



Optical Systems Design

2018

TECHNICAL PROGRAMME

14-17 May 2018

Frankfurt Fairgrounds
Frankfurt, Germany

www.spie.org/OSD



He gets it. Shouldn't you?

Sign up to the **free** weekly newsletter
and we'll send the news to you.

optics.org/newsletter

Get the latest industry news.



 follow us on twitter @opticsorg



optics.org



SPIE. OPTICAL
SYSTEMS
DESIGN

CONNECTING MINDS.
ADVANCING LIGHT.

OPTICAL SYSTEMS DESIGN

THE LATEST ADVANCES IN OPTICAL SYSTEMS,
APPLICATIONS, MATERIALS, AND PROCESSING

14-17 May 2018

Frankfurt Fairgrounds • Frankfurt, Germany

One Week Many Opportunities

CUTTING-EDGE RESEARCH

WORLD-CLASS SPEAKERS

FOCUSED TECHNICAL TOPICS

ACCESS TO THE OPTATEC EXHIBITION

www.spie.org/OSD



MANAGED BY

SPIE.EUROPE

SPIE Europe Ltd., a subsidiary of SPIE, is a not-for-profit UK-registered company serving SPIE constituents throughout Europe as an advocate and liaison to political and industry associations within the European optics and photonics community. In addition to providing membership services, SPIE Europe Ltd. organises and manages internationally recognised conferences, education programmes, and technical exhibitions featuring emerging technologies in optics and photonics.

SPIE Europe

2 Alexandra Gate • Ffordd Pengam, Cardiff, CF24 2SA

Tel: +44 29 2089 4747 • Fax: +44 29 2089 4750 • info@spieeurope.org

COLLOCATED ORGANISATION

Optatec



The international trade fair for optical technologies,
components and systems.



International
Day of Light

16 May

#SPIEOpticalSystems



@SPIEtweets



@SPIE.org



@SPIEphotonics



SYMPOSIUM CHAIR



Wilhelm Ulrich
Carl Zeiss AG (Germany)

SYMPOSIUM CO-CHAIRS



Juan Carlos Miñano
Univ. Politécnica de Madrid
(Spain)



David M. Williamson
Nikon Research Corp. of
America (United States)

HONORARY SYMPOSIUM CHAIR



Tina Kidger
Kidger Optics
Associates
(United Kingdom)

2018 TECHNICAL COMMITTEE

Stuart David, Synopsys, Inc. (United States)

Andreas Erdmann, Fraunhofer-Institut für Integrierte Systeme und Bauelementetechnologie IISB (Germany)

Roland Geyl, REOSC (France)

Nils Haverkamp, Carl Zeiss Industrielle Messtechnik GmbH (Germany)

Tina Kidger, Kidger Optics Associates (United Kingdom)

Michel Lequime, Institut Fresnel (France)

H. Angus Macleod, Thin Film Center, Inc. (United States)

Laurent Mazuray, Airbus Defence and Space (France)

Detlev Ristau, Laser Zentrum Hannover e.V. (Germany)

Sven Schröder, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

Daniel G. Smith, Nikon Research Corp. of America (United States)

Rolf Wartmann, Carl Zeiss Microscopy (Germany)

Andrew P. Wood, Qioptiq Ltd. (United Kingdom)

Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany)

Richard N. Youngworth, Riyo LLC (United States)

SPONSOR

SPIE.

COLLOCATED ORGANISATION

Optatec



The international trade fair for optical technologies, components and systems.
www.optatec-messe.de/en

Contents



6 Conferences



Facility Maps 4-5

Daily Schedule 6-7

Plenary Sessions 8

Don't miss these world-class speakers discussing the latest directions and most promising breakthroughs.

Special Events 9

Join your peers and colleagues at these special events including a special International Day of Light event.

Conferences 10-26

Hear the latest advancements in optical instrumentation

Conf. 10690 **Optical Design and Engineering VII** (Mazuray, Wartmann, Wood) . .10-13

Conf. 10691 **Advances in Optical Thin Films VI** (Lequime, Macleod, Ristau)14-17

Conf. 10692 **Optical Fabrication, Testing, and Metrology VI** (Schröder, Geyl) . . 18-20

Conf. 10693 **Illumination Optics V** (Kidger, David) 21-22

Conf. 10694 **Computational Optics 2018** (Smith, Wyrowski, Erdmann) 23-24

Conf. 10695 **Optical Instrument Science, Technology, and Applications**
(Haverkamp, Youngworth) 25-26

PROCEEDINGS 27

PARTICIPANTS LIST 28-34

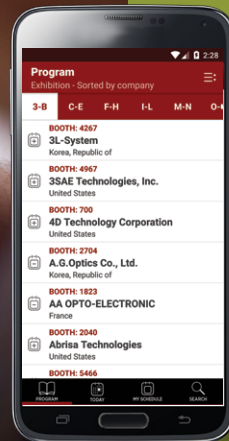
GENERAL INFORMATION 35

Registration · Author/Presenter Information · Food and Beverage · Onsite Services

