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DATES
Conferences + Courses:
13–18 February 2016

TECHNOLOGIES
- Optoelectronic Materials and Devices
- Photonic Integration
- Nanotechnologies in Photonics
- MOEMS-MEMS in Photonics
- Advanced Quantum and Optoelectronic Applications
- Semiconductor Lasers and LEDs
- Displays and Holography
- Optical Communications: Devices to Systems
- Green Photonics
- 3D Printing
SPIE OPTO 2016 addresses the latest developments and advances in a broad range of optical and optoelectronic mechanisms, devices, and technologies, and also their integration for a variety of industrial and non-industrial applications. Topics to be covered include materials and devices, semiconductor lasers and LEDs, solid state lighting, photonic integration, displays and holography, nanotechnologies in photonics, micro- and nanofabricated electromechanical and optical components, photonics packaging, and optical data handling and communications.

SPIE OPTO 2016 is also a fast-growing networking forum where individuals from a wide spectrum of optoelectronic and photonic endeavors come together to exchange information and share views. Take courses to further your professional development, gain insight from outstanding plenary speakers, and make industry connections with vendors on the exhibition floor.

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General Information

VENUE
The Moscone Center
747 Howard Street
San Francisco, CA 94103-3118 USA

San Francisco is often called “Everybody’s Favorite City,” a title earned by its scenic beauty, cultural attractions, diverse communities, and world-class cuisine. Visitors rate the atmosphere and ambience as their top reason for visiting San Francisco. Measuring 49 square miles, this walkable city is dotted with landmarks like the Golden Gate Bridge, cable cars, and Alcatraz.

REGISTRATION
SPIE Photonics West registration will be available October 2015

All participants, including invited speakers, contributed speakers, co-chairs, and committee members, must pay a registration fee. Authors, coauthors, program committee members, and session chairs are accorded a reduced symposium registration fee.

Fee information for conferences, courses, a registration form, and technical and general information will be available on the SPIE website in October 2015.

HOTEL INFORMATION
Opening of the hotel reservation process for SPIE Photonics West 2016 is scheduled for June 2015. SPIE will arrange special discounted hotel rates for SPIE conference attendees.

The website will be kept current with any updates.

STUDENT TRAVEL GRANTS
A limited number of SPIE student travel grants will be awarded based on need. Applications must be received no later than 7 December 2015. Eligible applicants must present an accepted paper at this meeting. Offer applies to undergraduate/graduate students who are enrolled full-time and have not yet received their PhD.

CLEARANCE INFORMATION
If government and/or company clearance is required to present and publish your presentation, start the process now to ensure that you receive clearance if your paper is accepted.

IMPORTANT NEWS FOR ALL VISITORS FROM OUTSIDE THE UNITED STATES

Find important requirements for visiting the United States on the SPIE Photonics West website. There are new steps that ALL visitors to the United States need to follow.

Online at: www.spie.org/visa
OPTO 2016

Contents.

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

OE101 Physics and Simulation of Optoelectronic Devices XXIV (Witzigmann, Osiński, Arakawa) .................................................. 6

OE102 Physics, Simulation, and Photonic Engineering of Photovoltaic Devices V (Freundlich, Lombez, Sugiyama) .......... 7

OE103 Optical Components and Materials XIII (Jiang, Digonnet) ...................... 8

OE104 Organic Photonic Materials and Devices XVIII (Tabor, Kajzar, Kaino, Koike) .................. 9

OE105 Ultrafast Phenomena and Nanophotonics XX (Betz, Elezzabi) .......... 10

OE106 Terahertz, RF, Millimeter, and Submillimeter-Wave Technology and Applications IX (Sadwick, Yang) ..... 11

OE107 Gallium Nitride Materials and Devices XI (Chyi, Fujioka, Morkoç) ................. 14

OE108 Oxide-based Materials and Devices VII (Teherani, Look, Rogers) ............. 15

**PHOTONIC INTEGRATION**
Program Chair: Yakov Sidorin, Quares & Brady LLP (USA)

OE109 Integrated Optics: Devices, Materials, and Technologies XX (Broquin, Nunzi Conti) .................................................. 16

OE110 Smart Photonic and Optoelectronic Integrated Circuits XVIII (Eladada, Lee, He) ............................ 17

OE111 Silicon Photonics XI (Reed, Watts) ..................................... 18

OE112 Optical Interconnects XVI (Schröder, Chen) .................................. 19

OE113 Photonic Instrumentation Engineering III (Soskind, Olson) ..................... 20

OE106 Terahertz, RF, Millimeter, and Submillimeter-Wave Technology and Applications IX (Sadwick, Yang) .................. 11

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

OE114 Quantum Sensing and Nano Electronics and Photonics XIII (Razeghi) ............... 21

OE115 Photonic and Phononic Properties of Engineered Nanostructures VI (Adibi, Lin, Scherer) ........ 22

OE116 High Contrast Metastructures V (Chang-Hasnain, Fattal, Koyama, Zhou) 23

OE117 Quantum Dots and Nanostructures: Growth, Characterization, and Modeling XIII (Huffaker, Eisele, Dick) .. 24

OE118 Advanced Fabrication Technologies for Micro/Nano Optics and Photonics IX (von Freymann, Schoenfeld, Rumpf) .. 25

**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)

OE118 Advanced Fabrication Technologies for Micro/Nano Optics and Photonics IX (von Freymann, Schoenfeld, Rumpf) ... 25

OE119 MOEMS and Miniaturized Systems XV (Piyawattanametha, Park) ............................. 26

OE120 Emerging Digital Micromirror Device Based Systems and Applications VIII (Douglass, King, Lee) ..................... 28

BO208 Microfluidics, BioMEMS, and Medical Microsystems XIII (Gray, Becker) ........ 29

BO407 Adaptive Optics and Wavefront Control for Biological Systems II (Bifano, Kubby, Gigan) .......................... 30

**ADVANCED QUANTUM AND OPTOELECTRONIC APPLICATIONS**
Program Chair: Zameer U. Hasan, Temple Univ. (USA)

OE121 Advances in Photonics of Quantum Computing, Memory, and Communication IX (Hasan, Hemmer, Lee, Migdall) ..... 31

OE122 Slow Light, Fast Light, and Opto-Atomic Precision Metrology IX (Shahriar, Scheuer) ........................................ 33

OE123 Complex Light and Optical Forces X (Glückstad, Andrews, Galvez) ............. 35

OE124 Optical and Electronic Cooling of Solids IX (Epstein, Seletskiy, Sheik-Bahae) ....................... 36

OE114 Quantum Sensing and Nano Electronics and Photonics XIII (Razeghi) .......................... 21
CALL FOR PAPERS

Abstracts Due: 3 AUGUST 2015

OE117 Quantum Dots and Nanostructures: Growth, Characterization, and Modeling XIII (Huffaker, Eisele, Dick) ............... 24

SEMICONDUCTOR LASERS AND LEDS
Program Chair: Klaus P. Streubel, OSRAM AG (Germany)
OE125 Vertical-Cavity Surface-Emitting Lasers XX (Choquette, Guenter) ........... 37
OE126 Novel In-Plane Semiconductor Lasers XV (Belyanin, Smolwton) ............ 38
OE127 Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XX (Jeon, Tu, Krames, Strassburg) ......................... 39
LA105 Components and Packaging for Laser Systems II (Glebov, Leisher) ........ 40
LA108 High-Power Diode Laser Technology and Applications XIV (Zediker) ....... 41
LA109 Vertical External Cavity Surface Emitting Lasers (VECSELs) VI (Wilcox) .......... 42
OE101 Physics and Simulation of Optoelectronic Devices XXIV (Witzigmann, Osiński, Arakawa) .................................................. 6
OE107 Gallium Nitride Materials and Devices XI (Chyi, Fujioka, Morkoč) ............ 14

DISPLAYS AND HOLOGRAPHY
Program Chair: Liang-Chy Chien, Kent State Univ. (USA)
OE128 Emerging Liquid Crystal Technologies XI (Chien)........................................ 43
OE129 Advances in Display Technologies VI (Chien, Lee, Wu) ............................. 44
OE130 Practical Holography XXX: Materials and Applications (Bjelkhagen, Bove) ........ 45

OPTICAL COMMUNICATIONS: DEVICES TO SYSTEMS
Program Chair: Benjamin Dingel, Nasfine Photonics, Inc. (USA)
OE131 Broadband Access Communication Technologies X (Dingel, Tsukamoto) .... 46
OE132 Optical Metro Networks and Short-Haul Systems VIII (Srivastava, Weiershausen, Dingel, Dutta) ................. 47
OE133 Next-Generation Optical Communication: Components, Sub-Systems, and Systems V (Li, Zhou) ............... 48
OE134 Next-Generation Optical Networks for Data Centers and Short-Reach Links III (Srivastava) ....................... 48
OE106 Terahertz, RF, Millimeter, and Submillimeter-Wave Technology and Applications IX (Sadwick, Yang) .............. 11
OE111 Silicon Photonics XI (Reed, Watts) .......................................... 18
OE112 Optical Interconnects XVI (Schröder, Chen) ...................................... 19
LA114 Free-Space Laser Communication and Atmospheric Propagation XXVIII (Hemmati, Boroson) .................. 49

General Information .................................................. 3
Photonics West Technology Tracks (TRANSLATIONAL RESEARCH, GREEN PHOTONICS, AND 3D PRINTING) .............. 50
Submission of Abstracts ............................................. 51
SPIE Photonics West Exhibition .................................. 52

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Physics and Simulation of Optoelectronic Devices XXIV

OE101

Conference Chairs: Bernd Witzigmann, Univ. Kassel (Germany); Marek Osinski, The Univ. of New Mexico (USA); Yashuhiko 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, Philips-Univ. Marburg (Germany); Cun-Zheng Ning, Arizona State Univ. (USA); Joachim Piprek, NUSOD Institute LLC (USA); Marc Sciamanna, Supelec (France); Ikuo Suemune, Hokkaido Univ. (Japan)

This conference targets existing and new physical and mathematical methods as applied to optoelectronics, as well as recent advances in new materials and devices. Its objective is to bring together experimentalists, theorists, computational specialists, and development engineers to provide an interdisciplinary forum to discuss physical understanding and state-of-the-art computational analysis of active and passive optoelectronic materials and devices. Theoretical and experimental papers are solicited on the following and related topics:

- **optoelectronic device modeling:** lasers, light-emitting diodes, photodetectors, modulators
- **materials for optoelectronic devices:** wide bandgap materials; band structure, band offsets, gain and recombination in II-VI and III-nitride structures, materials for mid-infrared optoelectronic devices, photonics synthetic matter
- **plasmonic materials and structures:** theory and application in optoelectronic devices
- **graphene and its applications in photonics:** electronic band structure, luminescent properties, device strategies
- **photovoltaics modeling:** simulation models and modeling results for solar cells
- **organic/inorganic hybrid nanostructures and devices:** interfaces, atomistic simulations
- **physics of nano structures:** quantum well, quantum wire, and quantum dot lasers and surface plasmon devices; lattice mismatch and strain effects; Coulomb effects and macroscopic theories; carrier and quantum transport, capture, and dynamics; hole burning, gain suppression and non-equilibrium effects; coherent effects; polarization phenomena
- **micro- or nano-cavity effects and photonic crystals:** applications for LEDs and lasers; thresholdless laser; novel VCSEL structures; polariton lasers
- **quantum communications:** semiconductor quantum bits; single-photon devices; entangled states; quantum cryptography; optically-probed spin dynamics; cavity quantum electrodynamics, superconducting optoelectronics
- **dynamics and noise in diode lasers and systems:** gain switching; passive and actively mode-locked diode lasers; self-pulsations; chaos and instabilities in diode lasers and laser arrays; bistability and multistability, effects of injected light and optical feedback; coherence of lasers and laser arrays
- **WDM network optical devices:** tunable lasers; ultrastable lasers; high-speed optoelectronics
- **numerical simulation methods:** new approaches for heterolayer transport simulation; ab-initio and multi-scale simulation of materials for optoelectronics; computational electromagnetics; comprehensive simulation of optical, electrical and thermal phenomena; photonic circuit simulation, code parallelization techniques
- **modeling techniques for fiber and integrated optical devices:** eigenvalue techniques, finite difference, finite element and Fourier transform methods, high-order propagation methods, wide-angle and vector wave equations, models of guided-wave reflection
- **advances in waveguides and waveguide devices:** pulse propagation in active waveguides, waveguide structures for routing, switching and high brightness devices; tapered waveguides; waveguide-fiber coupling; nonlinear and high-power effects in waveguides and fibers; gratings; soliton propagation.
Physics, Simulation, and Photonic Engineering of Photovoltaic Devices V (OE102)

Conference Chairs: Alexandre Freundlich, Univ. of Houston (USA); Laurent Lombez, Institut de Recherche et Développement sur l’Energie Photovoltaïque (France); Masakazu Sugiyama, The Univ. of Tokyo (Japan)

Program Committee: Kylie R. Catchpole, The Australian National Univ. (Australia); Gavin Conibeer, The Univ. of New South Wales (Australia); Olivier Durand, Institut National des Sciences Appliquées de Rennes (France); Nicholas J. Ekins-Daukes, Imperial College London (United Kingdom); Jean-François Guillelmoles, Institut de Recherche et Développement sur l’Energie Photovoltaïque (France), Next PV (Japan); Karin Hinzer, Univ. of Ottawa (Canada); Louise C. Hirst, U.S. Naval Research Lab. (USA); Seth M. Hubbard, Rochester Institute of Technology (USA); 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)

This conference attempts to capture basic research and breakthroughs in the application of photonic/novel device architectures and the development of advanced modeling and simulation techniques to feed the innovation pipeline leading to revolutionary and practically viable high-efficiency photovoltaic (PV) technologies. The conference also aims at providing an interdisciplinary forum to enhance interactions between physicists, photonic engineers and photovoltaic device specialists at both the experimental and theoretical levels.

Theoretical or experimental papers are sought that address recent advances in basic material/device physics, simulation, demonstration and optimization of:

- advanced light management concepts and architectures, including new approaches to spectral engineering (i.e. luminescent concentrators, up-down converters), light concentration, surface texturing and light trapping (i.e. plasmonic cavities, micro/nano-engineered ARs), as well as synergistic hybrid/multifunctional designs
- non-conventional PV converters, in particular application of advanced photonics to enable uniform conversion mechanisms. Examples include application of photonics to enable the demonstration of advanced quantum confined or nanostructured concepts, intermediate band concepts, multiple exciton generation, thermophotonics or hot-carrier effects
- advanced single and multi-junction devices leveraging on innovative materials or/and photonic architectures. In particular the simulation or/and demonstration of the application of cross-cutting photonic engineering approaches for enhancing the performance, reliability and functionality of these devices
- quantum- and nano-structured devices with a particular focus on deciphering the science at play in photogeneration, recombination, and carrier transport in quantum well/quantum dot and wire devices
- defect tolerant PV designs and application of photonics to enhance defect tolerance (dislocations, radiation defects, grain-boundaries, points defects) of solar cells
- contributions dealing with the characterization of the above mentioned devices/concepts as well as related advanced scalable micro/nano-fabrication technique are also of relevance.

Finally the conference also welcomes new and emerging methods in simulation of PV and hybrid photonic/PV devices, including but not limited to 3D-drift diffusion and RCWA models, integrated ab-initio and multi-scale simulation techniques.

IMPORTANT DATES

Abstracts Due: 3 AUGUST 2015

Author Notification: 12 OCTOBER 2015

Post-Meeting Manuscript Due Date (all except conferences OE114, OE131, OE132, and OE133):

20 JANUARY 2016

On-Site Manuscript Due Date (conferences OE114, OE131, OE132, and OE133 only):

7 DECEMBER 2015

Please Note: Submissions imply the intent of at least one author to register, attend the conference, present the paper as scheduled, and submit a full-length manuscript for publication in the conference proceedings.
Active and passive optical components are playing key roles in current optical communication networks, optical sensors, and medical optical devices. Extensive research continues to be carried out to improve their performance and functionality, and to reduce their size and cost. Areas of research that are particularly active include high-power fiber lasers, switches, filters, ultra-short-pulse fiber lasers, as well as material research in rare-earth-doped glasses, semiconductors, and nano-particles for enabling innovative photonic devices. There is also significant activity in developing components in lightwave circuits, which will ultimately reduce manufacturing cost while integrating multiple active and passive functions on a single chip.

