration of Solids VIII
SESSION 3: Laser Cooling in Semiconductors

Multi-phonon-assisted absorption and emission in semiconductors and its potential for laser refrigeration

PAPER 9380-11

Jacob B. Khurgin, Johns Hopkins Univ. (USA), et al.

THURSDAY 12 FEBRUARY • 1:30 PM

Conference 9381: Vertical-Cavity Surface-Emitting Lasers XIX
SESSION 7: Engineering VCSEL Optical Properties

Maximizing temperature insensitivity and energy-efficiency of 25-50 Gb/s 980-nm VCSELs via small oxide-aperture diameters and photon lifetime tuning

PAPER 9381-28

Philip Moser, Technische Univ. Berlin (Germany), et al.

THURSDAY 12 FEBRUARY • 1:45 PM

Conference 9388: Optical Metro Networks and Short-Haul Systems VII
SESSION 8: SDN and Energy Efficient Future Short Reach Networks

Design of a stateless low-latency router architecture for green software-defined networking

PAPER 9388-17

Silvia Saldaña Cercós, Technical Univ. of Denmark (Denmark), et al.

THURSDAY 12 FEBRUARY • 4:40 PM

Conference 9366: Smart Photonic and Optoelectronic Integrated Circuits XVII
SESSION 9: Photonic Logic Devices

Topological spin-polarized states in photonic metacrystals waveguide

PAPER 9366-24

Jian-Wen Dong, Sun Yat-Sen Univ. (China), et al.

SPIE. PHOTONICS WEST 3D PRINTING

SPIE APPLICATIONS OF 3D PRINTING 2015 HIGHLIGHTS PAPERS FROM BIOS, LASE, AND OPTO THAT SHOWCASE INNOVATIVE WAYS TO APPLY THIS MULTIDIMENSIONAL/ MULTIDISCIPLINARY TECHNOLOGY.

SYMPOSIUM CHAIR

Henry Helvajian
The Aerospace Corp. (USA)

Contents.

TOPIC AREAS

Additive manufacturing

Selective laser melting, laser sintering, laser photopolymerization

Novel materials, protean materials, and laser interactions

Software that increases efficiencies and speed

In-situ sensors or probes to verify and quantify additive manufacturing processes in real time

Conformal photonics/electronics

3D Printing

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Conference 9314: Optics and Biophotonics in Low-Resource Settings
SESSION 1: Mobile-Phone Enabled Cost-Effective Imaging, Sensing and Diagnostics Technologies
Mobile polarized imaging platform towards point-of-care malaria diagnostics

PAPER 9314-2

Casey W. Pirnstill, Texas A&M Univ. (USA), et al.

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Conference 9314: Optics and Biophotonics in Low-Resource Settings
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PAPER 9314-3

Guoan Zheng, Univ. of Connecticut (USA), et al.

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3D printing of tissue-simulating phantoms for standardized biomedical optical imaging

PAPER 9325-7

Ronald X. Xu, The Ohio State Univ. (USA), et al.

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Conference 9325: Design and Performance Validation of Phantoms Used in Conjunction with Optical Measurement of Tissue VII
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3D printed biomimetic vascular phantoms for assessment of hyperspectral imaging and diffuse reflectance systems

PAPER 9325-8

Jianting Wang, Univ. of Maryland, College Park (USA), et al.

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Conference 9325: Design and Performance Validation of Phantoms Used in Conjunction with Optical Measurement of Tissue VII
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PAPER 9325-9

Audrey K. Ellerbee, Stanford Univ. (USA), et al.

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Conference 9341: Bioinspired, Biointegrated, Bioengineered Photonic Devices III
SESSION 3: Wearable Photonic Devices
Optical design and modelling of tissue for application as wearable optoelectronic sensors

PAPER 9341-8

Olena Kulyk, Univ. of St. Andrews (United Kingdom), et al.

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Conference 9314: Optics and Biophotonics in Low-Resource Settings
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Smartphone based spatiotemporal mapping of mercury(II) ions using a colorimetric gold nanoparticle assay

PAPER 9314-18

Qingshan Wei, Univ. of California, Los Angeles (USA), et al.

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Conference 9386: Practical Holography XXIX: Materials and Applications
SESSION 1: Materials and Processes
Everything you need to know about resin interactions with PDMS as a window material and some new window materials for SLA 3D printers

PAPER 9386-3

Michael C. Cole, Univ. of Colorado at Boulder (USA), et al.

SUNDAY 8 FEBRUARY • 10:30 AM

Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
SESSION 1: 3D Direct Laser Writing I
Fabricating microscopic tools: Towards optically actuated micro-robotics

PAPER 9374-1

David B. Phillips, Univ. of Glasgow (United Kingdom), et al.

SUNDAY 8 FEBRUARY • 11:00 AM

Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
SESSION 1: 3D Direct Laser Writing I
Fabrication and characterization of micro-structures created by direct laser writing in multi-layered chalcogenide glasses
PAPER 9374-2
Casey M. Schwarz, Univ. of Central Florida (USA), et al.