SPIE POLICIES 36-37

PLAN YOUR WEEK
FULL PROGRAMME AND
ABSTRACTS ONLINE

Get the free
SPIE Conference App

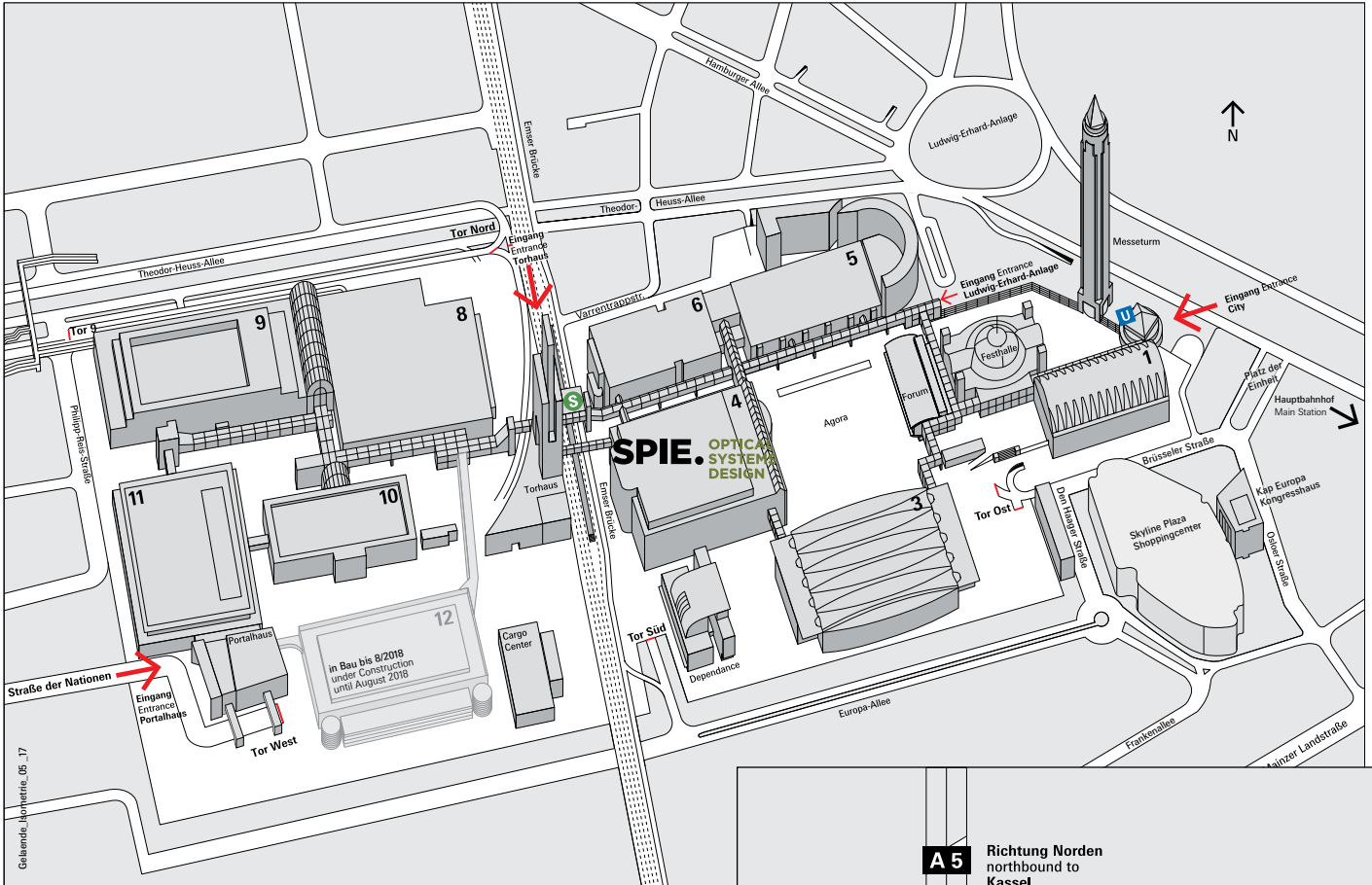


Find the best networking and information-gathering opportunities with this powerful planning tool. Schedule your time in the conferences...make new connections.

Available for iOS and Android.
Search: SPIE Conferences.



COURTESY OF
SPIE.

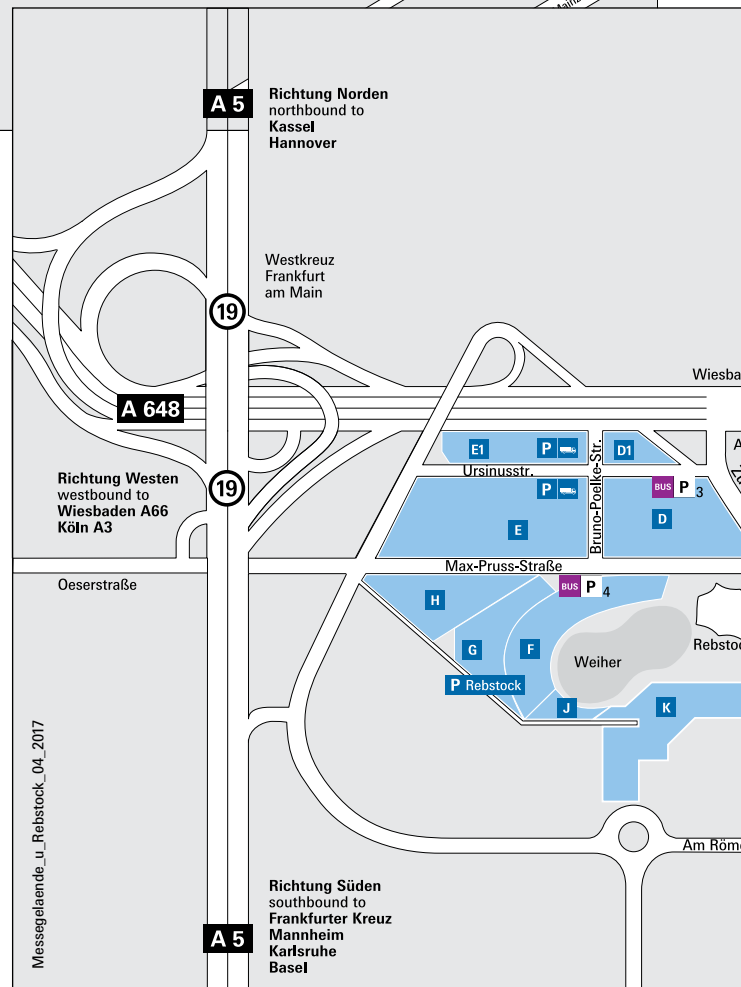


New data laws are in effect


Unless you opt in to receive email from us, you will not receive any SPIE information.

www.spie.org/signup

SPIE.