The purpose of this conference is to bring together researchers and engineers from academia and industry to discuss recent developments in these rapidly advancing fields. Suggested topics include:

- rare-earth-doped devices and materials
- rare-earth-doped or metal-doped glasses, crystals, polymers, semiconductors, hybrid materials, and fibers
- spectroscopy of rare-earth ions and other laser species
- graphene and carbon nanotubes
- nanoparticles
- quantum dots
- fiber amplifiers design and fabrication
- waveguide lasers and amplifiers
- UV to far-infrared fiber lasers
- cladding-pumped lasers and amplifiers
- Raman laser and amplifiers
- Brillouin lasers
- broadband fiber sources
- semiconductor-based lasers and amplifiers
- optical switches, modulators, and other devices
- optical nonlinearities in fibers and waveguides
- lithium niobate bulk-optic and waveguide devices
- thermal and UV poling of silica and other glasses
- electro-optic poled sol-gels
- progress in lithium niobate electro-optic modulators
- nonlinear frequency converters
- photonic-bandgap fibers and devices
- plasmonic devices and technologies
- sub-wavelength optical elements
- photosensitivity in fibers and planar waveguides
- photosensitivity in glasses and polymers
- filters, reflectors, and other grating-based devices
- fiber and waveguide Bragg gratings
- long-period fiber gratings
- modeling glass structure and defects arising from UV irradiation
- novel passive and active components for dense WDM
- tunable filters and add-drop filters
- device packaging, testing, and reliability
- devices for optical interconnect
- detectors
- SWIR photodetectors
- single-photon detectors
- silicon-based photodetectors
- low-noise detection architectures
- unique detector materials and special spectral regions
- progress in MEMS-based detectors
- detectors with gain.
For energy-saving and economic reasons, there is a growing interest and a revolution in organic/polymeric photonic and electronic materials and devices for optical communication, data transmission, storage, display and other applications. Recent advances in the development of optical interconnection and electro-optic devices as well as planar lightwave circuits, light-emitting and photovoltaic devices suggest that organic and polymeric materials will play a significant role in this area. Organic-inorganic hybrid materials and biophotonic materials are also of special concern for novel photonic device development. Metamaterials are also becoming important even in these fields. Organic Photonic Materials and Devices XVIII will serve as a forum for the dissemination and discussion of state-of-the-art results pertaining to organic/polymeric opto-electronic, nanophotonic, and biophotonic materials and devices as well as their applications.

The objective of this conference is to bring together researchers and engineers from academia, industry, and government laboratories who share a common interest in organic/polymeric photonic materials and devices.

This conference will provide a forum for an update on progress in the highly-connected and multidisciplinary subject of photonic technologies based on organic/polymeric materials. Papers are solicited in the following areas:

- nonlinear optical polymer materials and devices
- organic light-emitting materials and devices
- photorefractive materials and processes
- photochromic materials
- polymer optical waveguides and fibers
- multiphoton processes
- charge transport in organic materials
- single-molecule spectroscopy
- organic field effect transistors
- polymer lasers and amplifiers
- optical limiting materials
- polymer solar cells and photodetectors
- nanophotonics and organic metamaterials
- biophotonics
- electro-optic materials for silicon photonics
- biopolymers
- organic-inorganic hybrid materials and devices
- flexible semiconductors
- plasmonic NLO effects
- polymeric photonic crystals
- hybrid organic-inorganic materials
- multiphoton processes
- theoretical description of NLO processes
- printed optical materials and processes
- RF organic materials properties.

In 2016, we are planning to have a joint session with the Optical Interconnects conference, focusing on the theme, “Electro-optic polymers meet optical interconnection.” So please submit related papers to this conference or to the Optical Interconnects conference (OE112).
Ultrafast Phenomena and Nanophotonics XX (OE105)

Conference Chairs: Markus Betz, Technische Univ. Dortmund (Germany); Abdulhakem Y. Elezzabi, Univ. of Alberta (Canada)

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); Xiaojin 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); Pascal Ruello, Univ. du Maine (France); Volker J. Sorge, The George Washington Univ. (USA); Fabrice Vallee, Univ. Claude Bernard Lyon 1 (France)

This conference covers ultrafast phenomena in bulk semiconductors, semiconducting and metallic nanostructures and devices with emphasis on ultrafast optical and/or coherent phenomena. Manuscripts are solicited in the following topics but not restricted to:

**ULTRAFAST DYNAMICS IN SEMICONDUCTORS**
- carrier-carrier, carrier-phonon interactions
- formation, recombination dynamics of excitons
- polariton dynamics in microcavities
- ultrafast acoustic phenomena.

**COHERENT DYNAMICS OF OPTICAL EXCITATIONS**
- excitonic coherences
- quantum interference effects
- four-wave mixing, two-dimensional spectroscopy
- coherent phonons.

**NON-LINEAR OPTICAL EFFECTS**
- optical frequency conversion
- multi-photon processes, high-field physics
- high harmonic generation, attosecond physics
- ultrafast probing of surfaces and interfaces.

**NON-EQUILIBRIUM CARRIER TRANSPORT**
- ballistic carrier transport
- tunneling phenomena
- Bloch oscillations.

**ULTRAFAST PHENOMENA CARBON NANOMATERIALS**
- dynamics in graphene and carbon nanotubes
- graphene plasmonics
- carbon-based quantum dots
- related effects in other monolayer materials.

**SPIN DYNAMICS AND SPIN MANIPULATION**
- ultrafast optical spin manipulation
- spin coherence and relaxation
- ultrafast magnetism
- spin injection and transport.

**ULTRAFAST PLASMONICS**
- active plasmonics
- THz plasmonics
- ultrafast dynamics in metallic nanostructures.

**THZ SPECTROSCOPY**
- THz wave generation
- field-resolved techniques
- THz time-domain spectroscopy
- strong-field THz physics.

**ULTRAFAST PROCESSES IN DEVICES AND LASERS**
- ultrafast optical switching
- wavelength conversions
- gain dynamics in lasers and amplifiers.

**ULTRAFAST NANO-OPTICS**
- nanoemitters, nanoantennae
- nanolocalization of optical fields
- coherent control in nanostructures
- semiconductor quantum dots and wires
- single-photon sources
- applications for quantum information processing.

**ULTRAFast OPTICAL PROPERTIES OF METAMATERIALS**
- photonic and phononic crystals
- metal-semiconductor hybrid structures
- negative-index materials
- metatronics.
Terahertz, RF, Millimeter, and Submillimeter-Wave Technology and Applications IX (OE106)

Conference Chairs: Laurence P. Sadwick, InnoSys, Inc. (USA); Tianxin Yang, Tianjin Univ. (China)

Program Committee: René Belgang, Technische Univ. Kaiserslautern (Germany); 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); Alessia Portieri, TeraView Ltd. (United Kingdom); Jinghua Teng, A*STAR Institute of Materials Research and Engineering (Singapore); Jiangfeng Zhou, Univ. of South Florida (USA)

This conference brings together researchers and engineers from academia, industry, and government laboratories to explore and present work in the frequency range covering approximately less than 1 GHz (300 mm) to greater than 3 THz (100 μm). Papers on RF and millimeter technology including advances in wireless communications, radar, lidar, microwave and mm-wave photonics, terahertz and sub-millimeter technologies, metamaterials, and antennas are encouraged.

TERAHERTZ SOURCES

- solid-state sources, vacuum electronics sources, frequency mixers, parametric oscillators, quantum cascade lasers and related electronic devices, gas lasers, quantum cascade lasers and related sources, p-germanium sources, photoconductive switches, resonant tunneling diodes, backward wave oscillators
- novel stabilized photonic THz sources
- fabrication processes.

RF, SUB-MILLIMETER-WAVE AND MILLIMETER-WAVE SOURCES

- power sources of all types in the range of 1 GHz to 300 GHz and 300 GHz and higher (i.e. from S-band to the higher end of the millimeter-wave frequency range and all of the sub-millimeter-wave frequency region)
- novel stabilized photonic RF, millimeter-wave, sub-millimeter-wave sources.

DETECTORS

- bolometers and other thermal detectors, Schottky and other mixers, thermopiles, quantum devices, antenna integrated detectors, heterodyne detection techniques, hybrid detection, direct detection techniques, Theoretical modeling
- novel detectors.

HIGH-POWER SOURCES, MODULES, AND SYSTEMS

- THz, RF, millimeter-wave and sub-millimeter-wave high power sources
- THz, millimeter-wave and sub-millimeter-wave modules
- THz, RF, millimeter-wave and sub-millimeter-wave systems

Disciplines utilizing terahertz technology include physical chemistry (certain molecules or molecular segments exhibit strong resonances in the 10 cm⁻¹ to 100 cm⁻¹ spectral region), military, and homeland security (terahertz radiation can penetrate clothing and packing materials but is reflected by metals and other materials), biomedical technology (tissue exhibits reflection and absorption properties that change dramatically with tissue characteristics), medical and dental, secure short-distance wireless communications (atmospheric water content prevents terahertz radiation from traveling very far), astronomy (the cold background of the universe exhibits a peak in this spectral region), space communications (where the terahertz region is wide open for use) and other disciplines where new, yet-to-be-discovered applications will undoubtedly come forth. Since the low energy associated with terahertz radiation is expected to be no more harmful than infrared or microwave radiation, safety issues are not expected to limit the use of terahertz radiation at low-power levels.

Papers on power supplies and electronic power conditioners and associated power protection systems including energy-efficient power supplies are also encouraged.

Papers are solicited in the following and related areas:

(CO)SPONSOR:

OE106 (continued next page)
Terahertz, RF, Millimeter, and Submillimeter-Wave Technology and Applications IX (OE106) (continued)

- power supplies and support circuits, electronics, optoelectronics, systems.

**TERAHERTZ, RF, MILLIMETER-WAVE, AND SUB-MILLIMETER-WAVE PASSIVE COMPONENTS**
- optics, lenses, gratings, waveguides, photonic crystal structures and metamaterials, couplers, wire guides, other components.

**MATERIALS FOR THz AND GHz DEVICES**
- linear and nonlinear optical materials and devices
- organic and inorganic source and modulator materials and devices
- RF, millimeter-wave and sub-millimeter-wave materials, devices and fabrication processes
- THz material systems
- silicon (Si)-based
- silicon carbide (SiC)-based
- silicon-on-insulator (SOI)-based
- gallium arsenide (GaAs)-based
- gallium nitride (GaN)-based
- indium phosphide (InP)-based
- silicon germanium (SiGe)-based
- diamond-based
- graphene-based
- other-based.

**ENHANCEMENTS, IMPROVEMENTS AND ADVANCES IN RF, MILLIMETER-WAVE AND SUB-MILLIMETER WAVE GENERATION, MODULATION AND DETECTION**
- RF, millimeter-wave and sub-millimeter-wave integrated photonic devices
- RF, millimeter-wave and sub-millimeter-wave and photonic integration process development
- RF, millimeter-wave and sub-millimeter-wave performance characterization
- phased-array and single-element photonically-driven antennas
- phased-array and single-element antennas, systems, concepts, approaches
- low-Vp and wide-bandwidth modulators
- direct-driven millimeter-wave lasers and amplifiers
- millimeter-wave, sub-millimeter and THz photonic crystal devices and applications
- RF, millimeter-wave, sub-millimeter-wave and THz photonic up- and down-converters
- photonic phase locked loops
- RF, millimeter-wave, sub-millimeter-wave, and THz MMICs
- RF, millimeter-wave, sub-millimeter-wave, high power solid-state and electronic vacuum devices.

**SIMULATIONS AND MODELING**
- simulations and/or modeling of RF devices, components, and/or systems
- simulations and/or modeling of millimeter-wave devices, components, and/or systems
- simulations and/or modeling of sub-millimeter-wave devices, components, and/or systems
- simulations and/or modeling of THz devices, components, and/or systems
- modeling of optical components, optical systems, imaging systems, wave propagation, modes, Gaussian beam characteristics, couplers, antennas, performance limitations, software designs.

**SPECTROSCOPY**
- terahertz and/or sub-millimeter spectroscopy, DNA segment identification, cell abnormalities, cancer identification and screening, imaging, medical and dental detection
- identification of biological and chemical detection and fingerprinting
- identification of hazardous, explosive, and/or dangerous materials
- identification of chemical or biological threats
- scalar and vector network analysis at sub-millimeter and terahertz frequencies
- measurement techniques at sub-millimeter, millimeter, and terahertz frequencies
- identification of organic and inorganic compounds using terahertz and/or sub-millimeter wave spectroscopy
- high-speed and/or high-resolution spectroscopic techniques, methods, approaches
- novel approaches, systems, designs, techniques, reflection, sensitivity, applications.

**BIOMEDICAL APPLICATIONS**
- DNA identification, burn analysis, tissue abnormality identification, pharmaceutical, dentistry, medical, clinical, commercial applications
- cancer, burn, and/or water content detection; high sensitivity, high contrast, etc.
- biological and/or physiological aspects and/or related effects of RF, millimeter-wave, sub-millimeter-wave and/or THz
- imaging techniques, methods, hardware design, strategies, technologies and techniques.

**COMMUNICATION AND SENSING SYSTEMS**
- terahertz, RF, millimeter-wave and sub-millimeter-wave communications, media characteristics, wireless communications, inspection systems, detection systems, screening systems
- RF, millimeter, sub-millimeter-wave and microwave links
- RF, millimeter-wave, sub-millimeter-wave photonic communication and sensing systems.

**IMAGING AND SECURITY**
- RF imaging devices, components, and/or systems
- millimeter-wave imaging devices, components, and/or systems
- sub-millimeter-wave imaging devices, components, and/or systems
- THz imaging devices, components, and/or systems
- RF, millimeter-wave and sub-millimeter-wave active and passive imaging systems
- x-ray imaging including components, systems, power supplies, applications, techniques, etc.
**ASTRONOMY AND SPACE AND OTHER AREAS OF PHOTONICS, LIGHT, AND MATTER**
- Imaging techniques, ultra-sensitive detection, applications, programs
- Satellite communications
- Space based electronics and devices
- Satellite components and systems
- Space and satellite qualifications and testing
- Radiation hard electronics
- High-energy physics and related topics
- Fusion and related topics
- Fission and related topics

**INNOVATIONS**
- New or novel terahertz, RF, millimeter-wave and sub-millimeter, microwave concepts, systems, applications
- New or novel developments in THz or sub-millimeter waves including teaching, instruction, course offerings, simulations, conceptional and/or experimental procedures, implementations, concepts, etc.

**POWER SUPPLIES AND ELECTRONIC POWER CONDITIONERS**
- High-power power supplies
- Low- and ultra-low-power power supplies
- Low-noise power supplies
- High- and ultra-efficient power supplies
- Associated power protection systems
- Energy-efficient power supplies
- Novel designs and architectures
- Specialized power electronics
- Portable power supplies
- Power supplies tailored for photonics and/or RF, mm-wave and/or THz applications
- Power supplies for lighting applications including solid state lighting such as LEDs, OLEDs and quantum dots.

**ORGANIC ELECTRONICS**
- DC and low frequency
- High frequency
- Novel designs and architectures
- Passive and active addressable arrays
- Low power
- Modulated configurations
- Sensing, detection and/or emitting
- Organic light emitting diodes and associated electronics
- Lighting therapy using solid state lighting including OLEDs.

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**BEST STUDENT PAPER AWARDS**
We are pleased to announce that a cash prize, sponsored by HÜBNER GmbH & Co. KG, will be awarded to the best student paper(s) in this conference. Qualifying papers will be evaluated by the awards committee. Manuscripts will be judged based on scientific merit, impact, and clarity. The winners will be announced during the conference and the presenting authors will be awarded a certificate and cash prize.

**To be eligible for the Best Student Paper Award, you must:**
- Be a student without a doctoral degree (undergraduate, graduate, or PhD student)
- Be listed as an author on an accepted paper within OE106
- Have conducted the majority of the work to be presented
- Submit your manuscript online by **20 January**
- Present your paper as scheduled
- Be present at the Awards Ceremony.

**Nominations**
Details about how to apply for this Best Student Paper Award will be sent to all accepted authors shortly after the Author Acceptance Notifications are sent on **12 October 2015**.

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**IMPORTANT DATES**

**Abstracts Due:**
3 **AUGUST 2015**

**Author Notification:**
12 **OCTOBER 2015**

**Post-Meeting Manuscript Due Date**
(all except conferences OE114, OE131, OE132, and OE133):
20 **JANUARY 2016**

**On-Site Manuscript Due Date** (conferences OE114, OE131, OE132, and OE133 only):
7 **DECEMBER 2015**

**Please Note:** Submissions imply the intent of at least one author to register, attend the conference, present the paper as scheduled, and submit a full-length manuscript for publication in the conference proceedings.
Gallium Nitride Materials and Devices XI (OE107)

**Conference Chairs:** Jen-Inn Chyi, National Central Univ. (Taiwan); Hiroshi Fujioka, The Univ. of Tokyo (Japan); Hadis Morkoc, Virginia Commonwealth Univ. (USA)

**Conference Co-Chairs:** Yasushi Nanishi, Ritsumeikan Univ. (Japan); Ulrich T. Schwarz, IMTEK, Univ. Freiburg (Germany); Jong-In Shin, Hanyang Univ. (Korea, Republic of)

**Program Committee:** Frank Bertram, Otto-von-Guericke-Univ. Magdeburg (Germany); Michael 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, LG Electronics Inc. (Korea, Republic of); Ki-Bum Nam, Seoul Semiconductor (Korea, Republic of); Ümit Özgür, Virginia Commonwealth Univ. (USA); Joachim Piprek, NUSOD Institute LLC (USA); Tae-Yeon Seong, Korea Univ. (Korea, Republic of); Chih-Chung Yang, National Taiwan Univ. (Taiwan); Euijoon Yoon, Seoul National Univ. (Korea, Republic of); Jen-Inn Chyi, National Central Univ. (Taiwan); Hanyang Univ. (Korea, Republic of); Hadis Morkoc, Virginia Commonwealth Univ. (USA);

This conference will focus on recent advances and challenges in GaN and related materials and electronic, switching and optical devices based on them, including potential applications. An important objective of this conference is to provide a forum for dissemination of the latest results on current and emerging topics in GaN and related materials and devices, as well as paving the way for in-depth discussions among participants. The topics of discussion will include, but not limited to, scientific and technological advances in all aspects of materials, including bulk GaN, ternaries and quaternaries, heterostructures, new substrates and new methodologies employed for alternative substrates such as Si, materials physics, devices (electronic and optical), device physics, novel devices such as microcavities, processing, and particularly devices with emphasis on light emitters, novel growth techniques, and device reliability. Topics for presentation and discussion will include but not be limited to:

**Bulk Growth**
- solution growth methods both very high pressure and not so high pressure, HVPE growth, or by any other method, characterization (structural, electrical, and optical), high resistivity bulk GaN.