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Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
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Hybrid type-I/II waveguide embedded Bragg gratings in lithium niobate by direct femtosecond laser writing
PAPER 9374-3
Sebastian Kroesen, Westfälische Wilhelms-Univ. Münster (Germany), et al.

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Conference 9386: Practical Holography XXIX: Materials and Applications
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PAPER 9386-8
Jian-Wen Dong, Sun Yat-Sen Univ. (China), et al.

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Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
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PAPER 9374-4
Guangya Zhou, National Univ. of Singapore (Singapore), et al.

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Recent progress on triple-helix gold-based metamaterials
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Johannes Kaschke, Karlsruher Institut für Technologie (Germany), et al.

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Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
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PAPER 9374-6
Negar Otrooshi, Univ. of Central Florida (USA), et al.

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Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
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PAPER 9374-7
Vygantas Mizeikis, Shizuoka Univ. (Japan), et al.

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Time within time: 3D printed sculptures within holographic art practice
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Yin-Ren Chang, De Montfort Univ. (United Kingdom), et al.

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PAPER 9352-11
Maria Farsari, Foundation for Research and Technology-Hellas (Greece), et al.

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Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
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PAPER 9374-8
Marie Vangheluwe, Univ. Laval (Canada), et al.

SUNDAY 8 FEBRUARY • 2:50 PM

Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
SESSION 2: 3D Direct Laser Writing II
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PAPER 9374-9
Liang Yuan, Univ. of Toronto (Canada), et al.

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Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
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Volumetric integration of photorefractive micromodifications in lithium niobate using femtosecond direct laser write technique
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Conference 9314: Optics and Biophotonics in Low-Resource Settings
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Field portable fluorescence microscopy for detection of Giardia lamblia cysts in water samples
PAPER 9314-28
Hatice Ceylan Koydemir, Univ. of California, Los Angeles (USA), et al.

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Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
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Harald Giessen, Univ. Stuttgart (Germany), et al.

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Judith K. Hohmann, Research Ctr. OPTIMAS, Technische Univ. Kaiserslautern (Germany), et al.

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Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
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3D PRINTING PAPERS

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Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
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PAPER 9374-13

Jaime Viegas, Masdar Institute of Science & Technology (United Arab Emirates), et al.

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Conference 9342: Solid State Lasers XXIV: Technology and Devices
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Monolithic solid state lasers for spaceflight

PAPER 9342-19

Michael A. Krainak, NASA Goddard Space Flight Ctr. (USA), et al.

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Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
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PAPER 9374-14

Norbert Schneider, Karlsruher Institut für Technologie (Germany), et al.

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Craig Brideau, Univ. of Calgary (Canada), et al.

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Conference 9329: Multiphoton Microscopy in the Biomedical Sciences XV
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PAPER 9329-86

Xueqin Chen, Institut Fresnel (France), et al.

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Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
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Optochemically organized light filaments: From wide-eyed polymer lattices to encoded beams

PAPER 9374-15

Kalaichelvi Saravanamuttu, McMaster Univ. (Canada), et al.

MONDAY 9 FEBRUARY • 9:20 AM

Conference 9352: Synthesis and Photonics of Nanoscale Materials XII
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Growth of nanostructures and mesoscale architectures by pulsed laser synthesis, deposition, and integration of ultrasmall nanoparticle "building blocks"

PAPER 9352-20

David B. Geohegan, Oak Ridge National Lab. (USA), et al.

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Conference 9368: Optical Interconnects XV
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Multimode/single-mode polymer optical waveguide circuit for high-bandwidth-density on-board interconnects

PAPER 9368-1

Takaaki Ishigure, Keio Univ. (Japan), et al.

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Conference 9313: Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII
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Development and verification of a novel device for dental intra-oral 3D scanning using chromatic confocal technology
PAPER 9313-29

Michael Zint, ILM, Univ. Ulm (Germany), et al.

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Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
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PAPER 9374-22

Eric G. Johnson, Clemson Univ. (USA), et al.

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Conference 9350: Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XX
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3D micro-printing of optical temperature probes

PAPER 9350-9

Andreas Wickberg, Karlsruher Institut für Technologie (Germany), et al.

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Conference 9355: Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications XV
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Increasing performance of mobile devices: fs laser assisted high quality photonic devices in display glass screens

PAPER 9355-32

Jerome Lapointe, Ecole Polytechnique de Montréal (Canada), et al.

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Conference 9371: Photonic and Phononic Properties of Engineered Nanostructures V
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Strategies for optical integration of single-photon sources

PAPER 9371-11

Oliver Benson, Humboldt-Univ. zu Berlin (Germany), et al.

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Conference 9355: Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications XV
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Catheter shape sensing with 3D fiber-cladding photonics based on femtosecond laser direct-written Bragg grating waveguides

PAPER 9355-34

Kenneth K. C. Lee, Univ. of Toronto (Canada), et al.

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PAPER 9375-2

Sung-Pyo Yang, KAIST (Korea, Republic of), et al.

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Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
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Scalable and 3D nanofabrication toward optical metamaterials and plasmonic nanostructures

PAPER 9374-27

Junsuk Rho, Pohang Univ. of Science and Technology (Korea, Republic of), et al.