Öffentlicher Nahverkehr / Public transportation

Messe  S3 S4 S5 S6

Festhalle/Messe  U4

Festhalle/Messe Ludwig-Erhard-Anlage  16 17  50



International Day of Light

16 May

Following the highly successful International Year of Light and Light-based Technologies 2015, The International Day of Light was proclaimed at the General Conference of UNESCO in November 2017 and the first celebration will take place on 16 May 2018.

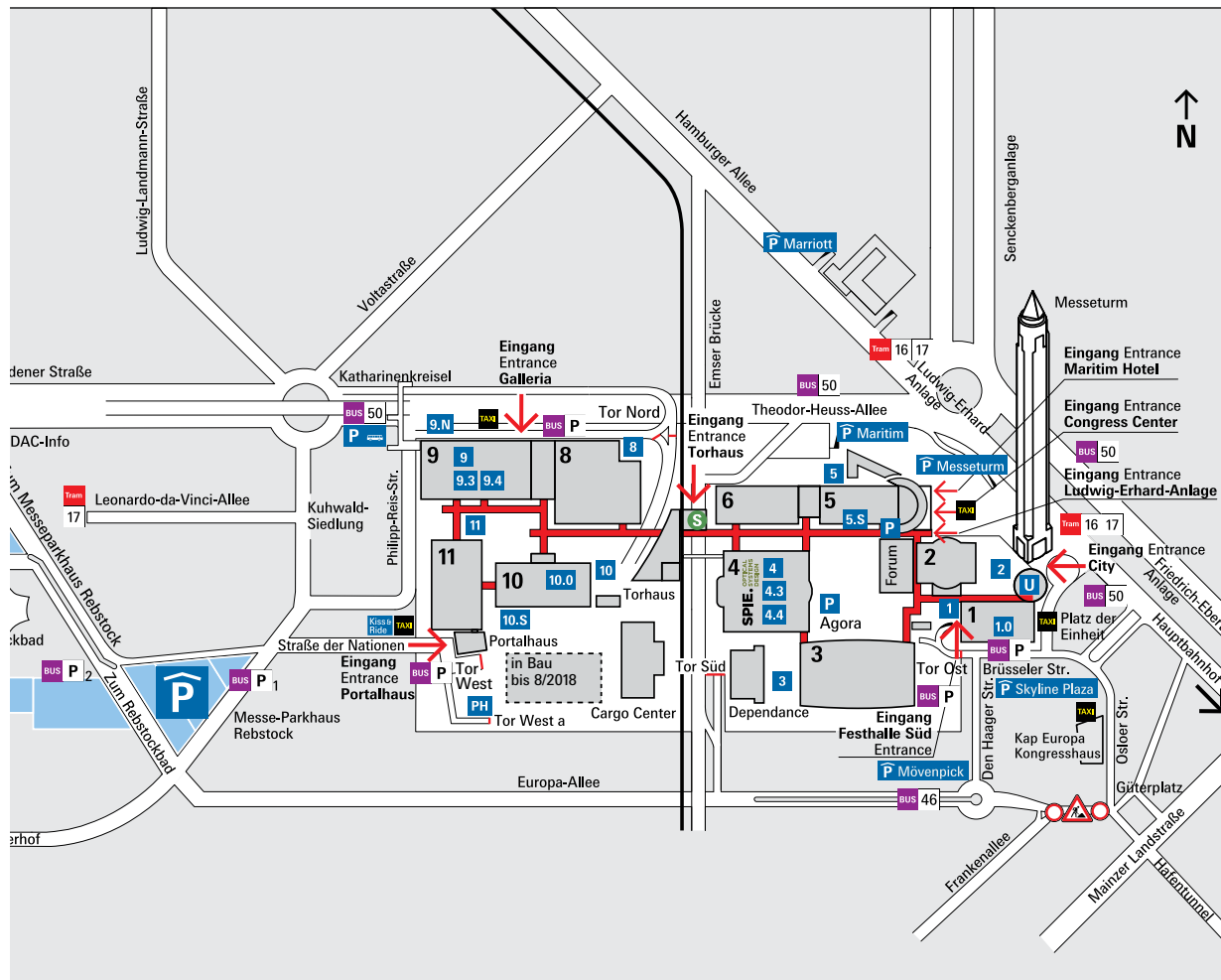
The broad theme of light will allow many different sectors of society around the world to participate in activities every 16 May to raise awareness of science and technology, art and culture, and their importance in achieving the goals of UNESCO — education, equality and peace.

SPIE supports the International Day of Light to promote awareness of life-saving, life-enhancing light.