**Epitaxial Growth, Bulk Growth, and Growth of Nanostructures**
- MOVPE, MBE, HVPE, substrates (patterned and planar, alternative orientations), precursors for dopants and constituents, epilatexial lateral overgrowth, alloys, low-dimensional systems, growth and exploitation of non-polar and semi-polar surfaces.

**Defects and Doping**
- defect structures at the structural and electronic energy levels, electronic states associated with group dopants (mainly involuntary kinds); techniques applied to illuminate the local nature of impurities; surface states; surface passivation; interface states; DLTS and its variants, low-frequency noise techniques, microscopy (TEM, electron holography, STM, AFM and its variants), x-ray analysis, novel dopants.

**Optical Characterization**
- photoluminescence, cathodoluminescence, optical emission imaging, non-linear optics, reflection spectroscopy, experimental measurement of energy band parameters and band structure, etc.

**Electrical Characterization**
- hall effect, carrier transport, magneto-transport, photoconductivity, thermally stimulated currents, etc.

**Structural Characterization**
- x-ray, TEM and its variants, local charge mapping, AFM detection of dislocations, stacking faults, etc.

**III-Nitride Nanostructures**
- including self-assembled and ordered quantum dots, quantum wires and related low dimensional structures.

**Fundamental Physics**
- band structure (including quantum well heterostructures), quantum size effects, strain effects, excitons (free and bond), polaritons, nanocavities, plasmonic effects, surface phenomena, polarization effects, piezoelectric effects, theoretical models.

**Devices**
- lighting by LEDs, LEDs for displays, LEDs for TVs, UV and visible LEDs (particularly radiative/nonradiative recombination processes and efficiency related topics), Laser diodes (particularly extended wavelengths toward longer and shorter wavelengths), FETs and dielectric gated FETs for high power switching and RF as well as high frequency applications inclusive of topics such as hold voltage and on current, hot phonon and hot electron effects, power dissipation, degradation/reliability, pathways for degradation and ways to improve reliability, UV and other optical detectors, chemical and biological sensors, field emitters, integration with other technologies, novel devices, device theory and simulations.
Oxide-based Materials and Devices VII (OE108)

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); Jean-Jacques Delaunay, The Univ. of Tokyo (Japan); Aleksandra B. Djurišić, The Univ. of Hong Kong (Hong Kong, China); 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); 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 Pauperté, 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); 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)

Oxides are remarkable multifunctional materials with a huge range of emerging applications spanning domains as diverse as solid-state lighting, photovoltaics, nanotechnology, biotechnology, capacitors, transparent electronics, next-generation memories, sensors, and spintronics. A number of breakthroughs over the past few years have driven an exponential surge in research activity in the field.

This interdisciplinary conference is intended to cover (but not be limited to) oxide materials for use as:

- transparent conductors
- opto-semiconductors
- ferroelectrics
- piezoelectrics
- dielectrics
- superconductors
- magnetic oxides
- metamaterials
- and various electrical/optical components

We will also have special sessions for:

- photovoltaics
- energy management: production, harvesting and storage
- “green processing” of materials/devices (the target is to promote cost-competitive, biocompatible materials and processes).

Presentations are solicited on the following topics:

- bulk growth and characterization
- thin film and multilayers (growth, interfaces, surfaces, and properties) of oxides, and oxides/non-oxide
- structural, mechanical, electrical, chemical, thermal, magnetic, and optical properties
- degenerate conduction
- plasmonics
- highly-correlated complex systems
- doping and band gap engineering
- photon-induced phenomena in complex oxides
- optical studies
- modeling and theoretical studies
- phase transitions
- amorphous oxide semiconductors
- processing, etching, annealing, and formation of ohmic and Schottky contacts

- applications including: LEDs, lasers, TCOs, transparent electronics, FETS, TFTs, memories, spintronics, scintillators, sensors, actuators, SAW devices, MEMS, optical coatings plus devices for high temperature, RF, radiation hard, microwave, and radar applications
- integration with Si + beyond Si oxide electronics
- nanostructure growth, properties, and applications
- gate-controlled metal-insulator transitions in oxides
- multilayered oxide structures for optical materials
- graphene/graphene oxide/hybrids of graphene and oxides
- nanoionics.
Integrated Optics: Devices, Materials, and Technologies XX (OE109)

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. Garcia-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)

The scope of this conference (celebrating its 20th anniversary!) is to highlight the continuous growth and advancement of the field of integrated optics, its applications, devices, materials and technologies by soliciting papers that report progress in all branches of waveguide-based integrated optics (IO). Recent advances in fabrication technologies (such as lithographic, UV exposure or replication-based techniques) have made possible unprecedented control over properties and geometry of waveguide (WG) structures and IO elements down to the level of nanoscale constituents. This opens the door to unprecedented design flexibility with respect to overall device and transfer functions and enables a broad range of critical functions such as spectral filtering/analysis, routing, splitting, multiplexing, optical interconnects, laser-locking, and integration for numerous technological applications. Continuing innovations in waveguide optics provide supporting platforms for integrated sensors, bio-applications, signal processing, display technologies, optofluidics, photovoltaics and astronomy.

The goal of this conference is to provide an inter-disciplinary update and to explore the possibilities in waveguide materials comprising structures down to the nanoscale, active and passive devices and applications, manufacturing technologies, and theoretical and experimental supporting tools. The topics include, but are not limited to:

- WG optics of conventional and novel materials (polymers, hybrid sol-gel materials, semiconductors, ceramics glasses, ferroelectrics, hybrid and photorefractive materials, chalcogenide)
- nonlinear (NL) WG optics (parametric conversion in WG devices, periodically poled materials and poling techniques, NL materials for waveguide optics)
- biophotonics and waveguide sensors (near-/evanescent-field based devices, grating and resonator-based sensors, spectrometers, bio-applications, lab-on-chip)
- rare-earth-doped integrated devices (optical amplifiers, CW and pulsed lasers, use of nano crystals as rare-earth sensitizers) for telecom, sensing and other applications
- optofluidics (co-integration of microfluidic and IO), light guided into fluids, integrated optical tweezers and other applications
- integrated subwavelength and diffractive photonics (advances in submicron/nanoscale fabrication technologies and WG/IO-applications based thereupon: active, passive, reconfigurable diffractive and holographic processing devices: arrayed-waveguide, echelle, resonant guided-mode gratings, grating couplers, Bragg gratings, integrated holographs)
- enabling photonics integration technologies (dense and large scale component integration; hybrid and monolithic integration of light sources, SOAs, modulators, (de)multiplexers, integrated optical isolators, mode converters, feedback resistant lasers)
- IO circuits based on the physics and technologies of guided-wave nano-optics (gap and index guidance in photonic crystal structures, new guidance concepts, metamaterials, slowlight waveguides, photonic wires, nanopatterning and nanoreplication, nanostructural integration)
- surface plasmon waveguides and devices (plasmonic transmission lines, nanoparticle waveguides, dielectric-plasmonic waveguide coupling, periodic structures, plasmonics based sensors)
- testing and metrology of IO devices: surface analysis and structural characterization, spectroscopic and optical testing methods, reliability and life-testing
- theory and modeling supporting the above mentioned areas (numerical modeling methods and design tools, propagation phenomena in special WG structures, optical guided-wave circuit design; thermal and mechanical modeling of IO systems).
CALL FOR PAPERS

Smart Photonic and Optoelectronic Integrated Circuits XVIII (OEIC110)

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, Koc 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)

Papers are solicited in the area of photonic integrated circuits (PICs) and optoelectronic integrated circuits (OEICs) for smart systems. Optical, photonic, optoelectronic, electronic, and biological devices are integrated to address the issues of cost, space, performance, and reliability in an increasingly complex and connected world with dynamic environments that can benefit from smart solutions comprising integrated micro- and nanoscale circuits with artificial intelligence.

Demands for greater bandwidths have driven the telecom and datacom research and development communities to realize complex optoelectronic integrated circuits such as transceivers, switching systems, low chip optical sources, and multichannel optical distribution systems. The integration of multi-wavelength laser arrays, monitoring photodiodes, and drivers is becoming a reality in the communications arena. Other emerging fields include 3D time of flight (TOF) sensing/scanning, real-time 3D imaging/mapping, 3D printing, holographic displays, smart pixel arrays, neural networks, optical computing, optical data storage, medical diagnostics, chemical/biological sensing, and object detection, tracking, identification, and classification.

The increased level of integration in recent years has resulted in an increased level of miniaturization. The scientific and technological issues and challenges concerning the micro/nano-quantum-scale integration of optoelectronic devices, circuits, and systems include the size effect, proximity effect, energy confinement effect, microwafer effect, single photon effect, optical interference effect, high field effect, noise effect, quantum optical effect, nonlinear effects, and chaotic noise effects. Optical alignment between miniature devices, minimizing interconnection losses, and maintaining optical modes between devices, are important issues and require careful consideration. Scientists and engineers from academic institutions, research laboratories, and the industry are strongly encouraged to submit papers in the following areas:

- electronics and photonics convergence on a silicon CMOS platform
- integration of different photon and optoelectronic structure types (dots, wires, wells, planar, free space, 1D/2D/3D photonic bandgap devices, plasmonic devices, etc.)
- integration of miniatures (micro/nano/quantum-scale) photonic and optoelectronic devices, circuits, and systems; photonic/optoelectronic system on a chip; VLSI/Ulsi photonics and optoelectronics
- integration of novel devices using micro-rings, micro-disks, micro-spheres, micro-cavities, nano-photonic/nano-photonic devices, nano-lasers, nano-detectors, nano-wires, plasmonics, and metamaterials
- integration and assembly of micro- and nanoscale imaging systems
- integration and assembly of micro- and nanoscale smart sensor and detector systems
- miniaturization and integration of THz and microwave photonic devices, components, and systems
- integration and interconnection of different functionalities (lasers, amplifiers, detectors, sensors, modulators, isolators, circulators, switches, attenuators, couplers, phased arrays, multi/demultiplexers, filters, wavelength converters, polarization controllers, PMD/CD compensators, control electronics, etc.)
- integration of dynamic devices actuated through thermo-optic, electro-optic, acoustooptic, magneto-optic, and all-optical mechanisms
- monolithic and hybrid integration of optical, photonic, optoelectronic, electronic, and biological devices
- parallel and serial integration of optical, photonic, and optoelectronic devices
- fabrication and processing techniques (UV/deep UV/X-ray/e-beam lithography, casting, molding, embossing, etching, passivation, etc.)
- alignment, tolerance, coupling, and interconnections; designs for alignment tolerance relaxation
- optical interconnection and integration on photonic PCBs
- integration on novel flexible and rigid substrates
- assembly and packaging approaches and processes
- characterization (optical, electrical, optoelectronic, thermal, structural, etc.)
- standards, quality, reliability, qualification, and certification
- components, modules, subsystems, and systems
- smart PIC- and OEIC-based systems with artificial intelligence
- smart systems of special interest include nodes in self-healing optical communication networks, light detection and ranging (LiDAR) sensing systems with object detection, tracking, identification, and classification capability
- applications: communications, quantum information services, computing, data storage, sensing, scanning, imaging, mapping, displays, printing, industrial automation, robotization, autonomous vehicles, etc.

Refinement of existing schemes as well as novel concepts are within the scope of this solicitation. Authors are also encouraged to emphasize design-for-manufacturing criteria and manufacturing methods that enable the commercial deployment of PIC- and OEIC-based smart systems.
The field of Silicon Photonics continues to develop for an increasing number of application areas. Technology allowing the combination and miniaturization of optoelectronic and electronic devices in a integrated silicon platform is key to providing affordable smart components for many different markets. Integration offers reduced component costs and size reduction in photonic networks, particularly for the emerging markets. Examples continue to appear of integrated systems and sub-systems, with the Data Center application leading the technology pull. Similarly, smart measurement and sensing systems using integrated optoelectronics could be miniaturized and made available at low cost, allowing wide deployment for medical, biological, and environmental screening applications. The need for optical interconnects on ULSI circuits is now an essential part of the roadmap for Si microelectronics.

As systems emerge, there is an increased focus on implementation, interfacing, and test. Consequently work is increasing on automated wafer scale testing systems, packaging, and passive alignment, all realized at low cost. Silicon is the ideal platform for integration of smart components. Large diameter, high quality silicon, and silicon-on-insulator (SOI) wafers are available at a relatively low cost and provide many chips per wafer, even for large area optoelectronic circuits. Furthermore, the move to 300mm wafers only exacerbates the need for high quality test and packaging in order to reach mass market applications. The maturity of Si process technology provides leverage for manufacture of optoelectronic components and provides many ways to integrate optoelectronic and electronic components on the same substrate. For optical interconnects, other important topics are the overall circuit architectures, the total power consumption, and the technology for optical wiring, couplers, modulators, emitters, and detectors, I/O, multiplexing and increasing levels of integration.

The emergence of the field of mid infra-red Silicon Photonics also opens many opportunities for this maturing technology to be applied into another buoyant application area, perhaps more naturally aligned with sensing applications. This conference aims to provide an international forum for presenting the latest results and reviewing technologies relevant to the evolution of active and passive optoelectronic devices on Si and SOI platforms for all applications. Prospective authors are invited to submit original experimental and theoretical papers dealing with enabling technology for optoelectronic device integration on Si-based platforms.

Topics of particular interest are silicon photonics devices and systems based on:
- monolithic integration in Si and group-IV alloys (electronic and photonic integrated circuits)
- hybrid integration (heterostructures, flip-chip bonding, and multi-chip modules on silicon)
- optical interconnect technology for ULSI
- wafer scale testing
- packaging
- optical I/O
- towards high-volume manufacturing
- systems and energy
- cost models for Si Photonics
- 300mm-technology implementation
- Low-power devices
- LEDs
- lasers
- detectors
- amplifiers
- wavelength converters
- mux/demux (rings, arrayed waveguide gratings, etc.)
- modulators
- interposers
- passive alignment
- switches
- waveguides (SOI, SiO2/Si, SU-8, or sol-gel materials, including design innovation for high-index contrast Si-nanophotonic waveguide systems)
- coupling
- Si photonic crystals and micro-cavities
- lab-on-a-chip
- optoelectronic sensors on Si for measurement and screening in biological, clinical, genomics, proteomics, and environmental applications
- micro-opto-electro-mechanical systems (MOEMS)
- mid-infrared applications
- quantum photonics
- long-wavelength communications.
CALL FOR PAPERS

Optical Interconnects XVI (OE112)

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); Patrick B. Chu, Sandia National Labs. (USA); Alan F. Evans, Corning Incorporated (USA); Alexei L. Glebov, Optigrate Corp. (USA); Ruth Houbertz, Multi Photonics GmbH (Germany); Marika P. Immonen, TTM Technologies, Inc. (Finland); Takaaki Ishigure, Keio Univ. (Japan); Wei Jiang, Rutgers, The State Univ. of New Jersey (USA); Mikko Karpinnen, VTT Technical Research Ctr. of Finland (Finland); Christian Koos, Karlsruher Institut für Technologie (Germany); Bert-Jan Offrein, IBM Research – Zürich (Switzerland); Hyo-Hoon Park, KAIST (Korea, Republic of); Nikos Pleros, Aristotle Univ. of Thessaloniki (Greece); Richard C. Pitwon, Univ. of Miami (USA); Ian H. White, Univ. of Southampton (United Kingdom); Peter Van Daele, Univ. Gent (Belgium); Michael R. Wang, Univ. of Miami (USA); Ian H. White, Univ. of Cambridge (United Kingdom); Chris Q. Wu, Corning Incorporated (USA); Xiaochuan Xu, Omega Optics, Inc. (USA)

Papers are solicited in the following areas:

OPTICAL INTERCONNECT TECHNOLOGIES

• electronic/photonics printed circuit boards and backplanes
• optical interconnect design and system architectures, end-to-end link modelling and simulation
• machine-to-machine, board-to-board, chip-to-chip, intra-chip optical interconnects
• reduced size and loss interconnects
• ultra-short reach optical interconnects
• optical waveguide hybridization techniques for electronic/photonics integration
• waveguide substrate guided, lay-in fiber and free space optical interconnects
• trends in ultra-short reach optical links.

NANOPHOTONICS FOR OPTICAL INTERCONNECTS

• Si, Ge, SiGe, III-V devices and integration
• small size and low loss waveguide-based active and passive devices
• grating coupler and adiabatic taper approaches
• subwavelength gratings for on-chip interconnect applications
• 2D membrane based devices
• photonic crystals and surface plasmonic waveguides for interconnect applications
• new regimes involving surface plasmons or optical polaritons
• implementation of optical interconnects in Si CMOS process compatible environment
• nanoscale fabrication technologies. Measurement and testing methods for hybrid electronic/photonics assemblies
• reliability assessment of optical interconnects, sub-systems and electronic/photonics assemblies

PARALLEL OPTICAL LINKS AND ACTIVE OPTICAL CABLES

• data communication systems with parallel optical links and active optical cables
• integration and packaging technologies for parallel transceivers and optical cables
• parallel optical engines for on-board data communication
• optical engines for consumer electronics active optical cables
• optical bus architectures for on-board interconnects
• ultra-low power optical links
• laser and photodiode array components for interconnect applications
• assembly and alignment of arrayed components.