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Conference 9364: Oxide-based Materials and Devices VI
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Guiding properties of zinc oxide-on-silica nanowire array

PAPER 9364-35

Igor V. Melnikov, National Research Univ. of Electronic Technology (Russian Federation), et al.

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Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
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Fabrication of two-dimensional aperiodic Vogel spiral photonic lattices by optical induction

PAPER 9374-28

Falko Diebel, Westfälische Wilhelms-Univ. Münster (Germany), et al.

MONDAY 9 FEBRUARY • 5:30 PM

Conference 9364: Oxide-based Materials and Devices VI
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Mechanisms of direct laser writing on a tailored silver-containing zinc phosphate glass: dual-color laser writing, UV post-illumination thermal influence, and sub-diffraction structures

PAPER 9364-36

Yannick G. Petit, Institut de Chimie de la Matière Condensée de Bordeaux (France), et al.

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Conference 9374: Advanced Fabrication Technologies for Micro/Nano Optics and Photonics VIII
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3D optical printing of piezoelectric nanoparticle-polymer composites

PAPER 9374-29

Donald J. Sirbuly, Univ. of California, San Diego (USA), et al.

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Large area maskless photopolymerization (LAMP): Disruptive technology for additive manufacturing using scanning spatial light modulators

PAPER 9376-3

Marvin Kilgo, DDM Systems (USA), et al.

TUESDAY 10 FEBRUARY • 9:20 AM

Conference 9355: Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications XV
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Patrick S. Salter, Univ. of Oxford (United Kingdom), et al.

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Badia Koudsi, Optecks, LLC (USA), et al.

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Alfred Jacobsen, Visitech AS (Germany), et al.

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Koji Sugioka, RIKEN (Japan), et al.

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Matthew S. Muller, Swept Image Inc. (Canada), et al.

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Conference 9376: Emerging Digital Micromirror Device Based Systems and Applications VII
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Characteristics of digital micromirror projection for 3D shape measurement at extreme speed

PAPER 9376-8

Roland Höfling, ViALUX GmbH (Germany), et al.

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High-resolution printing of functional microdots by double-pulse laser-induced forward transfer

PAPER 9350-17

Aiko Narazaki, National Institute of Advanced Industrial Science and Technology (Japan), et al.

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Miguel Morales, Univ. Politécnica de Madrid (Spain), et al.

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GENERAL INFORMATION

REGISTRATION

Onsite Registration and Badge Pick-Up Hours
Moscone Convention Center, North Lobby

Saturday 7 February . . . . . 7:00 am to 5:00 pm
Sunday 8 February . . . . . 7:15 am to 5:00 pm
Monday 9 February . . . . . 7:15 am to 5:00 pm
Tuesday 10 February . . . . . 7:30 am to 5:00 pm
Wednesday 11 February . . . . . 7:30 am to 5:00 pm
Thursday 12 February . . . . . 7:30 am to 4:00 pm

CONFERENCE REGISTRATION

Includes admission to all conference sessions, plenaries, panels, poster sessions, admission to the both BiOS EXPO and Photonics West Exhibition, Welcome Reception, technical and networking events, coffee breaks, and a choice of proceedings. Student pricing does not include proceedings.

COURSE AND WORKSHOP REGISTRATION

Courses and workshops are priced separately. Course-only registration includes your selected course(s), course notes, coffee breaks, and admittance to the exhibition. Course prices include applicable taxes. Onsite, please go to Course Materials Pickup after you pick up your badge.

Multiple facilities may be used for courses; allow yourself enough time to register, pick up your materials and possibly walk to a nearby facility before your course begins.

EXHIBITION REGISTRATION

Exhibition-Only visitor registration is complimentary.

SPIE MEMBER, SPIE STUDENT MEMBER, AND STUDENT PRICING

- SPIE Members receive conference and course registration discounts. Discounts are applied at the time of registration.
- SPIE Student Members receive a 50% discount on all courses.
- Student registration rates are available only to undergraduate and graduate students who are enrolled full time and have not yet received their Ph.D. Post-docs may not register as students. A student ID number or proof of student status is required with your registration.

PRESS REGISTRATION

For credentialed press and media representatives only. Please email contact information, title, and organization to media@spie.org.

SPIE Cashier

Location: North Lobby
Open during registration hours

REGISTRATION PAYMENTS

If you are paying by cash or check as part of your onsite registration, wish to add a course, workshop, or special event requiring payment, or have questions regarding your registration, visit the SPIE Cashier.

RECEIPTS AND CERTIFICATE OF ATTENDANCE

Preregistered attendees who did not receive a receipt may obtain one at Badge Corrections and Receipts next to SPIE Cashier. Attendees who need a Certificate of Attendance may obtain those from the SPIE Cashier.

BADGE CORRECTIONS

Badge corrections can be made at the Badge Corrections station. Please have your badge removed from the badge holder and marked with your changes before approaching the counter.

REFUND INFORMATION

There is a $50 USD service charge for processing refunds. Requests for refunds must be received by 29 January 2015; all registration fees, will be forfeited after this date. Membership dues, SPIE Digital Library subscriptions or Special Events purchased are not refundable.