- **SPIE IDL GRANTS**
- **FREE IDL MATERIALS**
- **SPIE PHOTO CONTEST**



For more information: www.spie.org/IDL



Parkplatz-Shuttle
Rebstock
Car park
shuttleRebstock

Parkplatz-Bezeichnung
Car park description



Daily Event Schedule

TIME	Optical Design and Engineering VII (Conf. 10690) LOCATION: EUROPA 1	Advances in Optical Thin Films VI (Conf. 10691) LOCATION: ALLIANCE	Optical Fabrication, Testing, and Metrology VI (Conf. 10692) LOCATION: CONCORDE	Illumination Optics V (Conf. 10693) LOCATION: ENTENTE	Computational Optics 2018 (Conf. 10694) LOCATION: CONSENS	Optical Instrument Science, Technology, and Applications (Conf. 10695) LOCATION: CONSENS
MONDAY						
8:15 to 10:10	PLENARY PRESENTATIONS: Current and Future NASA Space Telescopes (Joseph M. Howard); Optics for Virtual Reality: State of the Art and Future Challenges (Pablo Benítez)					
MORNING	SESSION 1: Design Methods I (Rolf Wartmann), p. 10	SESSION 1: Opening Session (Detlev Ristau), p. 14		SESSION 1: Optical Modelling, Effects, and Techniques I (Julius A. Muschaweck), p. 21		SESSION 1: Space and Remote Sensing (Nils Haverkamp), p. 25
12:00	Lunch Break					
AFTERNOON	SESSION 2: Design Methods II (Demetrio Labate), p. 10	SESSION 2: Design and Modelling (Alexander V. Tikhonravov), p. 14		SESSION 2: Freeform Techniques I (Fabian Duerr), p. 21		SESSION 2: Optical and Photonic Instrument Applications (Michael Layh), p. 25
	SESSION 3: Design Methods III (Rolf Wartmann), p. 10	SESSION 3: Deposition Processes (Juan I. Larruquert), p. 14				SESSION 3: Computational Methods and Prototyping (Alois M. Herkommer), p. 25
EVENING 17:30 to 20:00	WELCOME RECEPTION , p. 9					
TUESDAY						
8:00 to 8:45	PLENARY PRESENTATION: Demystifying Etendue (Bill J. Cassarly)					
MORNING	SESSION 4: Design Methods IV (Andrew P. Wood), p. 11	SESSION 4: Deposition Monitoring and Characterization I (Franck Delmotte), p. 14	SESSION 1: Optical Systems (Peter Hartmann), p. 18	SESSION 3: Freeform Techniques II (Fabian Duerr), p. 22		SESSION 4: Metrology and Applications (Richard N. Youngworth), p. 26
	SESSION 5: Design Solutions I (Andrew P. Wood), p. 11	SESSION 5: Deposition Monitoring and Characterization II (Angela M. Piegari), p. 15	SESSION 2: Microoptics (Reinhard Voelkel), p. 18			
12:00	Lunch Break					
AFTERNOON	SESSION 6: Design Solutions II (Simon Thibault), p. 11	SESSION 6: Deposition Monitoring and Characterization III (Claude Amra), p. 15	SESSION 3: Space Optics (Monika Krone- berger), p. 18	SESSION 4: Optical Modelling, Effects, and Techniques II (Peter Brick), p. 22		
	SESSION 7: Design Solutions III (Richard N. Youngworth), p. 11	SESSION 7: Short Wavelengths Coatings (Norbert Kaiser), p. 15	SESSION 4: Gratings and Functional Surfaces (Robert Leitel), p. 18			
18:00 to 19:30	POSTER SESSION					
19:30 to 21:30	SYNOPSIS / LIGHT TEC DINNER RECEPTION , p. 9					

Daily Event Schedule

TIME	Optical Design and Engineering VII (Conf. 10690) LOCATION: EUROPA 1	Advances in Optical Thin Films VI (Conf. 10691) LOCATION: ALLIANCE	Optical Fabrication, Testing, and Metrology VI (Conf. 10692) LOCATION: CONCORDE	Illumination Optics V (Conf. 10693) LOCATION: ENTENTE	Computational Optics 2018 (Conf. 10694) LOCATION: CONSENS	Optical Instrument Science, Technology, and Applications (Conf. 10695) LOCATION: CONSENS
WEDNESDAY						
8:00 to 8:45	PLENARY PRESENTATION: High performance flat optics (Federico Capasso)					
MORNING	SESSION 8: Design Solutions IV (Rolf Wartmann), p. 13	SESSION 8: Post-deadline Session (Detlev Ristau), p. 16	SESSION 5: Freeforms (Pierre Gloesener, Francois Riguet), p. 19	SESSION 5: Illumination Applications (Bill J. Cassarly), p. 22	SESSION 1: Design and Optimization (Frank Wyrowski), p. 23	
	SESSION 9: Freeforms I (Thierry Lépine), p. 13	SESSION 9: Materials (Ulrike Schulz), p. 16		SESSION 6: Trends in Automotive Lighting (Steffen Reichel), p. 22		
13:00 to 15:00	AGILENT TECHNOLOGIES LUNCH					
AFTERNOON	SESSION 10: Freeforms II (Herbert Gross), p. 13	SESSION 10: Coatings and Lasers (Liu Xu), p. 16	SESSION 6: Low-Loss Optics and Metrology (Sven Schröder), p. 19		SESSION 2: Computational Imaging (Andreas Erdmann), p. 23	
16:00 to 18:00	INTERNATIONAL DAY OF LIGHT SPECIAL EVENT , p. 9					
THURSDAY						
MORNING 8:30	SESSION 11: Freeforms III (Laurent Mazuray), p. 13	SESSION 11: Filters and Manufacturing I (Michel Lequime), p. 17	SESSION 7: Optical Fabrication (Roland Geyl), p. 20		SESSION 3: Microstructures and Illumination (Daniel G. Smith), p. 24	
	SESSION 12: Space Applications I (Laurent Mazuray), p. 13	SESSION 12: Filters and Manufacturing II (Marco Jupé), p. 17			SESSION 4: Physical Optics I (Miguel A. Alonso), p. 24	
12:00	Lunch Break					
AFTERNOON	SESSION 13: Space Applications II (Laurent Mazuray), p. 13		SESSION 8: Metrology I (Claude Amra), p. 20		SESSION 5: Physical Optics II (Martin Hammerschmidt), p. 24	
			SESSION 9: Metrology II (Christof Pruss), p. 20			

MICHAEL KIDGER MEMORIAL SCHOLARSHIP AWARD

The 2018 winner of the Michael Kidger Memorial Scholarship award is Caleb Daniel Gannon. Caleb received a BS in Engineering Physics from Rose-Hulman Institute of Technology in 2015 where he was honored as the Most Outstanding Engineering Physics Student in the graduating class of 2015. Caleb entered the PhD program at the College of Optical Sciences University of Arizona in fall 2015. He is currently in his third year of the PhD program at the College of Optical Sciences working with Professor Rongguang Liang, a SPIE fellow and Associate Editor of Optica. Professor Liang comments on Caleb's future: "His PhD research on optical design with deep learning will have a huge impact on future optical design."