OPTICAL COMMUNICATION IN DATA CENTERS

• optical interconnect solutions for rack- and enclosure scale disaggregation
• optically enabled hyperconverged infrastructures
• multi-tier optical connectivity
• WDM switching technologies and architectures for intra-data center interconnections
• parallel optics for data center optical interconnects: inter-rack, inter-board and inter-chip designs.

MICRO-OPTIC AND PHOTONIC PACKAGING TECHNOLOGIES

• micro-optic component assembly and integrated micro-opts
• heterogeneous and monolithic device integration including silicon photonics
• 3D optical routing and assembly of coupling elements
• new connectors and novel light coupling approaches
• prototyping for advanced interconnect fabrication
• processing and connectorization of optical fibers
• reflective, refractive and diffractive micro-optic elements and micro-optical systems
• active optical alignment and assembly automation
• passive micro-optic alignment techniques
• interconnect reliability, qualification and test.

MATERIALS FOR PACKAGING AND INTERCONNECTS

• advanced photonics packaging materials
• thin glass for board, modules and panel-level packaging
• polymers and organic/inorganic hybrid materials for optical interconnects
• graphene-based and transitional metal dichalcogenide membrane-based novel nanomaterials
• AuSn bonding for flip-chip with highest precision
• polymer optical fibers
• mid infrared fibers
• structures fibers, multicore fibers
• nanomaterials and applications
• novel bonding materials and processes.
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); Patrick C. Mock, Ziva Corp. (USA); Nada A. O'Brien, JDSU (USA); Daniel J. Reiley, California Institute of Technology (USA); Alain Villeneuve, Genia Photonics Inc. (Canada)

This conference provides an interdisciplinary forum for engineers and scientists to present their ideas, designs, case studies, and success stories in photonic instrumentation development. It also offers attendees an invaluable insight into the latest developments and trends in the continuously-evolving field of photonic instrumentation engineering.

The significant expansion and proliferation of photonic instrumentation has been driven by continuing advancement in several key areas: the discovery of new physical phenomena, the commercial availability of a wide variety of sophisticated optoelectronic devices, and the development of powerful simulation and analysis technologies. These improvements have led to technology that can exploit photons or optical fields and their interactions with matter across a wide expanse of scientific and industrial application areas. Today’s instrumentation developers are able to take advantage of a broad range of commercially available components for the generation, propagation, control, and detection of photons and optical fields for achieving system level design and development goals.

Contributions at both the component, sub-system, and system levels in the multi-disciplinary area of photonic instrumentation engineering are desired. Consideration will be given to submissions showing system-level interactions between various components and subsystems of photonic instruments, rather than the development of individual photonic components. Paper submissions related to the integration of optical radiation sources with various types of electro-optical components and photo-detectors, as well as with active and passive photonic modules for the conditioning, delivery, and control of the propagating radiation, will also be considered. Emerging photonics technologies and instrumentation schemes are welcome.

Theoretical and experimental papers are solicited in the following and related areas:

**PHOTONIC INSTRUMENTATION DESIGN, DEVELOPMENT, FABRICATION**
- novel photonic instrumentation architectures, design approaches and concepts
- modeling, tolerance analysis and optimization of photonic instruments
- innovative packaging and integration solutions
- agile, reconfigurable and real-time-controlled photonic instruments
- photonic instruments in extended spectral domains, including THZ, EUV, and x-ray

**LIGHT SOURCES IN PHOTONIC INSTRUMENTATION**
- novel coherent and incoherent emitters
- photonic instrumentation based on unique properties of laser radiation
- light control in spatial, spectral and temporal domains
- laser beam shaping and structured illumination
- interaction between emitters and other system components

**METROLOGY, CHARACTERIZATION, AND FABRICATION OF PHOTONIC INSTRUMENTS**
- photonic metrology instrumentation on the nano, micro, and macro levels
- system-level evaluation and performance verification
- calibration schemes and reference techniques
- photonic instruments alignment techniques

**SENSORS AND RUGGEDIZED SYSTEMS**
- innovative sensor architectures and applications
- high sensitivity, high dynamic range and broadband detectors and detection techniques
- fiber sensors and sensor networks
- metamaterials, plasmonic, and nanostructures in photonics instrumentation
- sensor miniaturization and functional integration
- photonics sensors in harsh and industrial environments
- sensors for display, virtual and augmented reality, and interactive gaming and learning

**APPLICATIONS OF PHOTONIC INSTRUMENTS**
- astronomical and imaging photonic instruments
- consumer applications: optical data storage, augmented reality devices, information display
- hyperspectral imagery and laser spectroscopy
- laser instrumentation in material processing and manufacturing; laser-matter interactions
- lithographic and projection instrumentation
- medical and bio-photonics instrumentation
- metrology instrumentation: interferometry, profilometry, polarimetry, reflectometry, scatterometry
- nanofabrication and self-assembly
- particle micromanipulation
- remote sensing and probing
Quantum Sensing and Nano Electronics and Photonics XIII (OE114)

Conference Chair: Manijeh Razeghi, Northwestern Univ. (USA)

Conference Co-Chairs: Gail J. Brown, Air Force Research Lab. (USA); Jay S. Lewis, Defense Advanced Research Projects Agency (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); Philippe Christol, Institut d'Electronique du Sud (France); 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. Lii, IQE Inc. (USA); Jerry R. Meyer, U.S. Naval Research Lab. (USA); Maya Mikhailova, loffe Physico-Technical Institute (Russian Federation); Jan Misiewicz, Wrocław Univ. of Technology (Poland); Oleg Mitrofanov, Univ. College London (United Kingdom); Ekmel Özbay, Bilkent Univ. (Turkey); Shanee Pacley, Air Force Research Lab. (USA); 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); Eric Tournié, Univ. Montpellier 2 (France); Alessandro Tredicucci, Lab. NEST (Italy); Miriam Serena Vitiello, Consiglio Nazionale delle Ricerche (Italy); Sheng Wu, California Institute of Technology (USA); Rui Q. Yang, The Univ. of Oklahoma (USA); John M. Zavada, National Science Foundation (USA)

One of the objectives of science is to enhance our senses and better understand the universe around us; by harnessing quantum size effects and/or nanophotonics it becomes possible to develop novel approaches to sensing.

Infrared detectors expand our vision into the realm of heat by allowing the remote sensing of an object’s temperature; single-photon detectors let us detect light at levels far below what the eye is capable of; all of this has had a dramatic impact on how we perceive our environment. LEDs, lasers, and other nanophotonic devices can be added to create integrated sensing systems that allow us to see a wire array of phenomena beyond just photons. These newfound abilities have in turn spurred the further development of advanced sensing systems. Future advances in this area are inspired by the use of quantum size effects to achieve higher efficiency and added functionality.

The purpose of this conference is to provide an opportunity to get a broad overview of the current state-of-the-art and future prospects in quantum sensing and nano electronics and photonics. By bringing together experts in physics, materials science, fabrication technology, and applications, we will have a well-rounded view of how science has progressed towards developing integrated and versatile detection systems. The diversity of topics discussed has been chosen to encourage the exchange of ideas between the different relevant disciplines.

Contributions for this conference are solicited in the following areas:

- quantum devices, including solar cells, LED lasers, detectors, pin, avalanche photodiodes, QWIP, BIB, UV, visible, IR, FIR, etc.
- applications (quantum spectroscopy, imaging, communications, cryptography)
- new quantum structures (quantum wells, wires, dots)
- characterization (optical, electrical, structural, etc.)
- micro- and nano-fabrication technologies (e-beam lithography, deep UV, etching, passivation, contacts, etc.)
- photonics band gap (PBG)
- semiconductor quantum detectors, FPAs and ROICs for UV, visible, Type II, MWIR, LWIR, VLWIR, THz, and applications
- nanophotonics, metamaterials, graphene, active plasmonics
- THz emitters and receivers (quantum cascade lasers, narrow band-gap, III-Nitride, etc.)
- single photon counting detectors, FPAs and their applications
- biosensing.

AWARDS FOR BREAKTHROUGHS IN HUMAN-CENTERED RESEARCH

SPIE announces the continuation of the Awards for Breakthroughs in Human-Centered Research to be presented at SPIE Photonics West 2016. The awards will recognize the scientific contribution of the best student(s) 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. The winner(s) will be announced at SPIE conference on Quantum Sensing and Nano Electronics and Photonics XIII, chaired by Prof. Manijeh Razeghi, and will be awarded a commemorative plaque as well as a cash prize at the Late News session where the work is presented. These awards are possible due to the support of the successful research efforts of Prof. Manijeh Razeghi of the Center from Quantum Devices at Northwestern University.

IMPORTANT: The proceedings for this conference will be printed prior to the meeting and made available at Photonics West. Full-length manuscripts (6-page minimum) are mandatory for participation in the conference. Note the earlier manuscript due date of 7 December 2015.
Photonic and Phononic Properties of Engineered Nanostructures VI (OE115)

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)

Engineered nanostructures (e.g., photonic crystals, metamaterials) offer the possibility of controlling and manipulating the propagation of electromagnetic (or acoustic) waves within a given frequency range. The existence of photonic (and phononic) bandgaps in such nanostructures makes it possible to fabricate ultrasmall optical (and acoustic) devices like lasers and cavities. These cavities find applications in several novel fields including cavity quantum electrodynamics (QED) and quantum computations.

Optical and acoustic metamaterials other unique material platform in which the geometrical engineering of the nanostructure allows for novel properties (e.g., negative refraction) that cannot be found in conventional bulk materials. Plasmonic structures are another set of structures that have recently demonstrated unique capabilities to control the propagation of light. Such structures are formed by engineering the metallic structures either separately or when combined with dielectric materials. Plasmonic structures provide unique capabilities that cannot be matched by conventional bulk materials.

The ability to control the propagation of electromagnetic (or acoustic) waves using engineered nanostructures (e.g., by including appropriate defects to the photonic crystal structure) makes them very attractive for the development of new set of devices that take advantage of the novel optical (or acoustic) properties of these structures. The ability for custom designing the electromagnetic mode patterns, frequencies and numbers opens up the possibility of novel devices (imaging systems, miniature lasers and detectors at different frequencies, switches, filters, interconnects, etc.) and interesting physics. The outstanding potentials of such devices to revolutionize communications, sensing, information, and energy technologies along with the existence of several challenges in design, optimization, fabrication, and characterization of such structures have inspired extensive research activities in the field of engineered nanostructure materials and devices.

It is the aim of this conference to bring together scientists and engineers worldwide to review and discuss state-of-the-art developments and future trends of engineered nanostructure materials and devices. Among such structures, photonic and phononic crystals, metamaterials, and plasmonic structures will be extensively covered.

We encourage authors to submit abstracts and manuscripts demonstrating their research achievements concerning, but not limited to, the following topical areas:

- fabrication of 2D and 3D structures (photonic and phononic crystals, plasmonic structures, and metamaterials)
- numerical methods for the analysis of engineered nanostructure materials and devices
- photonic and phononic crystal waveguides, cavities, and active devices
- novel plasmonic devices and their characterization
- novel photonic and optoelectronics materials (e.g., planar materials, graphene, diamond)
- photonic crystal active devices
- nonlinear effects in plasmonic structures, photonic crystals, and metamaterials
- novel phenomena in engineered nanostructures
- acoustic metamaterials
- negative index properties
- super-dispersive photonic crystals for wavelength demultiplexing and spectroscopy
- dispersion engineering in photonic crystals
- novel applications of plasmonic, photonic crystal, and metamaterial devices (e.g., sensing, communications)
- applications of photonic crystal cavities in lasing, cavity QED, and quantum computation
- photonic crystal fibers; supercontinuum generation
- integration of photonic, phononic, plasmonic, fluidic, and/or electronic functionalities on a single substrate.
High Contrast Metastructures V (OE116)

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)

A completely new class of planar optics has emerged using subwavelength metastructures with a large index contrast. Uniform high contrast gratings (HCGs) can be used to create high reflection mirrors, replacing distributed Bragg reflectors (DBRs). This has enabled simple fabrication of long-wavelength vertical cavity surface emitting lasers (VCSELs) and dynamically tunable all-pass filters (APF) for fast optical beam steering. HCGs can be designed to result in high-Q resonators with surface-normal output, enabling massive wafer-scale semiconductor lasers and optical filters. They are used to form hollow core waveguide for chip-scale ultra-low loss photonic delays. Vertical to in-plane waveguide coupler can be made with high efficiency for easy integration with Si-photonics circuits. Chirped HCGs are shown as excellent focusing reflectors and lenses with very high numerical apertures. Finally, simple but rigorous theoretical studies lead to intuitive device designs. The field has seen rapid advances in exciting experimental demonstrations and theoretical results.

This conference aims to provide an international forum for presenting the latest results and reviewing technologies relevant to new physics and devices using high contrast subwavelength metastructures. Prospective authors are invited to submit original experimental and theoretical papers dealing with enabling technology for optoelectronic device integration either on Si-based platforms or III-V platforms. Topics of particular interests include incorporation of high-contrast metastructures in the following:

- VCSELs and tunable VCSELs
- membrane lasers
- filters and tunable filters
- WDM multiplexer and de-multiplexers
- optical switches
- broad band mirrors, lenses, and focusing mirrors
- hollow core waveguides
- slow light devices
- nonlinear optics; coherent optical mixers
- high-Q resonators
- optical modulators
- optical amplifiers
- couplers for in-plane waveguide and surface-normal optical beam
- omni mirrors and spatial-mode filtering
- plasmonic HCG
- manipulation of polarization
- beam scanners
- novel fabrication techniques and materials
- photonic crystal devices and guided mode and leaky mode resonances
- physics and devices for optomechanics
- physics and theory
- novel devices.
Quantum Dots and Nanostructures: Growth, Characterization, and Modeling XIII (OE117)

Conference Chairs: Diana L. Huffaker, Univ. of California, Los Angeles (USA); Holger Eisele, Technische Univ. Berlin (Germany); Kimberly A. Dick, Lund Univ. (Sweden)

Program Committee: Minjoo Larry Lee, Yale Univ. (USA); Baolai L. Liang, Univ. of California, Los Angeles (USA); Huiyun Liu, Univ. College London (United Kingdom); Zetian Mi, McGill Univ. (Canada); Jeffrey C. Owrutsky, U.S. Naval Research Lab. (USA); Adriana Passaseo, Univ. del Salento (Italy); Qi Hua Xiong, Nanyang Technological Univ. (Singapore)

This conference seeks to highlight the most compelling work in nanostructures. We host a unique forum where materials scientists, semiconductor device designers, theorists and device experts can exchange recent results on this focused topic. Invited papers will represent international expertise in growth, characterization of quantum dots, nanowires, metallic nanostructures, and modeling of the optoelectronic properties of quantum nanostructures, metamaterials, and devices. Hot topics focus on nanomaterials (quantum dots, nanowires) to revolutionize optoelectronics through new device and integration possibilities. The geometry, i.e. size and shape, controls the properties of a quantum structure. However realization of their potential requires control of their geometry, location, composition, and surface interaction. This is often studied by development of unique models as well as development of methods to create the desired structure and of associated characterization techniques to measure the appropriate properties. Topics of metamaterials and plasmonics naturally combine with nanostructure technology and will be included in this conference.

Contributed papers are solicited concerning growth, characterization, and modeling of the following areas:

* nanowires, quantum dots, nanoparticles, metamaterials, plasmonics
* nanoscale properties such as energy transport, nonlinear processes, decoherence
* epitaxial growth, characterization, modeling
* nanofabrication and nanolithography
* characterization techniques and modeling
* optics of single quantum dots, ensembles, and exploratory devices
* single-photon emitters and detectors based on quantum dots
* devices based on nanomaterials, metamaterials, plasmonics.

SPECIAL TOPIC:

Nanowires—one full-day symposium to focus on epitaxy, synthesis, modeling, devices, and integration.
Advanced Fabrication Technologies for Micro/Nano Optics and Photonics IX (OE118)

LITHOGRAPHIC FABRICATION APPROACHES
- fabrication methodologies based on binary, grayscale, interferometric, and laser direct-write techniques
- additional techniques, such as additive lithography, and lift-off processes for sub-micron patterning.

ELECTRON AND ION BEAM FABRICATION OF MICRO- AND NANO-OPTICS
- single and multilayer resists
- analog and multi-exposure methods
- unique patterning and beam controls
- three-dimensional structuring.

ULTRAFAST LASER MICROMACHINING
- surface and bulk micromachining for micro- and nano-optics, fabrication of 2D and 3D waveguides, and the fabrication of novel optical elements.

ETCHING TECHNOLOGIES
- reactive ion etch (RIE) and chemically assisted etching of analog surfaces and high-aspect ratio structures
- focused ion beam and plasma jet etching
- processing of micro/nano optics and photonics in glass, silicon, and III-V and II-VI materials.

DEPOSITION AND GROWTH TECHNOLOGIES
- self-assembly and nucleation site control (2D and 3D)
- atomic-layer deposition
- lithographically defined selective growth
- pre-patterned and strain engineered templates.

MATERIALS ISSUES AND TECHNOLOGIES FOR POLYMERIC AND SOL-GEL MICRO- AND NANO-OPTICS
- LIGA, SLIGA, and related processes
- sol-gel processing methods for free-space and guided wave optics
- polymer replication
- novel photoresists.

PROCESSING OF NANOPHOTONIC DEVICES
- holographic lithography and multi-beam exposure methods for photonic crystals and metamaterials
- patterning and etching of multilayer DBR structures
- porous silicon
- selective etching techniques for 2D and 3D photonic crystal and metamaterials fabrication
- fabrication of polarization optics
- nano-patterning for site selective growth
- texturing and patterning for enhanced light extraction
- fabrication of plasmonic devices
- quantum device fabrication for micro and nano-devices.