U.S. GOVERNMENT CREDIT CARDS

U.S. Government credit card users: have your purchasing officer contact the credit card company and get prior authorization before attempting to register. Advise your purchasing agent that SPIE is considered a 5968 company for authorization purposes.

ONSITE SERVICES

Internet Access

Locations: D Entrance (Exhibition Level)
Esplanade Lobby (Esplanade Level)

Complimentary wired internet access is available; attendees can hook up their laptops or use provided workstations.

Wireless

Locations: North Lower Lobby (Exhibition Level)
South Lobby

Complimentary wireless access is also available; instructions will be posted onsite.

SPIE Conference App

Location: Hall A Entrance (Exhibition Level)

Search and browse the program, special events, participants, exhibitors, courses, and more. Free Conference Apps also available for iPhone and Android smart phones.

SPIE Exhibitor Directory

Location: Hall A Entrance (Exhibition Level)

Search exhibitors by name or booth numbers, browse products, and search technologies.

SPIE Bookstore

Location: North Lower Lobby (Exhibition Level)

The SPIE Bookstore is your source for the latest SPIE Press Books, Proceedings, and Education and Professional Development materials. Become an SPIE member, explore the Digital Library, take home a free SPIE poster, or buy a souvenir (tie, t-shirt, educational toys, and more).

SPIE Education Services

Course Materials – North Lobby

Browse course offerings and the other education services available: SPIE courses, videos, and CDs as well as customized in-company courses.

SPIE Press Room

Room 214 (Mezzanine Level)
Open during Registration hours

For Registered Press only. The Press Room provides meeting space, refreshments, access to exhibitor press releases, and Internet connections. Press are urged to register before the meeting by emailing name, contact information, and name of publication to media@spie.org. Preregistration closes approximately 10 days before the start of the event.

SPIE Luggage + Coat Check

Location: Room 102 (Exhibition Level)
Saturday through Thursday

Complimentary luggage, package, and coat storage are available. Please note posted hours; no late pickup available.

Business Center

Location: Near Exhibition Hall C (Exhibition Level)
Tuesday through Thursday

The Moscone Business Center provides full service business needs for your convenience. Their services include photocopying, faxing, computer workstations and printing services.

Restaurant & City Information

Location: South Lobby

Monday through Wednesday . . . . . 9:00 am to 5:00 pm

The San Francisco Travel Association will have Visitor's guides and maps available. Staff will be available during the posted hours to discuss city information including tips on local restaurants, the city's many attractions, sightseeing suggestions and transit information.

Child Care Services

ABC Bay Area Child Care Agency, San Francisco, CA 94122, Phone: 415.309.5662 • American Childcare Services, 580 California Street, Suite 1600, San Francisco, CA 94104, Phone: 415.285.2300, americanchildcare.com

Urgent Message Line

An urgent message line is available during registration hours: 415.978.3700

Airline Check-In and Boarding Pass Kiosk

Location: Room 102 (Exhibition Level)
Saturday through Thursday

Use this complimentary service to check in for your flight and print your boarding pass.

Lost and Found

Location: Cashier – North Lobby

Found items will be kept at Cashier during the meeting and available only during registration hours. At the end of the meeting, all found items will be turned over to Moscone Security Control, 415.974.4021.

GENERAL INFORMATION

AUTHOR / PRESENTER INFORMATION

Speaker Check-In and Preview Station

Location: Esplanade Foyer

Saturday through Thursday . . . . . 7:30 am to 5:00 pm

All conference rooms have a computer workstation, projector, screen, lapel microphone, and laser pointer. All presenters are requested to come to Speaker Check-In with their memory devices or laptops to confirm their presentation display settings.

Poster Sessions

To find out which poster session you are scheduled for, check the individual conference programs.

Poster Sessions in Exhibition Hall A (with BiOS Expo):

- Saturday and Sunday 3:00 to 4:00 pm: select BiOS conferences

Poster Sessions in Room 103 (Exhibit Level):

- Sunday 5:30 to 7:00 pm: select BiOS conferences
- Monday 5:30 to 7:30 pm: select BiOS conferences
- Tuesday 6:00 to 8:00 pm: all LASE conferences and select BiOS conferences
- Wednesday 6:00 to 8:00 pm: all OPTO conferences

Poster Setup Instructions

- Set-up hours vary
  - Saturday-Sunday BiOS Poster Sessions in Exhibition Hall A: Set up your poster from 12:00 pm (noon) on the day of your assigned presentation.
  - Sunday-Wednesday Evening Poster Sessions in Room 103: Set up your poster from 10:00 am to 4:30 pm on the day of your assigned presentation.
- Paper numbers will be placed on the poster boards in numerical order; please find your paper number and put up your poster in the designated space.
- A poster author is required to stand by the poster during the scheduled poster session to answer questions from attendees.
- Presenters who have not placed their poster(s) on their assigned board by 60 minutes prior to the session on the day of their presentation will be considered a "no show" and their manuscript will not be published.
- Presenters must remove their posters immediately after the poster session. Any posters that are not removed will be considered unwanted and will be discarded. SPIE assumes no responsibility for posters left up after the end of each poster session.