Caleb Daniel Gannon



The Michael Kidger Memorial Scholarship was established in 1998 to honor Michael John Kidger, a well-respected educator, design software developer, and member of the optical science and engineering community. For more information visit www.kidger.com

The Kidger Scholarship Award will be presented by **Tina E. Kidger**

Plenary Sessions

Monday Plenary Session

Monday 14 May 2018 • 8:15 to 10:10

Location: Europa 1

8:15 to 8:25:

WELCOME AND INTRODUCTIONS

8:25 to 8:30

A.E. CONRADY AWARD

PRESENTED TO

Phillip J. Rogers, VNF Ltd. (United Kingdom)

8:30 to 9:15:

PLENARY PRESENTATION: Current and Future NASA Space Telescopes



Joseph M. Howard

NASA Goddard Space Flight Ctr. (USA)

Abstract: Astronomy is arguably in a golden age, where current and future NASA space telescopes are expected to contribute to this rapid growth in understanding of our universe. A summary of our current space assets will be given, as well as an update on the status of the James Webb Space Telescope (JWST), which is in its

final stages of integration and testing. Future telescopes will also be discussed, including the formulation of the Wide Field Infra-Red Survey Telescope (WFIRST), as well as a brief overview of the mission concept studies being prepared for the 2020 Decadal Survey in Astrophysics.

Biography: **Joseph M. Howard** received his Ph.D. in Optical Design from The Institute of Optics, University of Rochester, and now serves as the lead optical designer for NASA's James Webb Space Telescope Project, the successor to Hubble Space Telescope. Joe lives with his wife and two children in Washington DC.

9:15 to 10:00:

PLENARY PRESENTATION: Optics for Virtual Reality: State of the Art and Future Challenges



Pablo Benitez

Univ. Politecnica de Madrid (Spain)

Abstract: Virtual Reality aims to become a new multimedia platform thanks to the advent of high-quality affordable headsets. However, mass adoption of VR technology will probably need to overcome multiple technological challenges, many of them limited by the conventional optics used today. Dramatically reducing

its size and weight, increasing its resolution up to the human visual acuity, matching vergence and accommodation, will require novel optical designs and displays. This talk will describe the design constraints and parameters, present commercial architectures as well as the most promising solutions that are facing the future challenges.

Biography: **Pablo Benitez** co-leads the Optical Engineering Group of the Technical University of Madrid and cofounder of Limbak, a company focused on developing advanced optics for VR and AR. He has a long research trajectory in developing advanced devices and design methods in optics (as the SMS), particularly using freeform surfaces.

10:00 to 10:10:

2018 Michael Kidger Memorial Scholarship Award



PRESENTED TO

Caleb D. Gannon

Univ. of Arizona, College of Optical Sciences (USA).

Presented by: **Tina Kidger**, Optics Associates (United Kingdom)

Tuesday Plenary Session

Tuesday 15 May 2018 • 8:00 to 8:45

Location: Europa 1

8:00 to 8:45:

PLENARY PRESENTATION: Demystifying Etendue



Bill J. Cassarly

Synopsys, Inc. (USA)

Abstract: Etendue is often used to characterize the fundamental performance limits for illumination systems, especially systems that use extended sources. Despite its value in illumination design, the term Etendue is often considered confusing. In this talk, we'll demystify Etendue by examining numerous common examples (e.g., MR16/Par38 lamps, projector displays, automotive signal lamps, etc). These examples will be used to show how Etendue is directly related to performance limits for some system but not others.

Biography: **Dr. Bill Cassarly**, a Synopsys Scientist, is a driving force in the movement to develop the field of computer-aided illumination engineering. He submitted the winning solutions for the 2006 IODC and 2010 IODC Illumination Design Problems, teaches illumination design courses, holds 48 US patents, and is a key contributor to many features available in LightTools.

Wednesday Plenary Session

Wednesday 16 May 2018 • 8:00 to 8:45

Location: Europa 1

8:00 to 8:45:

PLENARY PRESENTATION: High Performance Flat Optics



Federico Capasso

Harvard John A. Paulson School of Engineering and Applied Sciences (USA)

Abstract: Metasurfaces are leading to the emergence of new optical components that circumvent the limitations of standard refractive and diffractive one and with entirely new functionalities. Our formulation of the generalized laws of reflection and refraction for metasurfaces

has led us recently to demonstrate for the first time achromatic, diffraction limited lenses across the entire visible. Multifunctional components such as metalenses for chiral imaging, ultracompact spectrometers and high efficiency holograms in the visible will be also discussed. I will conclude by presenting novel compact polarimeters that have allowed us to match the performance of existing state-of-the-art bulky polarimeter.

Biography: **Federico Capasso** is the Robert Wallace Professor of Applied Physics at Harvard University, which he joined in 2003 after 27 years at Bell Labs where his career advanced from postdoctoral fellow to Vice President for Physical Research. He has made wide ranging contributions to optics, photonics and nanotechnology, including pioneering the band-gap engineering technique, the invention of the quantum cascade laser, and seminal research on metasurfaces and their applications, including the generalized Snell's law and high performance metalenses. His awards include the Balzan Prize, the IEEE Edison Medal, the American Physical Society Arthur Schawlow Prize in Laser Science, the King Faisal Prize, the SPIE Gold Medal, the AAAS Rumford Prize, the IEEE Sarnoff Award, the Materials Research Society Medal, the Franklin Institute Wetherill Medal, the European Physical Society Quantum Electronics Prize, the Rank Prize in Optoelectronics, the Optical Society Wood Prize, the Berthold Leibinger Future Prize, the Julius Springer Prize in Applied Physics, the Institute of Physics Duddell Medal, the Jan Czochralski Award for lifetime achievements in Materials Science, and the Gold Medal of the President of Italy for meritorious achievement in science. He is a member of the National Academy of Sciences, the National Academy of Engineering, a fellow of the American Academy of Arts and Sciences (AAAS) and a foreign member of the Accademia dei Lincei.