MICRO- AND NANO-OPTICAL INTEGRATION AND MANUFACTURING
- passive and/or active integration
- quality and metrology issues
- volume fabrication techniques for micro- and nano-optics and photonics.

(continued next page)
MOEMS-MEMS IN PHOTONICS

Advanced Fabrication Technologies for Micro/Nano Optics and Photonics IX (OE118) (continued)

JOINT SESSION WITH OE118 AND OE120
Advanced Fabrication using a Digital Micromanufacturing Device or MEMS Array

Active research in the fields of advanced fabrication and MEMS Arrays, such as the digital micromanufacturing device, have shown application and promise for implementing lithography and other forms of high precision printing. The purpose of this joint session is to explore the relationships between MEMS technology and fabrication as they relate to:
• 3D printing
• additive manufacturing
• lithography
• structured light.

JOINT SESSION WITH OE118 AND LA113
3D Printing

The purpose of this joint session is to emphasize the growing field of laser printing/fabrication of micro/nano optics and photonics.

BEST PAPER AWARDS

We are pleased to announce that a cash prize, sponsored by Nanoscribe GmbH, will be awarded to the best paper and best student paper in this conference. Qualifying papers will be evaluated by the awards committee. Manuscripts will be judged based on scientific merit, impact, and clarity. The winners will be announced during the conference and the presenting authors will be awarded a cash prize.

To be eligible for the Best Paper Award, you must:
• be listed as an author on an accepted paper within this conference
• have conducted the majority of the work to be presented
• submit your manuscript online by 20 January 2016
• present your paper as scheduled.

To be eligible for the Best Student Paper Award, you must:
• be a student without a doctoral degree (undergraduate, graduate, or PhD student)
• submit your abstract online, and select “Yes” when asked if you are a full-time student, and select yourself as the speaker
• be the presenting author on an accepted paper within this conference
• have conducted the majority of the work to be presented
• submit your manuscript online by 20 January 2016
• present your paper as scheduled.

Nominations

All submitted papers will be eligible for the awards if they meet the above criteria.

MOEMS and Miniaturized Systems XV (OE119)

Conference Chairs: Wibool Piyawattanamethe, 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, Mirocrle 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)

Micro and nano-technology based optical components and sub-systems are enabling the creation of highly functional systems with diverse applications including optical switches and spectrum analyzers, human interface components, imaging instruments, direct-write lithography tools and all-optical signal processing modules. MOEMS (for Micro-Opto-Electro-Mechanical-Systems) are MEMS devices or systems that sense or manipulate light. They exploit refraction, reflection or diffraction principles to control light intensity, polarization or phase. Prominent applications include spatial light modulators and devices for beam steering and beam shaping. The SPIE conference on MOEMS and Miniaturized Systems will address various aspects relating to theory, design, fabrication, new materials, device characterization and testing (including reliability issues), and integration of systems enabled by MOEMS technology. Original technical papers related to device or technology development, systems integration, and new applications related to the following topics are solicited:

MOEMS DEVICES
• design and simulation of MOEMS devices
• MOEMS for beam shaping, aberration correction, focus control devices, enhanced imaging, and visual aids
• micro optical 1D, 2D, and 3D beam steering components
• micromachined ultrasonic transducer arrays
• micromachined diffraction grating, interferometric display and imaging devices
• micromachined microbolometer, pyroelectric, and other IR and thermal imaging sensors
• micromachined ultrasonic transducer arrays
• resonant microdevices
• spectroscopic imaging devices
• tunable devices, tunable filters, lasers, lenses, microlens arrays, and DOE
• micro lenses with control of fluid, polymers, electro-optic materials or metamaterials for
control of light or imaging/sensing applications
• photonic crystals, waveguides and filters
• optical shutters, modulators and optical switching devices.

SYSTEMS, SUBSYSTEMS, AND APPLICATIONS
• novel miniaturized optical subsystems, systems and instrumentation
• MOEMS for telecommunication, computer, automotive, and military applications
• MOEMS display systems (2D, 3D, holographic)
• MOEMS for imaging systems (camera, recognition, detectors, surveillance)
• MOEMS for biomedical/biological imaging systems e.g. optical coherence tomography, confocal, two-photon, SHG, fluorescence, Raman, acousto-optic, multimodality imaging
• MOEMS for endomicroscopic or microendoscopic imaging systems
• MOEMS for portable imaging systems
• Digital Micromirror Device (DMD) applications
• MOEMS instruments for space exploration
• MOEMS for medical diagnostics and health monitoring (Bio-MOEMS) and bench-on-a-chip
• MOEMS for sensing systems
• photonic crystal based subsystems and applications
• MOEMS for nanotechnology
• design and simulation of MOEMS based subsystems and systems
• control schemes and circuits for MOEMS
• MEMS based laser beam optical trapping.

TECHNOLOGY DEVELOPMENT
• fabrication techniques for MOEMS
• integration of CMOS and MEMS for optical applications
• integration of photonics and MEMS (fabrication and functionality)
• integration of waveguides, integrated optics or photonic crystals with MEMS
• MOEMS-based III-V and II-VI compound semiconductors
• new approaches for MOEMS fabrication technologies (e.g. nanoimprinting)
• enhanced capabilities through novel materials including silicon, silica, non-silicon materials and polymers
• packaging, testing, and characterization schemes for MOEMS
• MOEMS technology transfer to manufacturing
• interfacing techniques for MOEMS.

JOINT SESSION WITH OE119 AND OE120
Spatial Light Modulator
Various technologies including MEMS, LCD, lasers, LED, and OLED are under development to build high-performance projection and flat panel display systems. They are needed to provide large display sizes or high light efficiency in comparison to integrated displays for mobile phones, digital cameras, biomedical instruments, and personal digital assistants with ever decreasing size. This special session will give a comprehensive overview about recent development activities and results of the various light modulating technologies from modulating devices to module/system integration for novel applications.

JOINT SESSION WITH OE119 AND BIOS BO103
Microscopy
This special joint session is in conjunction with BIOS conference BO103: Endoscopic Microscopy. Papers are solicited that address the unique challenges to deliver high-fidelity microscopic imaging of tissue with a miniaturized instrument platform. Example topics include mechanisms for distal beam scanning, focus control and aberration correction using MOEMS devices, MEMS actuators or electrowetting optics; proximal scanning based on DMD or other SLM technologies; novel optical assembly and alignment techniques; highly corrected miniature optical systems.

BEST PAPER AWARDS
We are pleased to announce that a cash prize, sponsored by Samsung Advanced Institute of Technology, will be awarded to the best paper and best student paper in MOEMS and Miniaturized Systems. Qualifying papers will be evaluated by the awards committee. Manuscripts will be judged based on scientific merit, impact, and clarity. The winners will be announced during the conference and the presenting authors will be awarded a cash prize.

To be eligible for the Best Paper Award, you must:
• be listed as an author on an accepted paper within this conference
• have conducted the majority of the work to be presented
• submit your manuscript online by 20 January 2016
• present your paper as scheduled.

To be eligible for the Best Student Paper Award, you must:
• be a student without a doctoral degree (undergraduate, graduate, or PhD student)
• submit your abstract online, and select “Yes” when asked if you are a full-time student, and select yourself as the speaker
• be the presenting author on an accepted paper within this conference
• have conducted the majority of the work to be presented
• submit your manuscript online by 20 January 2016
• present your paper as scheduled.
Emerging Digital Micromirror Device Based Systems and Applications VIII (OE120)

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: Vikram V. Appia, Texas Instruments Inc. (USA); Sara L. Best, Univ. of Wisconsin School of Medicine and Public Health (USA); Roland Höfling, ViALUX GmbH (Germany); Alfred Jacobsen, Visitech AS (Norway); Yuval Kapeliner Rabinovitz, EKB Technologies Ltd. (Israel); Badia Koudsi, Optecks, LLC (USA); Srinivasa G. Narasimhan, Carnegie Mellon Univ. (USA); Michael W. O’Keefe, Greenlight Optics, LLC (USA); Hakki H. Refai, Optecks, LLC (USA); David Smith, Wintech Digital Systems Technology Corp. (USA); Ivo M. Vellekoop, Univ. Twente (Netherlands); Karel J. Zuzak, Univ. of Texas Southwestern Medical Ctr. (USA)

The Digital Micromirror Device (DMD) was conceived at Texas Instruments in 1987, following a decade of work on analog deformable-mirror and cantilever-mirror devices. This particular optical MEMS or MOEMS device has been applied most famously to digital cinema projection systems, enterprise projectors and highly portable personal displays, all of which were enabled by DLP® technology.

As evidenced in this well-attended conference at Photonics West 2015, the DMD and associated development platforms are enabling many exciting new systems and applications beyond traditional display technologies. By bringing together scientists, technologists, and developers, the goal of this conference is to highlight new and interesting means of applying DMD technology to end applications within these emerging markets.

Technical areas of particular interest include, but are not limited to:
- 3D displays (volumetric, light-field, multiviews, and holographic)
- additive manufacturing (rapid prototyping, 3D printing)
- 3D metrology, machine vision, and factory automation
- augmented reality
- automotive applications (head-up displays, interior displays, and headlight illumination)
- industrial printers and exposure systems
- direct imaging lithography
- beam/wave-front shaping
- spectroscopy (including mobile spectroscopy)
- biochemical visualization
- compressive sensing
- holography
- hyperspectral imaging
- spectrally tunable light sources
- intelligent lighting or displays
- NIR applications
- UV applications
- medical devices
- microscopy
- optical micromanipulation
- optical telecommunications
- security and surveillance
- sensing solutions.

JOINT SESSION WITH BIOS BO400 AND OE120
Biomedical Imaging and Cell Manipulation using a Digital Micromirror Device or MEMS Array

This special joint session is in conjunction with BIOS conference BO400: Imaging, Manipulation, and Analysis of Biomolecules, Cells, and Tissues. The utilization of the DMD and other Optical MEMS arrays to manipulate light has numerous medical applications ranging from cancer detection to operating room aids to the manipulation of individual cells.

Papers are solicited that address the uses of a DMD and other Optical MEMS arrays with:
- 3D medical visualization
- confocal microscopes
- hyperspectral imaging
- image-guided intervention
- microscopy
- optoelectronic tweezers
- organs on a chip
- oxygenation measurements
- phototherapy
- selectable wavelength light sources
- spectroscopy (including mobile spectroscopy)
- structured light or 3D imaging
- tissue illumination.

JOINT SESSION WITH OE118 AND OE120
Advanced Fabrication using a Digital Micromirror Device or MEMS Array

Active research in the fields of advanced fabrication and MEMS Arrays, such as the digital micromirror device, have shown application and promise for implementing lithography and other forms of high precision printing. The purpose of this joint session is to explore the relationships between MEMS technology and fabrication as they relate to:
- 3D printing
- additive manufacturing
- direct imaging lithography
- sensing solutions
- structured light, 3D metrology, machine vision, and factory automation.
Microfluidics, BioMEMS, and Medical Microsystems XIV (BO208)

The purpose of this conference is to provide an international technical forum to showcase recent advances in microfluidics, BioMEMS, and medical Microsystems. Microfluidic devices and systems have created a tremendous interest in many application fields, including life sciences, point of care (POC) diagnostics, and environmental applications. They offer many advantages over the existing macroscale methods of medical diagnostics and therapeutics. Thus, the range of interests has expanded from the molecular scale over single cells to more complex biological systems, and finally, living organisms. Further, several conventional methods in medical engineering for diagnosis and therapy have also been shifting towards miniaturization and MEMS technologies, including minimally invasive surgery, in vivo and ex vivo monitoring, and smart implants. Last, but not least, environmental applications have focused on developing inexpensive sensors for in situ monitoring of contaminants in the environment for public safety or measuring a person’s exposure to environmental contamination.

For many of these applications, microfluidics and other MEMS technologies are essential, as they provide the functional basis of many research tools as well as commercial devices and applications. Thus, over the past several years, there has been a significant increase in the activities associated with understanding, development, and application of micro-mechanical and microfluidic devices and systems for BioMEMS and medical Microsystems.

Papers are solicited on the following major topics and other related subjects:

**MICRO/NANO FLUIDIC COMPONENTS**
- fluid delivery, transport, and control
- micro-valves, -pumps, -mixers, and -reactors
- nanofluidic devices and systems
- microdroplet generation and manipulations
- micro-heating/cooling devices
- emerging microfluidic approaches (inertial microfluidics, electrofluidics, optofluidics)
- CAD, modeling, and analysis.

**MICROFABRICATION TECHNOLOGIES FOR MICROFLUIDICS AND BIOMEMS**
- polymer microfabrication methods
- emerging fabrication technologies (e.g., paper microfluidics)
- fluidic modules and interconnects
- fluidic packaging and assembly
- microstructuring of organic materials
- functional materials for microfluidics and BioMEMS
- surface texturing and modification.

**APPLICATIONS OF MICROFLUIDICS, BIOMEMS, AND MEDICAL MICROSYSTEMS**
- point-of-care (POC) medical monitoring and diagnostics
- nano bio/medical sensors
- optofluidics, on-chip waveguides and optical detection
- cell-based sensing devices and systems, flow cytometry
- implantable medical Microsystems
- sensors and systems for environmental monitoring
- sensors and systems for in vitro/in vivo monitoring and diagnosis
- microfluidic-based drug development and analysis.

**BEST STUDENT PAPER AWARD**
A cash prize sponsored by microfluidic ChipShop GmbH will be awarded to the best student paper.

**Judging and Requirements**
Presentations and manuscripts will be judged based on scientific merit, impact, and clarity. 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 by the deadline (18 January 2016).

**Nominations**
To be considered, submit your abstract online, select “Yes” when asked if you are a full-time student, and select yourself as the speaker.
Adaptive Optics and Wavefront Control for Biological Systems II (BO407)

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, Howard Hughes Medical Institute (USA); John M. Girkin, Durham Univ. (United Kingdom); Na Ji, Howard Hughes Medical Institute (USA); Benjamin Judkwitz, California Institute of Technology (USA); Ori Katz, Univ. Pierre et Marie Curie (France); Peter A. Kner, The Univ. of Georgia (USA); Pablo Loza-Alvarez, ICF - 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)

Wavefront engineering has greatly expanded the capability of optical microscopy and measurements in biological systems. Recent breakthroughs in measuring and controlling optical wavefront have led to many important applications, including deep tissue microscopy with improved imaging quality and depth, optical tweezers with sophisticated shape and momentum distribution, and three-dimensionally patterned optogenetic excitation. This conference will bring together leading experts in a variety of research fields that employ innovative wavefront control technologies for biomedical applications.

Technical papers concerning the following aspects of adaptive optics are appropriate for submission and consideration:

• adaptive optics for microscopy and optical coherence tomography
• guide-star probes for wavefront measurement and light guiding in biological tissues
• imaging neural connectivity and function in brain tissue
• focusing light through scattering tissues (optimization, transmission matrix)
• channel de-mixing for endoscopy
• wavefront shaping for photoacoustic and acousto-optical imaging
• applications of time-reversal in biological imaging, optical phase conjugation
• shaped beams for light sheet and structured illumination microscopy
• coherent optical adaptive techniques
• computed optical imaging techniques
• wavefront shaping devices (deformable mirrors, spatial light modulators).
Advances in Photonics of Quantum Computing, Memory, and Communication IX (OE121)

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); David H. Hughes, Air Force Research Lab. (USA); Fedor Jelezko, Univ. Stuttgart (Germany); 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); Stephen Garner, Naval Air Systems Command (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)

Advanced optical devices have the potential to satisfy the ever-increasing requirements of computing and communication systems. Applications can be envisioned in computational algorithms, in data transfer and routing, in memory and storage, and in clock stability. Increasingly these applications exploit the coherent and quantum characteristics of the interactions of optical fields with atomic and nanostructured materials. These are variously represented by optical and quantum interference and quantum entanglement phenomena, by spectral discrimination and dispersion of resonant transitions; and by incorporation of nonlinearity and feedback. The promises of quantum computing are well-recognized. They depend on the realization of material systems that exhibit slow decoherence as well as singular interactions with data and control signals from the programming environment. Development of these attributes is near fruition in optical materials with laser-born signal interactions. This capability is a continuing theme of this conference.

These principles connect naturally to those of quantum interconnects, dependent for bandwidth, power efficiency, timing and fidelity on the attributes of entanglement. Alternatively, manipulation of atomic or morphological dispersion can impact this requirement. Interfacing between different photonic and material systems is critical to the development of practical quantum information processing, as storage and transfer. Sourcing nodes and connecting links will likely not all be directly compatible. Interfaces will include single-photon frequency and bandwidth conversions and conversions between photonic and material states as well as the development of hybrid photonic components. Possible systems include atoms, Rydberg atoms, spins, quantum dots, rare earth ions, photonic crystal molecules all of which exhibit quantum characteristics which influence the throughput of the intended quantum operation. And of interest for a number of important applications is pushing these controls to the single-photon and single-particle level. Understanding and capability are maturing so that either the quantum aspects of bias processes can be addressed and controlled or with Poisson statistics – as if they do not derive from quantum ensembles. These, of course, also exhibit quantum characteristics which influence the throughput of the intended quantum operation. And of interest for a number of important applications is pushing these controls to the single-photon and single-particle level. Understanding and capability are maturing so that either the quantum aspects of bias processes can be addressed and controlled or with Poisson statistics – as if they do not derive from quantum ensembles. These, of course, also exhibit quantum characteristics which influence the throughput of the intended quantum operation.
and control of such photonic chips is also of much practical interest for components in optical processing and communication systems. This conference invites papers on the full range of these topics.