FOOD AND BEVERAGE SERVICES

Coffee Breaks

Complimentary coffee will be served twice daily, at 10:00 am and 3:00 pm. Check individual conference listings for exact times and locations.

Saturday am . . . . . Esplanade Foyer
North Lower Lobby (Exhibition Level)
Saturday pm . . . . . BiOS EXPO (Exhibition Hall A)
Sunday am & pm. . . . . BiOS EXPO (Exhibition Hall A)
Monday am & pm . . . . . Esplanade Foyer
North Lower Lobby (Exhibition Level)
Tuesday through Thursday . . . . . Exhibition Halls A, B, C, D

FOOD & REFRESHMENTS FOR PURCHASE

Saturday through Thursday

A variety of food outlets will serve hot and cold snacks, espresso, beverages, hot entrees, deli sandwiches, salads, and pastries are available for purchase. Cash and credit cards accepted.

Food Outlets Open in the Exhibition Halls

Exhibition Hall A

Saturday. . . . . .Noon to 3:00 pm
Sunday . . . . . 11:00 am to 3:00 pm
Exhibition Halls A, B, C, D
Tuesday through Thursday . . . . . 10:00 am to 4:00 pm

DESSERTS

Saturday and Sunday . . . . . BiOS EXPO, Exhibition Hall A
Tuesday through Thursday . . . . . Exhibition Halls A, B, C, D

Complimentary tickets for dessert snacks are included in course and conference attendee registration packets.

Travel to San Francisco

Car Rental

Hertz

Hertz Car Rental is the official car rental agency for this Symposium. To reserve a car, identify yourself as a Photonics West Conference attendee using the Hertz Meeting Code CV# 029B0019.

In the United States call 1-800-654-2240

Parking During Photonics West

For parking information please check the SPIE website

www.spie.org/x24985.xml

SPIE BOOKSTORE

Make your visit complete

Books

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Ties

Posters

Souvenirs

Educational Toys

SPIE.

Acceptance of Policies and Registration Conditions

The following Policies and Conditions apply to all SPIE Events. As a condition of registration, you will be required to acknowledge and accept the SPIE Registration Policies and Conditions contained herein.

Granting Attendee Registration and Admission

SPIE, or their officially designated event management, in their sole discretion, reserves the right to accept or decline an individual's registration for an event. Further, SPIE, or event management, reserves the right to prohibit entry or remove any individual whether registered or not, be they attendees, exhibitors, representatives, or vendors, who in their sole opinion are not, or whose conduct is not, in keeping with the character and purpose of the event. Without limiting the foregoing, SPIE and event management reserve the right to remove or refuse entry to any attendee, exhibitor, representative, or vendor who has registered or gained access under false pretenses, provided false information, or for any other reason whatsoever that they deem is cause under the circumstances.

Misconduct Policy

SPIE is a professional, not-for-profit society committed to providing valuable conference and exhibition experiences. SPIE is dedicated to equal opportunity and treatment for all its members and meeting attendees. Attendees are expected to be respectful to other attendees, SPIE staff, and contractors. Harassment and other misconduct will not be tolerated; violators will be asked to leave the event.

Identification

To verify registered participants and provide a measure of security, SPIE will ask attendees to present a government-issued Photo ID at registration to collect registration materials.

Individuals are not allowed to pick up badges for attendees other than themselves. Further, attendees may not have some other person participate in their place at any conference-related activity. Such other individuals will be required to register on their own behalf to participate.

Capture and Use of a Person's Image

By registering for an SPIE event, I grant full permission to SPIE to capture, store, use, and/or reproduce my image or likeness by any audio and/or visual recording technique (including electronic/digital photographs or videos), and create derivative works of these images and recordings in any SPIE media now known or later developed, for any legitimate SPIE marketing or promotional purpose.

By registering for an SPIE event, I waive any right to inspect or approve the use of the images or recordings or of any written copy. I also waive any right to royalties or other compensation arising from or related to the use of the images, recordings, or materials. By registering, I release, defend, indemnify and hold harmless SPIE from and against any claims, damages or liability arising from or related to the use of the images, recordings or materials, including but not limited to claims of defamation, invasion of privacy, or rights of publicity or copyright infringement, or any misuse, distortion, blurring, alteration, optical illusion or use in composite form that may occur or be produced in taking, processing, reduction or production of the finished product, its publication or distribution.

Payment Method

Registrants for paid elements of the event, who do not provide a method of payment, will not be able to complete their registration. Individuals with incomplete registrations will not be able to attend the conference until payment has been made. SPIE accepts VISA, MasterCard, American Express, Discover, Diner's Club, checks and wire transfers. Onsite registrations can also pay with Cash.

Authors/Coauthors

By submitting an abstract, you agree to the following conditions:

- An author or coauthor (including keynote, invited, and solicited speakers) will register at the author registration rate, attend the meeting, and make the presentation as scheduled.
- A full-length manuscript (minimum 6 pages) for any accepted oral or poster presentation will be submitted for publication in the SPIE Digital Library, printed conference Proceedings, and CD. (Some SPIE events have other requirements that the author is made aware of at the time of submission.)
- Only papers presented at the conference and received according to publication guidelines and timelines will be published in the conference Proceedings and SPIE Digital Library (or via the requirements of that event).