Welcome Reception

Monday 14 May 2018 • 17:30 to 20:00
Location: Foyer Room Europa

All attendees are invited to relax, socialise, and enjoy light refreshments. Please contact the onsite registration desk for additional guest tickets. Please remember to wear your conference registration badges. Dress is casual.

Poster Session

Tuesday 15 May 2018 • 18:00 to 19:30
Location: Foyer Connecting Hall 4 to Hall 3

All registered symposium attendees are invited to attend the Tuesday poster session provided as an opportunity to enjoy networking and refreshments while reviewing poster papers. The interactive poster session is designed to promote opportunities for networking with colleagues in your field. Attendees are encouraged to review the high quality papers that are presented in this alternate format and to interact with the poster authors. Posters will be on display after 12.00 Tuesday. An interactive poster session and reception with authors present will be held on Tuesday 18.00 to 19.30. Light refreshments will be served.

Synopsys / Light Tec Dinner Reception

Tuesday 15 May 2018 • 19:30 to 21:30
Location: Grandhotel Hessischer Hof

Organised and hosted by Light Tec, this dinner reception invites attendees to come and network at the renowned Grandhotel Hessischer Hof. For further information please contact Light Tec.

Agilent Technologies Lunch

Wednesday 16 May 2018 • 13:00 to 15:00
Location: Entente

A limited number of seats is available, and pre-registration is required.

Speakers: **Dr. Andreas Kerstan** and **Dr. Marcus Schulz**, Agilent Technologies (United States)

Do you measure the optical properties of coatings, thin films, optical components, solar cells, or glass? Do you measure reflectance AND transmission? Do you want to reduce your cost-per-analysis, and save time and money? Do you want to measure transmission, reflection and absorbance at any polarization without moving the sample? With the Cary 7000 UMS, you can. Join our Seminar and find out about the Cary 5000 UV Vis NIR system combined with the Universal Measurement System for automated measurement of multiple angle in reflection and transmission on one spot of the sample, including polarization and spot size control.

Following the presentation, you will be able to try out the Cary 5000 + UMS accessory as well as have a Q&A session with the presenters. A working lunch will be provided.

LUNCH SPONSORED BY:  **Agilent Technologies**

International Day of Light Event

Wednesday 16 May 2018 • 16:00 to 18:00
Location: Foyer Room Europa

SPIE would like to welcome you on the International Day of Light. All technical attendees are invited to relax, socialise, and enjoy light refreshments.

COSPONSORED BY:  **SPECTARIS** **SPIE.**

CONFERENCE 10690

LOCATION: EUROPA 1

Monday–Thursday 14–17 May 2018 • Proceedings of SPIE Vol. 10690

Optical Design and Engineering VII

Conference Chairs: **Laurent Mazuray**, Airbus Defence and Space (France); **Rolf Wartmann**, Carl Zeiss Microscopy (Germany); **Andrew P. Wood**, Qioptiq Ltd. (United Kingdom)

Program Committee: **Catherine Antier**, Thales Optronique S.A.S. (France); **Tobias Bauer**, Leica Microsystems GmbH (Germany); **Francoise Cau**, Sagem (France); **Andres F. Cifuentes**, ASE Optics Europe (Spain); **Andrew J. Court**, TNO (Netherlands); **Guillaume Dovillaire**, Imagine Optic SA (France); **Michael Duparré**, Friedrich-Schiller-Univ. Jena (Germany); **Alain Durieux**, Sodern (France); **Regis Grasser**, CILAS (France); **Herbert Gross**, Friedrich-Schiller-Univ. Jena (Germany); **Ullrich Krüger**, JENOPTIK Optical Systems GmbH (Germany); **Demetrio Labate**, Leonardo (Italy); **Paolo Laporta**, Politecnico di Milano (Italy); **Thierry Lépine**, Institut d'Optique (France), Lab. Hubert Curien (France); **Kevin F. Middleton**, STFC Rutherford Appleton Lab. (United Kingdom); **Takao Nakagawa**, Japan Aerospace Exploration Agency (Japan); **Iain A. Neil**, ScotOptix (Switzerland); **Thomas Nobis**, Carl Zeiss AG (Germany); **Jérôme Primot**, ONERA (France); **Jeffrey M. Raynor**, STMicroelectronics (R&D) Ltd. (United Kingdom); **Jannick P. Rolland**, Univ. of Rochester (United States); **Elisabetta Rugi**, RUAG Holding AG (Switzerland); **Simon Thibault**, Univ. Laval (Canada); **Min Wang**, INO (Canada); **Richard N. Youngworth**, Riyo-LLC (United States); **María J. Yzuel**, Univ. Autònoma de Barcelona (Spain)

MONDAY 14 MAY

MONDAY PLENARY SESSION MON 8:15 TO 10:10

- 8:15 to 8:25: **Welcome and Introductions**
- 8:25 to 8:30: **A.E. Conrady Award**
presented to:
Philip J. Rogers, VNF Ltd. (United Kingdom)
- 8:30 to 9:15: **Current and future NASA telescopes**
(*Plenary Presentation*)
Joseph M. Howard, NASA Goddard Space Flight Ctr.
(United States)
- 9:15 to 10:00: **Optics for Virtual Reality: state of the art and future challenges** (*Plenary Presentation*)
Pablo Benítez, Univ. Politécnica de Madrid (Spain)
- 10:00 to 10:10: **2018 Michael Kidger Memorial Scholarship Award**
presented to:
Caleb D. Gannon, Univ. of Arizona, College of Optical Sciences (United States)
See page 8 for details.