Diamond optical color centers, such as N-V centers, are recognized as the most interactive single-atom-like quantum mechanical systems. Such centers are addressable by single- and multiple-photon sources, can be entangled, and lately, can be produced with great control and precision on optical platforms. Thus, the so called “diamond photonics” has provided a new paradigm for nano-sensing and probing, quantum entanglement and computing, and biophotonics with unprecedented precision and resolution.

This conference will include special sessions on diamond photonics. The topics of interest will also include the quantum structures themselves; waveguides, dielectric resonators, metallic or plasmonic structures, and hybrid structures that combine bulk diamond or diamond nanoparticles with other materials.

Papers are solicited on the following and related topics:

• diamond waveguides and resonators
• hybrid structures combining diamond with other dielectrics or metals for quantum information sensing
• diamond bio-optics
• diamond opto-mechanics
• diamond based quantum computing and magnetometry
• Raman lasers
• optical aspects of quantum computing, materials, methods, and algorithms
• diamond-based quantum computing and magnetometry
• rare-earth-based systems for quantum computing
• plasmonics for enhanced quantum entanglements
• room temperature quantum computing and sub-shot noise sensing
• quantum optical entanglement for computational and communication links
• quantum plasmonics
• nanophotonics materials, devices, information transfer
• advanced optical memory and storage concepts, materials, interfaces, and error compensation
• applications for advanced optical memory technologies
• quantum-enhanced solar cells
• quantum communication
• quantum metrology, entanglement-enhanced metrology and quantum electronic metrology and more generally, few-photon metrology
• quantum repeaters and quantum cryptography
• smart photodetectors
• plasmonic detectors
• optical enhancements to electronic microchips
• photonic interface to single spins in semiconductor impurities and quantum dots
• ultra-narrow band holeburning-based filters
• nonbleachable and ultrasmall fluorescent markers for monitoring biological processes in cells
• nanophotonics and plasmonics in quantum biology
• approaches to enhanced accuracy in quantum measurements using squeezed and entangled light
• quantum-scale bias fields in quantum optics
• bias fields from collective quantum effects
• cascade and feed-back quantum processes
• simulation of experimentally difficult systems using photonic topological-based schemes. Simulated systems include synthetic gauges and topological order
• few-photon nonlinearities and hybrid quantum systems.
Slow Light, Fast Light, and Opto-Atomic Precision Metrology IX (OE122)

Conference Chairs: Selim M. Shahriar, Northwestern Univ. (USA); Jacob Scheuer, Tel Aviv Univ. (Israel)

Program Committee: John H. Burke, Air Force Research Lab. (USA); Shanhui Fan, Stanford Univ. (USA); Daniel Joseph Gauthier, Duke Univ. (USA); Kohzho 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)

Steep dispersions in engineered media of a wide variety have opened up a new direction of research in optics. A positive dispersion with negligible absorption can be used to slow the propagation of optical pulses to extremely low velocities. Similarly, a negative dispersion with small absorption or residual gain can be employed to create conditions under which pulses can propagate superluminally. These effects have now moved beyond the stage of theoretical curiosity, and have ushered in studies of a set of exciting applications, ranging from optical data buffering and signal processing to enhanced precision in interferometry.

Many different systems are currently being investigated in order to achieve optimal performances for these applications. For producing slow light via positive dispersion, the systems being studied include conventional electromagnetically induced transparencies (EIT) within a lambda system, population pulsations in a two level system, Raman and Brillouin gains, wave mixing in photorefractive media, photonic bandgap structures, coupled microresonators, and so on. For producing fast light via negative dispersion, the systems being studied include dual peaked Raman gain, dual pumped Brillouin gain in a fiber, coupled whispering gallery resonators, and photorefractive media, among others. Some important technological developments for advancing these systems include the developments of rubidium loaded hollow core fiber and Arrow waveguide, tapered fiber and SIN waveguides embedded in hot and cold rubidium vapor, dynamically adjustable photonic crystal structures, etc.

One of the key applications driving the field of slow light is optical data buffering. The key goal in this area is to develop a practical and compact system capable of producing a significant and controllable delay for high bandwidth optical data. An initial challenge in this endeavor was the perceived constraint imposed by a limited delay-bandwidth product. However, various clever ideas have been investigated theoretically and experimentally to pave the way for overcoming this constraint. Another arena of interest is the use of slow light for enhancing the sensitivity of interferometry. For example, the slow light process can be employed to enhance the precision of relative rotation sensing and spectrally resolved interferometry. Other applications of slow light include quantum memory, phased array antenna, precise timing of data pulses, fiber-optic sensors, and enhancement of non-linear effects.

It has also been shown that a fast light medium can be used to realize an absolute rotation sensor with a sensitivity that is orders of magnitude better than that of a conventional gyroscope. A fast light enhanced gyroscope may be sensitive enough to detect the gravitational frame-dragging effect terrestrially, via measuring the Lense-Thirring rotation. Furthermore, the fast light process has been used to demonstrate the so-called white light cavity (WLC). A WLC can be used to produce a long delay for a data stream of a high bandwidth, without being constrained by the delay-bandwidth product limitation encountered in a conventional cavity. Furthermore, a WLC can be employed to enhance the sensitivity-bandwidth product of the next-generation interferometer being developed for detecting gravitational waves. Recently, it has been shown that fast light can also be used for realizing ideal trap doors for data buffering with a very large delay-bandwidth product, with minimal distortion.

Traditionally, slow and fast light effects have been investigated in passive systems. However, it is also important to investigate the effects of steep dispersion — both normal and anomalous in an active medium — particularly in a laser. One example is the superluminal laser, which can be realized by using a gain medium with a dip in the gain profile. In particular, it has been shown that such a laser may be the ideal system for fast-light enhanced sensitivity in measuring a broad range of effects, including rotation, acceleration/vibration, magnetic fields, temperature, and so on. It may also be possible to realize a gravitational wave detector using such a laser. It is also possible to realize a subluminal laser, with a steep peak in the gain spectrum. Such a laser is also likely to have important properties, such as extreme robustness to perturbations. In order to optimize the utilization of the superluminal and subluminal laser, it is also important to study, theoretically and experimentally, the quantum effect limited noise properties thereof.

As evident from the discussions above, a key application of the steep dispersion that yields slow and fast light effects is in the field of precision metrology (PM). However, similar effects based on multilevel atomic resonances can also be used in general for PM, without necessarily making use of the slow/fast light effects explicitly. Thus, the scope of this conference has been expanded to include a sub-set of PM that makes use of optically induced transitions in atomic media.

This sub-area of opto-atomic precision metrology includes, but is not limited to, coherent population trapping based clocks and magnetometers in vapors or cold atoms, optical clocks using frequency combs, optically pumped microwave atomic clocks, ring laser gyroscopes using atomic gases, including those employing fast-light effects, laser induced atomic interferometry for rotation sensing, gravimetry,

(CEE122) (continued next page)
gravity gradiometry and magnetometry, and spin squeezing for enhancing the sensitivity of devices such as atomic clocks, atomic interferometers and magnetometers. Broadly speaking, any PM technology that employs atomic resonances excited by electromagnetic waves would be under the purview of this call, irrespective of the part of the spectrum occupied by the waves. As such, devices such as nuclear magnetic resonance (NMR) based gyroscopes would also be of interest. Also of interest are new ideas of gravitational wave detection using atomic interferometry, fast-light enhanced gravitational wave detection, and superluminal ring-laser based vibrometers and accelerometers.

The objective of this conference is to bring together researchers whose expertise covers the entire spectrum of technological advances and applications in the field of slow and fast light.

List of Topics:
- materials and systems for slow light
- optical data buffering and processing using slow light
- optical architecture for slow light mediated data buffering
- application of slow and fast light for interferometry
- theoretical and experimental advances in overcoming the delay-bandwidth product limitation
- materials and systems for fast light
- trap-door optical data buffering with fast light
- development and characterization of superluminal and subluminal lasers
- quantum noise and linewidth of superluminal and subluminal lasers
- advances in miniaturization of systems for producing slow and fast light
- quantum memory
- quantum communication
- quantum computing
- quantum optics
- optical communications
- nonlinear optics
- structural slow and fast light
- special and general relativity in slow and fast light
- plasmonics and nano-antennas
- metamaterials
- cavities and resonators
- photonic crystals
- optical fibers
- slow and fast light in microwave or THz domain
- sensors
- solid state materials
- integrated optics
- nanophotonics
- theoretical studies in slow and fast light
- experimental studies in slow and fast light
- novel concepts and applications for slow and fast light
- atomic clocks and magnetometers using coherent population trapping in vapors or cold atoms
- optical clocks using frequency combs
- optically-pumped microwave atomic clocks
- ring laser gyroscope using atomic gases
- laser-induced atomic interferometry for rotation sensing, gravimetry, gravity gradiometry and magnetometry
- spin squeezing for atomic clocks, atomic interferometers, and magnetometers
- NMR gyroscopes
- gravitational wave detection using atomic interferometry
- gravitational wave detection using slow or fast light
- fast-light-enhanced sensing of rotation, acceleration/vibration, magnetic field, temperature and other effects.
Complex light – light with structured wavefronts, amplitudes, phases and polarization – is the common theme in a rapidly expanding number of areas including orbital angular momentum of light; spin-orbit effects; optical beams with structured wavefronts and polarization distributions; high-order modes and their generation methods; optical waves that have singularities of phase and polarization; monochromatic and multichromatic vortices; vortex loops and knots; novel propagation dynamics; the interaction between singularities; new topological effects of multidimensional mode spaces; the interactions of complex light with rotating optical elements and in laser cavities; and the encoding of spatial modes onto light for communication. These studies also link significantly into other fields including optical trapping, lab-on-a-chip fluidics, microanatomy, and cold atoms. Increasing interest in quantum information has also led to developments in the multimode encoding of quantum information, quantum communication, quantum imaging, the use of orbital angular momentum quantum eigenstates for quantum computing, and new fundamental tests of quantum mechanics.

The complex light fields that can now be routinely produced offer an unprecedented level of control for probing and exerting forces on matter at the microscale and nanoscale level. The applied topics of this conference include the study of novel ways to manipulate matter with optical fields and to organize, rotate, bind, channel or sort microscale or nanoscale objects. The applications of optical forces on matter generally engage light fields with special structures. Optical tweezers today offer exquisite control over microscopic objects using methods based on intensity and phase differentials. They are also used to generate beams with vortices, singularities and other kinds of phase structure: hollow beams; tailor-made three-dimensional optical traps; sheets of light; curved focus beams and evanescent waves. The optical elements associated with the production and detection of such beam structures themselves have significant imaging applications. Through the exchange of linear or angular momentum between light and matter, optical force fields and torques can be produced with no conventional counterpart. Many of these methods offer new opportunities for implementation in ultrahigh resolution imaging, nanoscale probes, optical tools for biotechnology, nanofabrication and photonics, laser cooling, atom trapping, atom chips, particle sorting, and quantum information.

Together, these topics represent a highly active interdisciplinary field with a rich scope for new developments, notably spanning both fundamental and applied aspects. This conference provides a forum for advancing the development and application of new forms and methods of generating complex optical structures. The world-wide interest in these topics brings together an international community to discuss new fundamentals, methods, techniques, and devices. Papers on all such areas are solicited, focusing on any of the following or related topics:

- singular optics with phase or polarization discontinuities
- optical vortices and their interactions
- optical angular momentum
- geometric phases
- spiral phase contrast and vortex filters
- polarization management
- structured optical modes
- Laguerre-Gauss, Hermite-Gauss, Bessel, Mathieu, Airy, helico-conical beams
- pulsed structured beams, Bessel-X pulses
- optical tweezers and holographic optical trapping and manipulation
- optical binding
- optical manipulation using generalized phase contrast (GPC)
- optical robotics
- laser cooling, atom trapping and atom chips
- tractor beams and vector beams
- single-photon spin transfer
- single-molecule interactions
- quantum multimode spaces, quantum information and imaging
- entanglement and hyper-entanglement with spatial modes
- micro- and nanofabrication with structured light
- nano- and nanostructure devices
- optofluidics, optical sorting, optical fractionalization
- chirality in optical fields
- chirality in particles and film nanophotonics
- near-field and evanescent wave interactions
- ultrahigh resolution imaging
- electron vortices
- multimode propagation in fibers
- spin-orbit effects.
Optical and Electronic Cooling of Solids IX (OE124)

Conference Chairs: Richard I. Epstein, The Univ. of New Mexico (USA); Denis V. Seletsky, 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, Technion-Israel Institute of Technology (Israel); Joaquín Fernández, Univ. del País Vasco (Spain); Thomas Fraser, Air Force Research Lab. (USA); 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)

The laser cooling of solids and the related area of electroluminescent refrigeration and thermoelectric cooling have been advancing on many fronts. Work on the laser cooling of rare-earth doped solids has expanded to include materials comprised of ytterbium, thulium, erbium and dysprosium dopants in a variety of crystal and glass hosts. The quality of these cooling materials have has improved to the point that operating temperatures below 100 K have been demonstrated, approaching liquid nitrogen temperatures. Rare-earth-based cryogenic optical refrigerators may soon find applications in cooling infrared cameras, low-noise electronics, high-purity germanium gamma ray spectrometers and high-temperature superconductors. The last couple of years have also witnessed the first demonstration of laser cooling in semiconductors and cryogenic cooling by collisional redistribution of radiation and spontaneous Brillouin cooling in micocavities. Additionally, there has been great progress in cooling of small mechanical structures with radiation pressure and encouraging proposals for various implementations of Raman cooling. We encourage the submission of papers dealing with experimental, theoretical studies and the applications of optical refrigeration of solids, electroluminescent refrigeration, radiationally balanced lasers, and optomechanical cooling.

In parallel to the developments in laser cooling of solids, the alternative solid-state cooling technology of thermoelectric cooling has also seen great experimental and theoretical progress, with recent proposals of possibility of deep cryogenic operation of Peltier coolers. This conference will serve as a venue to present and discuss novel research on both optical and electronic cooling of solids.
Sustained research and development of vertical-cavity surface-emitting lasers (VCSELs) over the past thirty years has transformed VCSELs to viable components in the photonic marketplace for optical interconnect and sensing applications. Currently, VCSELs are being developed for a wide variety of applications, as well as being designed to conform to standard system architectures. This conference seeks to provide a forum for interaction between VCSEL researchers, product developers, and system engineers, and VCSEL component users to disseminate information about new advances and applications. Subjects of interest for this conference include the design, novel fabrication, and physical characterization of VCSELs. Papers concerning commercial VCSEL activity and new VCSEL applications are particularly solicited.

Topics of interest include:
• high-performance VCSELs (low-threshold current, high output power, high-speed modulation, etc.)
• VCSEL applications (smart pixels, optical data links, print heads, display, scanning, position sensing, sensors, etc.)
• VCSEL reliability (qualification, research)
• hybrid VCSEL integration with optics and/or microelectronics
• advances in fabrication technologies (selective oxidation, dry etching, wafer bonding, etc.)
• techniques and monitoring of VCSEL growth (uniformity, reproducibility)
• new materials for VCSELs
• 2D VCSEL arrays
• characterization and control of transverse optical modes and polarization
• new VCSEL devices including tunable VCSEL structures
• commercial VCSEL production techniques
• VCSEL packaging
• VCSEL/VCSEL similarities and differences.
High-quality, in-plane semiconductor lasers exhibit improved performance over a wide range of emission wavelengths from ultraviolet into the THz range. Devices are finding an ever increasing number of applications in, for example, telecommunications, printing, spectroscopy, displays, and medical diagnostics and therapy.

Well-developed GaAs- and InP-based lasers operating from the 0.8 to 2-μm are achieving multi-watt output powers with beams of high spatial and spectral purity. Lasers made from new material systems, such as dilute nitride-antimonides, bismides or quantum-dot active regions, are pushing performance and spectral coverage. Mode-locked diode lasers are demonstrating improvements such as reduced pulse length and timing jitter. Applications in communication are pushing advances in laser dynamics, including the use of coupled and/or chaotic semiconductor lasers. The GaN based laser field continues to innovate and make progress in terms of e.g. power, reliability and to extend operation deeper into the green and the ultraviolet parts of the spectrum. In the infrared, Sb-based quantum well lasers display high performance at wavelengths up to ~ 5 μm, and quantum cascade lasers operate at wavelengths from just below 3 μm to almost 300 μm. Emerging applications in the mid/far-infrared stimulate the development of high-efficiency, high-power quantum cascade lasers operating at an ambient temperature and with new functionalities such as ultrashort pulse generation, frequency combs, injection locking, and beam control. Novel laser sources utilize recent advances in plasmonics, nanophotonics, and nonlinear optics for efficient generation and manipulation of light. A variety of approaches are being developed for silicon based lasers, including hybrid structures by local area growth or wafer bonding.
CALL FOR PAPERS

Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XX (OE127)

Conference Chairs: Heonsu Jeon, Seoul National Univ. (Korea, Republic of); Li-Wei Tu, National Sun Yat-Sen Univ. (Taiwan); Michael R. Krames, Arkesso (USA); 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 Heukten, AIXTRON SE (Germany); Christoph Hoelen, Philips Lighting B.V. (Netherlands); Satoshi Kamiyama, Meijo Univ. (Japan); Jong Kyu Kim, Pohang Univ. of Science and Technology (Korea, Republic of); Markus Klein, OSRAM Opto Semiconductors GmbH (Germany); Kei May Lau, Hong Kong Univ. of Science and Technology (Hong Kong, China); Kurt J. Linden, NZ Biomedical (USA); Tien-Chang Lu, National Chiao Tung Univ. (Taiwan); 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); Klaus P. Streubel, OSRAM AG (Germany); Tetsuya Takeuchi, Meijo Univ. (Japan); Dong-Sing Wu, National Chung Hsing Univ. (Taiwan)

Light-emitting diodes (LEDs) have been evolving as the dominant light source in mobile phones, LCD displays, automobiles, and architectural lighting. The availability of devices emitting in the full visible color range including white, ultraviolet, and infrared enables a variety of exciting applications. Novel materials and device architectures combined with increasingly sophisticated manufacturing processes promise low-cost solid-state light sources with high efficiency and luminous flux. With the recent advances in efficiency, output power, and white quality, LEDs are seriously competing with conventional lighting technologies in all areas of lighting including the huge general lighting market.