Audio, Video, Digital Recording Policy

Conferences, courses, and poster sessions: For copyright reasons, recordings of any kind are prohibited without prior written consent of the presenter or instructor. Attendees may not capture or use the materials presented in any meeting/course room or in course notes on display without written permission. Consent forms are available at Speaker Check-In. Individuals not complying with this policy will be asked to leave a given session and/or asked to surrender their recording media.

EXHIBITION HALL: For security and courtesy reasons, recordings of any kind are prohibited unless one has explicit permission from on-site company representatives. Individuals not complying with this policy will be asked to surrender their recording media and to leave the exhibition hall.

Your registration signifies your agreement to be photographed or videotaped by SPIE in the course of normal business. Such photos and video may be used in SPIE marketing materials or other SPIE promotional items.

Laser Pointer Safety Information/Policy

SPIE supplies tested and safety-approved laser pointers for all conference meeting rooms. For safety reasons, SPIE requests that presenters use provided laser pointers.

Use of a personal laser pointer represents user's acceptance of liability for use of a non-SPIE-supplied laser pointer. If you choose to use your own laser pointer, it must be tested to ensure <5 mW power output. Laser pointers in Class II and IIIa (<5mW) are eye safe if power output is correct, but output must be verified because manufacturer labeling may not match actual output. Come to Speaker Check-In and test your laser pointer on our power meter. You are required to sign a waiver releasing SPIE of any liability for use of potentially non-safe, personal laser pointers. Misuse of any laser pointer can lead to eye damage.

Access to Technical and Networking Events

Persons under the age of 18 including babies, carried or in strollers, and toddlers are not allowed in technical or networking events. Anyone 18 or older must register as an attendee. All technical and networking events require a valid conference badge for admission.

Underage Persons on Exhibition Floor Policy

For safety and insurance reasons:

- No persons under the age of 18 will be allowed in the exhibition area during move-in and move-out.
- Children 14 and older, accompanied by an adult, will be allowed in the exhibition area during open exhibition hours only.
- All children younger than 14, including babies in strollers and toddlers, are not allowed in the exhibition area at any time.

Unauthorized Solicitation Policy

Unauthorized solicitation in the Exhibition Hall is prohibited. Any non-exhibiting manufacturer or supplier observed to be distributing information or soliciting business in the aisles, or in another company's booth, will be asked to leave immediately.

Unsecured Items Policy

Personal belongings should not be left unattended in meeting rooms or public areas. Unattended items are subject to removal by security. SPIE is not responsible for items left unattended.

Wireless Internet Service Policy

At SPIE events where wireless is included with your registration, SPIE provides wireless access for attendees during the conference and exhibition but cannot guarantee full coverage in all locations, all of the time. Please be respectful of your time and usage so that all attendees are able to access the internet.

Excessive usage (e.g., streaming video, gaming, multiple devices) reduces bandwidth and increases cost for all attendees. No routers may be attached to the network. Properly secure your computer before accessing the public wireless network. Failure to do so may allow unauthorized access to your laptop as well as potentially introduce viruses to your computer and/or presentation. SPIE is not responsible for computer viruses or other computer damage.

Mobile Phones and Related Devices Policy

Mobile phones, tablets, laptops, pagers, and any similar electronic devices should be silenced during conference sessions. Please exit the conference room before answering or beginning a phone conversation.

Smoking

For the health and consideration of all attendees, smoking, including e-cigarettes, is not permitted at any event elements, such as but not limited to: plenaries, conferences, workshops, courses, poster sessions, hosted meal functions, receptions, and in the exhibit hall. Most facilities also prohibit smoking and e-cigarettes in all or specific areas. Attendees should obey any signs preventing or authorizing smoking in specified locations.

Hold Harmless

Attendee agrees to release and hold harmless SPIE from any and all claims, demands, and causes of action arising out of or relating to your participation in the event you are registering to participate in and use of any associated facilities or hotels.

Event Cancellation

If for some unforeseen reason SPIE should have to cancel the event, registration fees processed will be refunded to registrants. Registrants will be responsible for cancellation of travel arrangements or housing reservations and the applicable fees.

Confidential Reporting of Unethical or Inappropriate Behavior

SPIE is an organization with strong values of responsibility and integrity. Our Ethics Statement and Code of Professional Conduct contain general guidelines for conducting business with the highest standards of ethics. SPIE has established a confidential reporting system for staff & other stakeholders to raise concerns about possible unethical or inappropriate behavior within our community. Complaints may be filed by phone or through the website, and, if preferred, may be made anonymously. The web address is www.SPIE.ethicspoint.com and the toll free hotline number is 1-888-818-6898.

SPIE INTERNATIONAL HEADQUARTERS

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Fax: +44 29 2089 4750

info@spieeurope.org • www.SPIE.org

Proceedings.

Full paid registration includes your choice of Proceedings of SPIE (excluding student registrations). See the attached list for product order numbers for proceedings options from this meeting. You will need a product order number when you make your proceedings choice on the registration form.

Available as part of registration:

Symposium CD Collection—a searchable CD of one or multiple proceedings volumes. Available within 8 weeks of the meeting.