Coffee Break Mon 10:10 to 10:30

SESSION 1

LOCATION: EUROPA 1 MON 10:30 TO 12:00

Design Methods I

Session Chair: **Rolf Wartmann**,
Carl Zeiss Microscopy GmbH (Germany)

- 10:30: **Image simulation using decomposition of the point spread function** (*Invited Paper*), Jim Schwiegerling, College of Optical Sciences, The Univ. of Arizona (United States) [10690-1]
- 11:00: **Practical use of saddle-point construction in lens design**, Zhe Hou, Technische Univ. Delft (Netherlands); Irina L. Livshits, ITMO Univ. (Russian Federation); Florian Bociort, Technische Univ. Delft (Netherlands) ... [10690-2]
- 11:20: **Alternative approach to find start points for polychromatic correction**, Norbert Schuster, SUSTAR-OPTICS (Germany) [10690-4]
- 11:40: **Stray light simulation and control in imaging systems including diffraction elements**, Xiaotong Li, Zhaofeng Cen, Zhejiang Univ. (China) [10690-5]
- Lunch Break Mon 12:00 to 13:50

SESSION 2

LOCATION: EUROPA 1 MON 13:50 TO 15:30

Design Methods II

Session Chair: **Demetrio Labate**, Leonardo (Italy)

- 13:50: **Lens optimization: making an engineering challenge more friendly**, Irina L. Livshits, ITMO Univ. (Russian Federation); Donald C. Dilworth, Optical Systems Design, Inc. (United States) [10690-6]
- 14:10: **Polarization effect on wide angle lens relative illumination**, Simon Thibault, Zhenfeng Zhuang, Univ. Laval (Canada); Jocelyn Parent, ImmerVision (Canada) [10690-7]
- 14:30: **Use of advanced sensitivity approach to novel optical compensation methods**, Mark C. Sanson, Keith Hanford, Corning Incorporated (United States) [10690-8]
- 14:50: **Simulation of straight and bent self-written waveguides in photopolymer mixture using phenomenological and diffusion models**, Monali Suar, Maik Rahlves, Eduard Reithmeier, Bernhard Roth, Hannoversches Zentrum für Optische Technologien (Germany) and Leibniz Univ. Hannover (Germany) [10690-9]
- 15:10: **Mathematical modelling of optical microfluidic structures**, Geetha Prakash, Dipak Cumar, Global Academy of Technology (India) [10690-10]
- Coffee Break Mon 15:30 to 17:20

SESSION 3

LOCATION: EUROPA 1 MON 16:00 TO 17:20

Design Methods III

Session Chair: **Rolf Wartmann**,
Carl Zeiss Microscopy GmbH (Germany)

- 16:00: **Phase space aberrations in general imaging systems**, James Babington, Excelitas Qioptiq (United Kingdom) [10690-11]
- 16:20: **Modeling and experimental validation of highly astigmatic laser beams**, Ulrich Kallmann, David Schill, Hochschule Furtwangen Univ. (Germany); Tom Davies, Photon Engineering LLC (United States) ... [10690-13]
- 16:40: **Optical design of a compact high power rifle scope with a large zoom ratio**, Kameron Tinkham, Xiaojing Huang, Wooyoun Kim, David Lippman, Angel Morales, Martin Tangari, Tianyi Yang, Julie L. Bentley, Univ. of Rochester (United States) [10690-362]
- 17:00: **Hybrid ray tracing method for photorealistic image synthesis in head-up displays**, Igor S. Potemin, Dmitry Zhdanov, Andrey Zhdanov, Nikolay Bogdanov, ITMO Univ. (Russian Federation); Alexey Voloboy, M. V. Keldysh Institute of Applied Mathematics (Russian Federation) [10690-14]

TUESDAY 15 MAY

TUESDAY PLENARY SESSION TUE 8:00 TO 8:45

Demystifying etendue (*Plenary Presentation*)
Bill J. Cassarly, Synopsys, Inc. (United States)

See page 8 for details.

SESSION 4

LOCATION: EUROPA 1 TUE 9:00 TO 10:20

Design Methods IV

Session Chair: **Andrew P. Wood**, Excelitas Qioptiq (United Kingdom)

9:00: **Induced third-order spherochromatism**, Andrea Berner, Carl Zeiss AG (Germany); Yueqian Zhang, Herbert Gross, Ewa Kasperkiewicz, Friedrich-Schiller-Univ. Jena (Germany) [10690-15]

9:20: **Finding the optimal starting configuration in optical design, when image plane location is a design parameter, using a diapioint-based error function**, Sergio Barbero, Instituto de Óptica "Daza de Valdés" (Spain) [10690-16]

9:40: **Effects of striae inside optical glasses on optical systems**, Steffen Reichel, Pforzheim Univ. (Germany); Uwe Petzold, Peter Hartmann, SCHOTT AG (Germany); Herbert Gross, Friedrich-Schiller-Univ. Jena (Germany); Sandra Gärtner, Hochschule Darmstadt (Germany) [10690-17]

10:00: **Investigation of Striae tolerance in optical system**, Yueqian Zhang, Friedrich-Schiller-Univ. Jena (Germany); Yen-Nan Chen, National Tsing Hua Univ. (Taiwan); Herbert Gross, Friedrich-Schiller-Univ. Jena (Germany); Peter Hartmann, SCHOTT AG (Germany); Steffen Reichel, Pforzheim Univ. (Germany) [10690-3]

Coffee Break Tue 10:20 to 10:40

SESSION 5

LOCATION: EUROPA 1 TUE 10:40 TO 12:10

Design Solutions I

Session Chair: **Andrew P. Wood**, Excelitas Qioptiq (United Kingdom)

10:40: **Study of infrared optical payloads to be integrated in a nanosat** (*Invited Paper*), Guillaume Druart, ONERA (France); Renaud Allieux, Earthcube (France); Philippe Perrault, Vincent Lefranc, ONERA (France) [10690-18]

11:10: **Doubly folded catadioptric lens for smartphone portraiture photography**, Conor J. Sheil, Alexander V. Goncharov, National Univ. of Ireland, Galway (Ireland) [10690-19]