The objective of this conference is to bring together scientists working on material and device aspects of LEDs, OLEDs, and solid-state lighting, and to review the current art in the field of efficiency, color quality, reliability, and other relevant factors. Theoretical and experimental papers will include, but will not be limited to the following areas:

LED APPLICATIONS AND SOLID-STATE LIGHTING
• LEDs for SSL, quality of white light, phosphors for SSL, packages for SSL, white binning.

NOVEL TECHNOLOGIES FOR LED DESIGN AND FABRICATION
• simulations and optimization of LED
• novel LED fabrication methods.

HIGH CURRENT PERFORMANCE AND “DROOP” IN INGAN LEDS
• fundamental physics and modeling
• droop-free and droop-optimized structures.

LED MANUFACTURING
• MOVPE, MBE, HVPE
• LED processing (etching, bonding, patterning, novel processes)
• LED packaging.

NOVEL SUBSTRATES FOR LED EPISTRUCTURE GROWTH
• non-polar substrates
• LEDs on silicon.

OLEDs AND OLED LIGHTING
• materials, structures, LED efficiency, device lifetime, white light.

NANOMATERIALS AND NANOSTRUCTURES FOR LEDS
• nanowires, quantum dots, low-dimensional structures
• photonic crystals and surface plasmons
• nano-phosphors.

UV/DUV-EMITTING LEDS
• LEDs for near- and deep-UV emission
• applications for UV/DUV LEDs.

NIR/IR-EMITTING LEDS
• LEDs for near-IR and IR emission including arsenides and phosphides
• applications for NIR/IR LEDs.
Components and Packaging for Laser Systems II (LA105)

Optical components are crucial for laser performance and form a foundation for advances in laser science and technology. All around the globe, vast and constantly growing research efforts are dedicated to developing new and more advanced laser components and systems. Along this line, packaging solutions for optical components enable their most efficient and consistent integration in laser systems. Laser component packaging is decisive for stable and reliable laser operations while not only improving laser characteristics but also enabling broader laser usability and applications.

This conference is dedicated to recent achievements and progress made in the field of optical components for lasers and laser systems as well as laser packaging solutions. A wide range of topics covers a variety of laser components and packaging technologies for semiconductor lasers, solid state lasers, fiber lasers, gas lasers, cw and pulsed lasers, ultra-short pulsed lasers, and others.

COMPONENTS FOR LASERS
- diffractive optical elements (DOE) and holographic optical elements (HOE)
- lenses and lens arrays
- mid-IR optical elements for lasers
- components for high-power and high-energy laser systems
- space qualification of laser components
- AR coating of components for high-power laser applications
- polarization optics for lasers
- recent advances in isolators, couplers, splitters, etc.
- grating components for lasers: volume Bragg gratings, blazed gratings, holographic phase gratings, and others
- components for laser line narrowing, mode locking, and mode selection
- novel active laser medium

LASER PACKAGING SOLUTIONS
- packaging, assembly, and mounting solutions of optical components in lasers
- packaging technologies for high-power lasers
- laser array packaging solutions
- thermal management of high-power lasers
- materials for laser packaging
- materials for component attachment (epoxies, solders, etc.)
- novel active and passive alignment techniques
- reliability of laser systems
- modeling and design of laser packaging
CALL FOR PAPERS

High-Power Diode Laser Technology and Applications XIV (LA108)

Conference Chair: Mark S. Zediker, Nuburu Inc. (USA)

Program Committee: Friedrich G. Bachmann, FriBa LaserNet (Germany); Stefan W. Heinemann, TRUMPF Photonics (USA); Volker Krause, Laserline GmbH (Germany); Robert Martensen, nLIGHT Corp. (USA); Kurt J. Linden, N2 Biomedical (USA); Erik P. Zucker, JDSU (USA)

The High-Power Diode Laser Technology and Applications conference intends to gather people to discuss the latest developments in high-power laser diode technology and how the technology is being used. The conference will focus on high-power diode laser devices based on bars, single emitters and multi-chip arrays. Topics of special interest include coherent beam combining, spatial beam combining, spectral beam combining, frequency stabilization, high-power and high-brightness fiber coupling, reliability and failure mode analysis, high-efficiency, high-temperature operation, and short wavelength high-power diode lasers for display applications. The conference provides a forum to introduce new developments in high-power diode laser technology and how new devices are being integrated into applications.

Papers are solicited on a wide range of topics related to high-power diode laser technology and applications, including but not limited to:

- high-power diode laser systems
- high-power single emitters, mini-bars and array technology
- reliability of high-power diode laser devices and packages
- high-brightness diode laser technology
- beam formation with high-power diode laser arrays
- beam combining of high-power diode lasers and arrays
- frequency stabilization of high-power laser diodes and arrays
- fiber coupling of high-power diode lasers and arrays
- high-power visible diode lasers for digital cinema and other projection display applications
- high power mid-infrared diode lasers
- fiber lasers pump sources
- solid-state laser pump sources
- 2D pump arrays for fusion energy systems
- diode laser system applications including, brazing, welding, heat treating, annealing, and cladding
- comparison of diode laser performance to other laser technologies.

SPECIAL ABSTRACT REQUIREMENTS: PEER REVIEW

Contributions are accepted based on a peer reviewing process. Contributions to this conference must include the following three separate abstracts:

- 100-word text abstract (for online program)
- 250-word text abstract (for abstract digest)
- 2-page extended abstract (for committee review only)
- The extended abstract is limited to two pages, including tables and figures.
- Include author names and affiliations; text; any figures, tables, or images; and sufficient data to permit peer review (main body text font size at least: 11 pt. Times/Times Roman).
- Only the extended abstract (PDF file) will be considered by the review committee when scoring submissions to determine acceptance.
- Extended abstracts will be used only for the purpose of peer review, and will not be published.
Vertical External Cavity Surface Emitting Lasers (VECSELs) VI (LA109)

Conference Chair: Keith G. Wilcox, Univ. of Dundee (United Kingdom)

Program Committee: Juan L. Chilla, Coherent, Inc. (USA); Arnaud Garnache, Univ. Montpellier 2 (France); Mircea Guina, Tampere Univ. of Technology (Finland); Jennifer E. Hastie, Univ. of Strathclyde (United Kingdom); Eiyahou Kapon, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Ursula Keller, ETH Zürich (Switzerland); Jerome V. Moloney, College of Optical Sciences, The Univ. of Arizona (USA); Wolfgang Stoilz, NAsp III/V GmbH (Germany); Anne C. Tropper, Univ. of Southampton (United Kingdom)

The purpose of this conference, now in its sixth year, is to highlight current work in the rapidly developing field of optically- and electrically-pumped vertical external cavity surface emitting lasers (VECSELs). These lasers, which are also referred to as optically-pumped semiconductor lasers (OPSLs) or semiconductor disk lasers (SDLs), have gained a strong interest for brightness scaling over a broad range of emission wavelengths. In a VECSEL the light is emitted perpendicular to the epitaxial layers, unlike edge-emitting lasers where the beam propagates in the epilayered layers. In contrast to a VCSEL (i.e. a vertical cavity surface emitting laser) the external cavity of the VECSEL offers additional mode control for excellent transverse beam quality, even at highest power levels, and enables the integration of elements for nonlinear intracavity frequency conversion, wave-length tuning elements, or passive mode-locking.

Since the first demonstration in 1997, we have seen tremendous progress in VECSEL research, operating in both continuous-wave and the ultrafast regime. Optically-pumped VECSELs can convert low-cost, low-beam-quality optical pump beams provided by high-power diode laser bars into a near-diffraction-limited output beam with good efficiency. This has resulted in achieving more than 20 W cw power in single frequency operation, substantially higher than from any other type of semiconductor laser. An important advantage compared to well-established diode-pumped solid-state lasers, is that VECSELs operate in spectral regions not covered by solid-state laser gain materials. To date, direct CW emission from VECSEL has been demonstrated for the entire wavelength range covered by compound semiconductor lasers, extending from 650 nm to 2.9 μm, and have been extended even to 4-5 μm. Moreover they allow efficient, low-noise, intra-cavity nonlinear frequency conversion to further broaden spectral coverage, including visible, ultra-violet, and terahertz emission.

In mode-locked operation, the performance of ultrafast VECSELs has also surpassed that of other semiconductor lasers. Ultrafast VECSELs have generated average power levels of several watts in several-hundred-femtosecond pulses. Pulse durations below 100 fs have been achieved, and the repetition rate of fundamentally mode-locked VECSELs has increased to tens of GHz. Furthermore the SESAM and the VECSEL gain structure can be integrated into a single semiconductor structure, which is referred to as a mode-locked integrated external-cavity surface emitting laser (MIXSEL). MIXSELs can produce fundamentally mode-locked trains of sub-picosecond pulses at repetition rates over 100 GHz. Recently, ultrafast VECSELs and MIXSELs have been used to generate gigahertz self-referenceable frequency combs and dual wavelength combs.

Such VECSEL performance should be well-suited for many applications including laser projection, optical clocking, frequency metrology, high resolution nonlinear multiphoton microscopy, or laser cooling. A selection of invited papers will provide a comprehensive overview of the latest progress in this new field. In addition, contributed papers are solicited for this VECSEL conference with the focus on:

- power scaling of VECSELs and MIXSELs
- novel wavelength, heat management and optical pumping schemes
- material systems, epilayer design, and epitaxial fabrication
- intracavity nonlinear frequency conversion
- numerical modeling of gain, dynamical behavior, thermal behavior
- experimental characterization of semiconductor components, including ultrafast dynamics
- electrical pumping
- mode-locked operation
- single frequency operation
- frequency comb generation and applications
- integrated extended cavities and wafer processing
- applications.

BEST STUDENT PRESENTATION AWARD

The committee is pleased to announce that this year a cash prize of $500, donated by Coherent Inc., will be awarded for the best student presentation, judged, by the committee, on the basis of scientific content, impact and clarity.

To be eligible for consideration, the student must:
- submit their abstract online by the deadline
- be the primary author
- select “Yes” when asked if they are a full-time student
- select themselves as the speaker
- be accepted to present an oral presentation
- submit their manuscript online by the deadline
- make the oral presentation.
Emerging Liquid Crystal Technologies XI (OE128)

Conference Chair: Liang-Chy Chien, Kent State Univ. (USA)
Conference Co-Chairs: Dick J. Broer, Technische Univ. Eindhoven (Netherlands); Hirotsgu Kikuchi, Kyushu Univ. (Japan); Nelson V. Tabiryan, BEAM Engineering for Advanced Measurements Co. (USA)

Program Committee: Vladimir G. Chigrinov, Hong Kong Univ. of Science and Technology (Hong Kong, China); Harry J. Coles, Univ. of Cambridge (United Kingdom); 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, Univ. du Luxembourg (Luxembourg); Yi-Hsín Lin, National Chiao Tung Univ. (Taiwan); Kristiaan Neyts, Univ. Gent (Belgium); Masanori Ozaki, Osaka Univ. (Japan); Ci-Ling Pan, National Tsing Hua Univ. (Taiwan); Miha Ravnik, Univ. of Ljubljana (Slovenia); Ivan I. Smalyukh, Univ. of Colorado at Boulder (USA); Timothy J. White, Air Force Research Lab. (USA); Ming Hsien Wu, Hamamatsu Corp. (USA); Tae-Hoon Yoon, Pusan National Univ. (Korea, Republic of); Yanlei Yu, Fudan Univ. (China)

Join us at the 2016 Emerging Liquid Crystal Technologies XI (ELCT-XI) conference. This conference will provide forum for academic and industrial scientists and engineers to present high-impact scientific and technological research on recent advances in materials, devices, and applications. Numerous emerging topics on liquid crystal science and technology have taken advantage of unique anisotropic properties of liquid crystal materials to significantly improve the performance of existing devices or create new devices. The conference will feature plenary, topical oral, and poster sessions and an industrial exhibition. Mark your calendars today and plan to attend ELCT-XI.

Papers are solicited but not limited to the following areas:
• new materials and effects
• chiral phase materials and devices
• 3D displays
• flexible displays
• wearable displays
• photoalignment and photopatterning
• display materials and components
• spatial light modulators
• switchable polarization gratings and holography
• holographic displays
• holographically-formed materials, devices, and applications
• LC applications in the terahertz, microwave infrared, and telecom
• nonlinear optics, lasing, and plasmonic effects
• lens, filters, and waveguides
• nanostuctured systems and metamaterials
• dye, colloids, and nanoparticles-doped composites
• polymers, elastomers, and LC composites
• tweezing, imaging, manipulating or self-assembled nanoparticles
• organic semiconductor and photovoltaic devices
• energy harvesting, saving, and storage
• sensors and actuators
• lyotropic and biological self-assemblies.

IMPORTANT DATES
Abstracts Due: 3 AUGUST 2015
Author Notification: 12 OCTOBER 2015
Post-Meeting Manuscript Due Date (all except conferences OE114, OE131, OE132, and OE133): 20 JANUARY 2016
On-Site Manuscript Due Date (conferences OE114, OE131, OE132, and OE133 only): 7 DECEMBER 2015

Please Note: Submissions imply the intent of at least one author to register, attend the conference, present the paper as scheduled, and submit a full-length manuscript for publication in the conference proceedings.
In all market segments and applications, expectations for display performance have grown at a rapid pace, driving not only the accelerated development of diverse display technologies but also supporting control algorithms and image-processing methodologies. Display technologies have evolved to support a wide range of applications. The diversity in display technologies with enormous difference in operating principles, imaging qualities and functions presents both opportunities and challenges for application-specific displays development. Although some advancements in display performance focus on the application, there are general trends toward improved spatial and temporal resolution, higher dynamic range, and expanded color gamuts.
Practical Holography XXX: Materials and Applications (OE130)

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)

MATERIALS
The widespread application of holography to commercial electronics and communication applications requires recording holograms and diffractive elements in real materials. Successful engineering solutions require understanding of handling and process issues, as well as familiarity with the performance properties of existing and designed materials. This conference will focus on holographic recording materials and processes used in display, engineering, medical and data storage applications, and on applications and holographic elements (HOEs), which take advantage of material properties. New HOEs and the application in the photovoltaic field. New materials will be discussed, as well as all materials currently in use (photopolymers, silver halide, dichromated gelatin, photoresist, and embossing media).

Topics of interest include:
• materials for holography and diffractive optics
• holographic performance and optical properties
• mechanism of image formation
• modeling and analysis of holographic performance
• durability and environmental testing of materials and devices, and materials issues affecting device construction
• HOEs and DOEs utilizing materials properties for enhanced performance
• improved processing of materials, including techniques and processes for production of holograms, HOEs, and DOEs
• real-time and active holographic materials and processes for information storage and dynamically switchable holograms
• WDM applications of holographic materials
• applications and demonstrations of new or improved materials in display holography, security holograms, HOEs, DOEs, holographic information storage, and real-time holography.

APPLICATIONS
Holography is emerging from the research laboratory to find wider and more effective application to communication and engineering problems. This conference will highlight advances of holographic and technology, especially those that impact the practice and applications of holography to imaging and display engineering.

Topics of particular interest for this conference are:
• 3D imaging for application in industry, medicine, education, advertising, and other visual communication areas, with an emphasis on the visualization of 3D digital data by holographic means; holographic stereograms and computer-generated image holograms are areas of strong current interest including HOEs in autostereoscopic 3-D systems
• “electro-holography,” meaning the electronic generation, transmission, or display of holographic image information, and the creation of moving, interactive, or real-time holographic images
• processes, hardware, and techniques: new systems and applications for the recording, producing, manufacturing, or optimizing of holograms and diffractive elements
• digital reconstructions of holograms for image analysis
• metrology, microscopy, nondestructive testing, and holographic optical elements, emphasizing the application and engineering issues rather than the underlying scientific principles or component fabrication issues
• spatial light modulators, computer graphics systems, data visualization systems, and related technologies relevant to advances in holographic imaging
• techniques and concepts in display
• artistic applications of holography and the use of holography in recording and display of historical items.
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); Chakkai So-In, Khon Kaen Univ. (Thailand); Atul K. Srivastava, NEL America, Inc. (USA); Peter Van Daele, Univ. Gent (Belgium)

To satisfy the growing demand of end-customers for fast Internet access, new multimedia services, and rapid interactive applications, all telecommunications networks operators are under intense pressure to solve the “last-mile connection” problem. This problem is not only the need for huge broadband in one direction but also for high-speed two-way connectivity, and mobile access as opposed to fixed access. New emerging access technologies such as Optical Coherent Access, optical fiber to the home (FTTH), wireless (WLL), and Radio-over-Fiber (RoF) are increasingly being researched, developed and deployed since they offer huge broadband potential and mobility. We will have special sessions on:

- visible light (Li-Fi) communications (organized by Prof. Harald Hass)
- resilient and green optical and wireless access networks for future mobile technologies (organized by Prof. Katsutoshi Tsukamoto and Prof. Katsumi Iwatsuki)
- millimeter-wave radio technologies for integrated access networks (organized by Dr. Spiros Mikroulis and Dr. Manoj P. Thakur)
- green broadband access and data centers.