Symposium Online Collection—online access to multiple related proceedings volumes via the SPIE Digital Library. Available as papers are published.

Printed Proceedings Volume—a printed book of a single proceedings volume. Available 6 weeks after the meeting.

Online Proceedings Volume—online access to a single proceedings volume via the SPIE Digital Library. Available as papers are published.

You may also purchase additional proceedings products beyond what you choose with your registration plan. **(Note: Single online proceedings volumes not available for separate purchase).** See below for pricing and product order numbers.

Accessing Online Proceedings

Access to purchased online proceedings will be ongoing using your SPIE login credentials; papers are available as they are published.

To access your purchased proceedings:

- Sign in with your SPIE account credentials at **https://spiedigitallibrary.org**. If you do not have an SPIE account, create one using the email address you used to register for the conference.
- Once you have signed in, click the My Account link at the top of the page. You can access your proceedings in the My Conference Proceedings tab.

Note: If your organization subscribes to the SPIE Digital Library, you can also access this content via your organization's account when logging on through your institution's network.

Should you need any assistance, please contact SPIE:
Email: SPIEDLsupport@spie.org
Phone (North America): +1 888 902 0894
Phone (Rest of World): +1 360 685 5580

Proceedings Collections

Product Order Number		Collection Title/Included Volumes (See next page for volume titles and editors)	Price for separate purchase
Symposium CD Collection	Symposium Online Collection		Meeting Attendees Only
CDS557	**DLC557**	**Photonics West BiOS 2015: Photonic Therapeutics; and Diagnostics and Clinical Technologies and Systems** *9303, 9304, 9305, 9306, 9307, 9308, 9309, 9310, 9311, 9312, 9313, 9314, 9315, 9316, 9317, 9318, 9319, and 9320*	**$155**
CDS558	**DLC558**	**Photonics West BiOS 2015: Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering; Biomedical Spectroscopy, Microscopy, and Imaging; and Nano/Biophotonics** *9321, 9322, 9323, 9324, 9325, 9326, 9327, 9328, 9329, 9330, 9331, 9332, 9333, 9334, 9335, 9336, 9337, 9338, 9339, 9340, 9341, and 9355*	**$155**
CDS559	**DLC559**	**Photonics West LASE 2015: Laser Source Engineering; Nonlinear Optics; and Laser Applications** *9342, 9343, 9344, 9345, 9346, 9347, 9350, 9354, 9355, 9356, 9360, 9361, 9379, and 9380*	**$155**
CDS560	**DLC560**	**Photonics West LASE 2015: Semiconductor Lasers and LEDs; and Laser Micro-/Nanoengineering** *9346, 9348, 9349, 9350, 9351, 9352, 9353, 9357, 9363, 9374, 9381, 9382, and 9383*	**$155**

Product Order Number		Collection Title/Included Volumes (See next page for volume titles and editors)	Price for separate purchase
Symposium CD Collection	Symposium Online Collection		Meeting Attendees Only
CDS561	**DLC561**	**Photonics West OPTO 2015: Optoelectronic Materials and Devices; Nanotechnologies in Photonics; Advanced Quantum and Optoelectronic Applications; and Semiconductor Lasers and LEDS** *9346, 9348, 9349, 9357, 9358, 9359, 9360, 9361, 9362, 9363, 9364, 9370, 9371, 9372, 9373, 9374, 9377, 9378, 9379, 9380, 9381, 9382, and 9383*	**$155**
CDS562	**DLC562**	**Photonics West OPTO 2015: Photonic Integration; MOEMS-MEMS in Photonics; Displays and Holography; and Optical Communications; Devices to Systems** *9320, 9335, 9354, 9362, 9365, 9366, 9367, 9368, 9369, 9374, 9375, 9376, 9384, 9385, 9386, 9387, 9388, 9389, and 9390*	**$155**

Single Proceedings Volumes from BiOS

Online proceedings volumes are not available for separate purchase.

Product Order Number		Volume Title/Volume Editors	Price for print volume separate purchase
Printed Proceedings Volume	Online Proceedings Volume		Meeting Attendees Only
9303	**DL9303**	**Photonic Therapeutics and Diagnostics XI** *Bernard Choi, Nikiforos Kollias, Haishan Zeng, Hyun Wook Kang, Brian J. F. Wong, Justus F. Ilgner, Alfred Nuttal, Claus-Peter Richter, Melissa C. Skala, Mark W. Dewhirst, Guillermo J. Tearney, Kenton W. Gregory, Laura Marcu, Andreas Mandelis*	**$145**
9304	**DL9304**	**Endoscopic Microscopy X; and Optical Techniques in Pulmonary Medicine II** *Melissa J. Suter, Stephen Lam, Matthew Brenner, Guillermo J. Tearney, Thomas D. Wang*	**$90**
9305	**DL9305**	**Optical Techniques in Neurosurgery, Neurophotonics, and Optogenetics II** *Henry Hirschberg, Steen J. Madsen, E. Duco Jansen, Qingming Luo, Samarendra K. Mohanty, Nitish V. Thakor*	**$125**
9306	**DL9306**	**Lasers in Dentistry XXI** *Peter Rechmann, Daniel Fried*	**$53**
9307	**DL9307**	**Ophthalmic Technologies XXV** *Fabrice Manns, Per G. Söderberg, Arthur Ho*	**$100**
9308	**DL9308**	**Optical Methods for Tumor Treatment and Detection: Mechanisms and Techniques in Photodynamic Therapy XXIV** *David H. Kessel, Tayyaba Hasan*	**$60**
9309	**DL9309**	**Mechanisms for Low-Light Therapy X** *Michael R. Hamblin, James D. Carroll, Praveen Arany*	**$60**
9310	**DL9310**	**Frontiers in Biological Detection: From Nanosensors to Systems VII** *Benjamin L. Miller, Philippe M. Fauchet, Brian T. Cunningham*	**$45**
9311	**DL9311**	**Molecular-Guided Surgery: Molecules, Devices, and Applications** *Brian W. Pogue, Sylvain Gioux*	**$60**
9312	**DL9312**	**Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XIX** *James G. Fujimoto, Joseph A. Izatt, Valery V. Tuchin*	**$150**
9313	**DL9313**	**Advanced Biomedical and Clinical Diagnostic and Surgical Guidance Systems XIII** *Anita Mahadevan-Jansen, Tuan Vo-Dinh, Warren S. Grundfest*	**$80**
9314	**DL9314**	**Optics and Biophotonics in Low-Resource Settings** *David Livitz, Aydogan Ozcan, David Erickson*	**$60**
9315	**DL9315**	**Design and Quality for Biomedical Technologies VIII** *Ramesh Raghavachari, Rongguang Liang*	**$60**
9316	**DL9316**	**Multimodal Biomedical Imaging X** *Fred S. Azar, Xavier Intes*	**$53**
9317	**DL9317**	**Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications XV** *Israel Gannot*	**$70**
9318	**DL9318**	**Optical Biopsy XIII: Toward Real-Time Spectroscopic Imaging and Diagnosis** *Robert R. Alfano, Stavros G. Demos*	**$60**
9319	**DL9319**	**Optical Tomography and Spectroscopy of Tissue XI** *Bruce J. Tromberg, Arjun G. Yodh, Eva Marie Sevick-Muraca*	**$105**
9320	**DL9320**	**Microfluidics, BioMEMS, and Medical Microsystems XIII** *Bonnie L. Gray, Holger Becker*	**$80**
9321	**DL9321**	**Optical Interactions with Tissue and Cells XXVI** *E. Duco Jansen*	**$70**

Product Order Number		Volume Title/Volume Editors	Price for print volume separate purchase
Printed Proceedings Volume	Online Proceedings Volume		Meeting Attendees Only
9322	**DL9322**	**Dynamics and Fluctuations in Biomedical Photonics XII** *Valery V. Tuchin, Kirill V. Larin, Martin J. Leahy, Ruikang K. Wang*	**$70**
9323	**DL9323**	**Photons Plus Ultrasound: Imaging and Sensing 2015** *Alexander A. Oraevsky, Lihong V. Wang*	**$185**
9324	**DL9324**	**Biophotonics and Immune Responses X** *Wei R. Chen*	**$70**
9325	**DL9325**	**Design and Performance Validation of Phantoms Used in Conjunction with Optical Measurement of Tissue VII** *David W. Allen, Jean-Pierre Bouchard*	**$45**
9326	**DL9326**	**Energy-based Treatment of Tissue and Assessment VIII** *Thomas P. Ryan*	**$70**
9327	**DL9327**	**Optical Elastography and Tissue Biomechanics II** *Kirill V. Larin, David D. Sampson*	**$70**
9328	**DL9328**	**Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues XIII** *Daniel L. Farkas, Dan V. Nicolau, Robert C. Leif*	**$90**
9329	**DL9329**	**Multiphoton Microscopy in the Biomedical Sciences XV** *Ammasi Periasamy, Peter T.C. So, Karsten König*	**$130**
9330	**DL9330**	**Three-Dimensional and Multidimensional Microscopy: Image Acquisition and Processing XXII** *Thomas G. Brown, Carol J. Cogswell, Tony Wilson*	**$90**
9331	**DL9331**	**Single Molecule Spectroscopy and Superresolution Imaging VIII** *Jörg Enderlein, Ingo Gregor, Zygmunt Karol Gryczynski, Rainer Erdmann, Felix Koberling*	**$70**
9332	**DL9332**	**Optical Diagnostics and Sensing XV: Toward Point-of-Care Diagnostics** *Gerald L. Coté*	**$60**
9333	**DL9333**	**Biomedical Applications of Light Scattering IX** *Adam Wax, Vadim Backman*	**$70**
9334	**DL9334**	**Optical Methods in Developmental Biology III** *Andrew M. Rollins, Scott E. Fraser, Michael A. Choma*	**$60**
9335	**DL9335**	**Adaptive Optics and Wavefront Control for Biological Systems** *Thomas G. Bifano, Joel Kubby, Sylvain Gigan*	**$60**
9336	**DL9336**	**Quantitative Phase Imaging** *Gabriel Popescu, YongKeun Park*	**$120**
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