Preliminary list of confirmed invited speakers:

- Anthony Lentine, Sandia National Labs. (USA), on the challenges in the implementation of dense wavelength division multiplexed (DWDM) optical interconnects using resonant silicon photonics
- Lisa Huff, Discerning Analytics (USA), on the economics of data center optics
- Werner Hofmann, Technische Univ. Berlin (Germany), on the next-generation-VCSELs as an enabling technology for green access networks and data centers
- Ming-Jun Li, Corning Inc. (USA), on novel optical fibers for datacenter applications.

This conference will also address (but not limited to) the following topics:

NEXT-GENERATION OPTICAL BROADBAND ACCESS TECHNOLOGIES
- next-gen PON (WDM-, CWDM-PON technologies)
- 10G/100G Ethernet-based networks, ethernet over first mile
- fiber-in-the-loop (FITL), FTTP, FTTH, FTTC, HFC
- advanced components, optical fiber and equipment

- passive optical network (PON)-based access and deployments (EPON, GPON, SuperPON)
- advanced devices, optical fiber, equipment for PON
- access network design and optimization.

TECHNO-ECONOMIC ANALYSIS OF BROADBAND ACCESS
- economics of broadband access
- pricing strategies for access
- green technologies for access
- advanced and cost-effective power management
- security in access networks.

RADIO-OVER-FIBER (ROF) BROADBAND ACCESS TECHNOLOGIES
- RoF-based distributed antenna systems, wireless access, and wireless networks
- advanced opto-electronics devices, optical fiber and equipment for RoF-based access
- digital RoF networks
- optical wireless, hybrid systems and network (indoor/outdoor wireless architectures).

WIRELESS BROADBAND ACCESS TECHNOLOGIES
- wireless access, components, and protocols
- emerging and advanced components to support Wi-Fi, UWB, Bluetooth
- long term evolution (LTE) and LTE Advanced
- MIMO technologies for high-speed mobile users
- WLAN security issues, protocols and standards
- high-speed WLAN (11n, ac, ad and others) technologies and components for gigabit wireless
- mobile front-haul/backhaul network technologies
- resilient wired and wireless access networks.

FREE-SPACE-OPTICS-BASED AND SATELLITE ACCESS
- free-space optics, hybrid free-space, and RF
- broadband satellite last-mile access solutions
- two-way connectivity, broadcast satellite services.

HOME NETWORKING AND CABLE-ACCESS NETWORK SECURITY AND TECHNOLOGIES
- home networking devices and technologies
- security issues, sensing networks, monitoring technologies, standards, and performance
- CATV advanced components, equipment, architectures for multiple access, HFC network
- multi-channel video systems, alternatives modulation, optical SCM systems, performance
- powerline access technologies.

IMPORTANT: The proceedings for this conference will be printed prior to the meeting and made available at Photonics West. Full-length manuscripts (6-page minimum) are mandatory for participation in the conference. Note the earlier manuscript due date of 7 December 2015.
Optical Metro Networks and Short-Haul Systems VIII (OE132)

Conference Chairs: Atul K. Srivastava, NEL America, Inc. (USA); Werner Weiershausen, Deutsche Telekom AG (Germany); Benjamin B. Dingel, Nasfine Photonics, Inc. (USA); Achyut K. Dutta, Banpl Photonics, Inc. (USA)

Program Committee: Youichi Akasaka, Fujitsu Network Communications Inc. (USA); Júlio César R. F. de Oliveira, CpoD (Brazil); Ivan B. Djojdevic, 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)

This conference will focus on the next-generation optical metro networks, short-haul systems. It promotes discussion on optical network strategies regarding converged multi-layer platforms and cost-optimized architectures. It provides a forum for the recent technological advances in optical transmission systems, network equipment, modules and components including network demonstrations, field trials and testbeds, and industry standards. The topics include:

DIGITAL TRANSMISSION SYSTEMS
• metro and short haul transmission: system solutions, experiments, and field demonstrators
• efficient high-capacity and high-speed WDM/TDM
• 100Gbit/s and higher rate line and client interfaces (ethernet and OTN)
• advanced modulation formats and super channels for 400Gbit/s and 1Tbit/s systems
• sliceable bandwidth transceivers (flexible rate, flexible modulation format)
• coherent detection and digital signal processing
• black link approach and compatibility of link and line interfaces
• advanced coherent transceivers for filterless optical channel selection by tunable local oscillator.

ANALOG TRANSMISSION SYSTEMS
• RF overlay networks for video distribution
• modulation techniques including OFDM.

NETWORK ARCHITECTURES AND APPLICATIONS
• access, aggregation, and transport networks and enablers
• aggregation networks with drop&waste approach using filterless detection (via local oscillator)
• operational impact of different network architectures (e.g. smart ROADM based vs. filterless networks)
• cost-optimized network approaches (CapEx, OpEx), optimization tools resilient architectures, mesh-, star-, ring topologies
• multilayer network integration
• IP integration into optical layer

• carrier-grade ethernet including MPLS-TP
• GPON, WDM PON and NGOA technologies
• control plane including SDN and openflow, openaylight and other protocols/interfaces
• transport SDN usecases for different network domains
• architectures for datacenter interconnect
• infrastructure as a service (IaaS), incorporating datacenter and transport network entities
• backhaul networks for mobile, LTE, LTE advanced network modeling, and simulation tools.

NETWORK COMPONENTS, EQUIPMENT AND SUB-SYSTEMS
• hybrid electrical-optical network equipment
• advanced optical components/sub-systems for circuit switching
• optical packet and burst switching, components for high-speed switching and routing
• integrated transmitter and receiver components including pluggable and MSA modules
• WSS based ROADM networks including colorless, directionless and contentionless architectures
• flexible grid ROADM components high port count and twin WSS architecture
• performance monitoring techniques
• Fault isolation strategies in complex meshed optically transparent islands, distributed monitoring, correlation analysis tools, instruments for practical field deployment
• technologies for information transfer between layers, PCE
• virtual network elements, e.g. virtual routers, virtual CPE
• space-division multiplexing, advances in fiber technology, multi-core fibers, multi-mode fibers
• advances in pluggable transponder technologies, pluggable modules, client transport schemes (e.g. multi lane).

SERVICES AND NETWORK SECURITY
• routing, congestion control, peer-to-peer/overlay
• novel routing strategies for optimized traffic flow, e.g. segment routing and alternatives
• reliability and quality of service
• network service chaining in an NFV-SDN-data-center environment
• protocols such as VPLS, SIP and IMS applications and services such as L2/L3 VPNs, VoIP, IPTV, content and data services and location-based services
• security: encoding at different OSI layers, direct resource efficient encoding at layer L1 (OTN)
• quantum key distribution.

IMPORTANT: The proceedings for this conference will be printed prior to the meeting and made available at Photonics West. Full-length manuscripts (6-page minimum) are mandatory for participation in the conference. Note the earlier manuscript due date of 7 December 2015.
Next-Generation Optical Communication: Components, Sub-Systems, and Systems V (OE133)

Conference Chairs: Guifang Li, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Xiang Zhou, Google (USA)

Program Committee: Kazi S. Abedin, OFS Fitel LLC (USA); Yi Cai, ZTE USA (USA); Hwan Seok Chung, Electronics and Telecommunications Research Institute (Korea, Republic of); Gabriella Cincotti, Univ. degli Studi di Roma Tre (Italy); Benjamin B. Dingel, Nafisine Photonics, Inc. (USA); John D. Downie, Corning Incorporated (USA); Ronald Freund, Fraunhofer-Institut für Nachrichtentechnik Heinrich-Hertz-Institut (Germany); Ezra Ip, NEC Labs. America, Inc. (USA); Inuk Kang, Alcatel-Lucent Bell Labs. (USA); Takahiro Kodama, Mitsubishi Electric Corp. (Japan); Tsuyoshi Konishi, Osaka Univ. (Japan); Chao Lu, The Hong Kong Polytechnic Univ. (Hong Kong, China); Zhongqi Pan, Univ. of Louisiana at Lafayette (USA); Jayanta K. Sahu, Univ. of Southampton (United Kingdom); Kunimasa Saitoh, Hokkaido Univ. (Japan); Junqiang Sun, Huazhong Univ. of Science and Technology (China); Wuhan National Lab. for Optoelectronics (China); Xianliang Zhang, Wuhan National Lab. for Optoelectronics (China); Yanjun Zhu, Huawei Technologies Co., Ltd. (USA)

This conference provides a forum to present the latest advances in technology and product developments in next-generation optical communication including coherent, space- and mode-division multiplexed optical transmission systems. The conference program encompasses components and subsystems related to next-generation optical communication technology as well as coherent, space- and mode-division multiplexed optical communication systems. Early-stage concepts and controversial solutions are also welcome and encouraged.

Topics for the conference include but are not limited to:
- advanced components for coherent transmitters and receivers
- photonic and optoelectronic integration
- subsystems including DSP algorithms
- coherent transport systems
- coherent detection for networking including access networks
- components for space-division multiplexing
- components for mode-division multiplexing
- electrical and optical signal processing for space- and mode-division multiplexing
- space- and mode-division multiplexed optical communication systems
- SDM networks.

Next-Generation Optical Networks for Data Centers and Short-Reach Links III (OE134)

Conference Chair: Atul K. Srivastava, NEL America, Inc. (USA)

Program Committee: Philippe P Absil, IMEC (Belgium); Julio C. R. F. de Oliveira, CpdQ (Brazil); Benjamin B. Dingel, Nafisine Photonics, Inc. (USA); Mitchell H. Fields, Avago Technologies Ltd. (USA); Hideki Isono, Fujitsu Ltd. (Japan); Hai-Feng Liu, Intel Corp. (USA); Jonathan D. Luff, Mellanox Technologies, Inc. (USA); Takahiro Nakamura, Photonics Electronics Technology Research Association (Japan); Takashi Saida, NTT Photonics Labs. (Japan); Ivan Shubin, Oracle (USA); Takashi Takemoto, Hitachi, Ltd. (Japan)

This conference will focus on the optical network architecture and components for data centers and short reach data links including high-performance computing. It promotes discussion on optical network strategies regarding high-data-rate and cost-optimized architectures for data centers. It provides a forum for the recent technological advances in optical short-reach transmission systems, network equipment, modules, and related components.

DATACENTER PHOTONIC NETWORK ARCHITECTURE
- 100Gb/s, 400Gb/s and higher rate transport
- novel modulation formats and robust schemes for 400Gbit/s and 1Tbit/s systems
- coherent detection and digital signal processing
- visible light and free-space communication links.

HIGH-PERFORMANCE COMPUTING LINK ARCHITECTURE
- active optical cables and backplane optical interconnects
- board-to-board and chip-to-chip optical links
- optical engine standards.

NETWORK ARCHITECTURES AND APPLICATIONS
- high-capacity exascale datacenter - networks
- novel hierarchy in interconnection networks
- reconfigurable WDM technology for elastic and flexible networking
- combining WDM with OTDM
- interconnectivity of servers and storage devices
- very low latency high-performance server-to-server connectivity
- approaches for cost, size, and power dissipation optimization
- new approach to folded Clos interconnect topology
- non-blocking packet switching
- architecture to support diverse web services and cloud computing.

HIGH-CAPACITY LINKS AND COMPONENTS FOR DATA CENTERS
- backplane, board-to-board, and chip-to-chip optical connectivity
- 400G components for data links
- 56Gb/s and higher rate links and related components
- integrated photonic components including silicon photonics.
CALL FOR PAPERS

Free-Space Laser Communication and Atmospheric Propagation XXVIII (LA114)

This conference of related interest is part of LASE 2016 co-located at Photonics West, www.spie.org/lasecall

Conference Chairs: Hamid Hemmati, Facebook Inc. (USA); Don M. Boroson, MIT Lincoln Lab. (USA)

Program Committee: Abhijit Biswas, Jet Propulsion Lab. (USA); Donald M. Gornwell Jr., NASA Goddard Space Flight Ctr. (USA); Olga Korotkova, Univ. of Miami (USA); William S. Rabinovich, U.S. Naval Research Lab. (USA); Zoran Sodnik, European Space Research and Technology Ctr. (Netherlands); Morio Toyoshima, National Institute of Information and Communications Technology (Japan)

This conference will provide a forum for all professionals involved in technologies related to free-space laser communications, and broadband optical communications. The conference will cover subjects related to the latest research and technology advances, and provide an overview useful to lasercom specialists, technology managers, and THz/mm-wave communication engineers. Papers are encouraged on ongoing laser communication programs, free-space laser communication system requirements, technology and subsystem advancements, and in-depth analysis of present status and future trends. Original papers are solicited on, but are not limited to, the following topics:

FREE-SPACE LASER COMMUNICATION TECHNOLOGIES AND ATMOSPHERIC PROPAGATION

• present and future laser communication systems; space-based systems, airborne links terrestrial/indoor/commercial links
• next generation lasercom technologies
• modulation and error correction encoding
• pointing, acquisition, and tracking
• atmospheric propagation, transmission effects, and compensation techniques
• transmitters for space, receivers, subsystems, optical and optoelectronic components
• flight qualification, lifetime and reliability
• ground receivers, particularly low-cost large apertures (telescope, dome, gimbal)
• optics for electronic module interconnects
• quantum communication and cryptography
• global communications systems that make use of wireless-terrestrial, air, and space optical connections.

NETWORK COMPONENTS, EQUIPMENT, AND SUB-SYSTEMS
• advanced optical components/sub-systems for photonic switching
• optical packet and burst switching, components for high-speed switching and routing
• integrated transmitter and receiver components including pluggable modules
• active optical cables
• new requirements for the ROADM networks in data centers
• performance monitoring techniques.

NETWORK SECURITY AND SERVICES
• security issues in datacenter networks
• routing, congestion control, peer-to-peer/overlay
• reliability and quality of service
• protocols such as VPLS, SIP, and IMS
• applications and services such as L2/L3 VPNs, VoIP, IPTV, content and data services and location-based services.

• CMOS-based photonic devices
• 4x25Gb/s and higher-rate transceivers
• multi-core and multi-mode fiber links and connectors
• reliability of optical components under high-temperature operation
• software controlled transceivers
• low-power dissipation transceiver design
• client and line interface standards
• protocols for data centers.
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If your BiOS, LASE, or OPTO paper has applications for translational research, 3D printing, environmental or energy solutions, then you are eligible to include your abstract in one of the Photonic West Applications Tracks. See details below on how to submit your abstract.

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SPIE Translational Research 2016 will highlight papers from BIOS that showcase the latest photonics technologies, tools, and techniques with high potential to impact healthcare.

GREEN PHOTONICS
SPIE Green Photonics 2016 highlights papers from 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.

3D PRINTING
SPIE Applications of 3D Printing 2016 highlights papers from BIOS, LASE, and OPTO that showcase innovative ways to apply this multidimensional/multidisciplinary technology.

Submit outcomes-based research in these areas:

- Photonic Therapeutics and Diagnostics
- Tissue Optics, Laser-Tissue Interaction, and Tissue Engineering
- Clinical Technologies and Systems
- Biomedical Spectroscopy, Microscopy, and Imaging
- Nano/Biophotonics
- Neurophotonics, Neurosurgery, and Optogenetics
- Laser-assisted Manufacturing and Micro/Nano Fabrication
- Renewable Energy Generation: Fusion and Photovoltaics
- Solid State Lighting and Displays
- Communications
- Additive Manufacturing
- Selective Laser Melting, Maser 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

Symposium Chairs:
Bruce Tromberg
Beckman Laser Institute, Univ. of California, Irvine (USA)

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

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

Symposium Chair:
Henry Helvajian,
The Aerospace Corp. (USA)

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* Choose your conference in BiOS, LASE, or OPTO.
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* If paper is accepted in the conference, it will be cross-listed in the Applications Track of your choice in online and printed programs.
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- Please also submit a 100-word text summary suitable for early release. If accepted, this summary text will be published prior to the meeting in the online or printed programs promoting the conference.
- Only original material should be submitted.
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- Conference Chair/Editors reserve the right to reject for presentation any paper that does not meet content or presentation expectations.
- The contact author will receive notification of acceptance and presentation details by e-mail the week of 12 October 2015.
- Final placement in an oral or poster session is subject to the Chairs’ discretion.

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Topics include optoelectronic materials and devices, photonic integration, displays and holography, nanotechnologies in photonics, advanced quantum and optoelectronic applications, semiconductor lasers and LEDs, MOEMS-MEMS, optical communications: devices to systems.

If your BiOS, LASE, or OPTO paper has applications in translational research, 3D printing, environmental or energy solutions, then you are eligible to also submit your abstract to the Photonics West Application Tracks. Details provided in the online submission webpage.

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**Green Photonics:** Including green photonics for solid state lighting and displays, laser-assisted manufacturing and micro/nano fabrication, communications, renewable energy generation: fusion and photovoltaics.

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