11:30: **Optical design of a hyperspectral drone advanced camera for soil monitoring using an electro-optical liquid crystal technology**, Cristian Baccani, Guglielmo Rossi, Univ. degli Studi di Firenze (Italy); Federico Landini, INAF - Osservatorio Astrofisico di Arcetri (Italy); Teresa Salvatici, Marco Romoli, Maurizio Pancrazzi, Univ. degli Studi di Firenze (Italy); Mauro Focardi, Vladimiro Noce, INAF - Osservatorio Astrofisico di Arcetri (Italy); Sandro Moretti, Nicola Casagli, Univ. degli Studi di Firenze (Italy) [10690-20]

11:50: **Realization of a high resolution MEMS spectrochip in visible and near infrared range for home healthcare, food safety, and IoT applications**, Cheng-Hao Ko, National Taiwan Univ. of Science and Technology (Taiwan) [10690-21]

Lunch Break Tue 12:10 to 13:30

SESSION 6

LOCATION: EUROPA 1 TUE 13:30 TO 15:20

Design Solutions II

Session Chair: **Simon Thibault**, Univ. Laval (Canada)

13:30: **Integrating a compact multichannel cryogenic infrared camera in an operational detector dewar cooler assembly** (*Invited Paper*), Florence de la Barrière, Guillaume Druart, Nicolas Guérineau, Frédéric Champagnat, Aurélien Pleyer, ONERA (France); Serge Magli, SOFRADIR (France); Gilles Lasfargues, CEA-LETI (France) [10690-22]

14:00: **System design of large optical communication antennas**, Hans J. Kärcher, Farroukh Peykar, MT Mechatronics GmbH (Germany) [10690-23]

14:20: **Potential performance loss and compensation techniques of a lens under ionizing radiations**, Cyprien Muller, Lab. Hubert Curien (France) and Commissariat à l'Énergie Atomique (France); Thierry Lépine, Institut d'Optique Graduate School (France) and Lab. Hubert Curien (France); Timothé Allanche, Aziz Boukenter, Lab. Hubert Curien (France); Philippe Paillet, Commissariat à l'Énergie Atomique (France); Sylvain Girard, Youcef Ouerdane, Lab. Hubert Curien (France) [10690-24]

14:40: **Diffraction optical elements for generation and transformation of structured laser beams**, Alexey P. Porfirev, Samara Univ. (Russian Federation); Svetlana Khonina, Russian Academy of Sciences (Russian Federation); Sergey Fomchenkov, Samara Univ. (Russian Federation) [10690-25]

15:00: **Comparison of exact scan patterns of different configurations of rotational Risley prisms**, Virgil-Florin Duma, Alexandru-Lucian Dimb, Aurel Vlaicu Univ. of Arad (Romania) [10690-26]

Coffee Break Tue 15:20 to 15:50

SESSION 7

LOCATION: EUROPA 1 TUE 15:50 TO 17:50

Design Solutions III

Session Chair: **Richard N. Youngworth**, Riyo LLC (United States)

15:50: **Interferometer design and method for measurement of homogeneity of lenses**, Beate Boehme, Carl Zeiss AG (Germany) [10690-27]

16:10: **Two iris imaging over an extended depth of field with a mobile phone camera**, Niamh M. Fitzgerald, National Univ. of Ireland, Galway (Ireland); Christopher Dainty, FotoNation Ltd. (Ireland); Alexander V. Goncharov, National Univ. of Ireland, Galway (Ireland) [10690-28]

16:30: **Optical design of ZEISS ForTune photo mask tuning system: how to generate diffraction-limited laser foci in thick specimens**, Markus Seesselberg, Carl Zeiss AG (Germany); Vladimir Dmitriev, Uri Stern, Carl Zeiss SMS Ltd. (Israel); Joachim Welte, Carl Zeiss SMT GmbH (Germany) [10690-29]

16:50: **Design of TMC wavefront coding system based on user defined surface mask plate**, Xiaohu Guo, China North Vehicle Research Institute (China); Tielin Lu, Instrumentation Technology and Economy Institute (China); Jingjing Zhu, Weiwei Zhu, Meng Guo, Zuming Kang, Xiaoce Sun, Ji Zhao, China North Vehicle Research Institute (China); Lingqin Kong, Beijing Institute of Technology (China) [10690-30]

17:10: **1 x 8 green light intensity splitter based on gallium-nitride slot waveguide in MMI structure**, Dror Malka, Holon Institute of Technology (Israel) [10690-31]

17:30: **Optical design of the post focal relay of MAORY**, Matteo Lombini, Mauro Patti, Emiliano Diolaiti, Paolo Ciliangi, Fausto Cortecchia, INAF - Osservatorio Astronomico di Bologna (Italy); Philippe Feautrier, Institut de Planétologie et d'Astrophysique de Grenoble (France); Carmelo Arcidiacono, INAF - Osservatorio Astronomico di Bologna (Italy) [10690-51]

TUESDAY POSTER SESSION

LOCATION: FOYER CONNECTING HALL 4 TO HALL 3 TUE 18:00 TO 19:30

Conference attendees are invited to attend the joint poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster authors must set up their poster between 10:00 and 16:00 on Tuesday 15 May.

Minesweeper drones, Vishal Sharma, Univ. of Delhi (India) [10690-54]

The increase in starting torque of BLDC motor by applying of optical sensors, Kamil Plachta, Wroclaw Univ. of Science and Technology (Poland) [10690-55]

Radiation-resistant television system for articulated manipulator arm, Andrei S. Timko, Radda A. Iureva, Anastasiya S Chernaya D.D.S., ITMO Univ. (Russian Federation) [10690-56]

Creation of three-dimensional image of pipeline's internal surface, Andrei S. Timko, Radda A. Iureva, Nadezhda K. Maltseva, ITMO Univ. (Russian Federation); Alexandr V. Ilinsky, S.I. Vavilov State Optical Institute (Russian Federation) [10690-57]

Design and analysis of a simple augmented reality optical system with AMOLED microdisplay, Vitaly Sidorov, Galina E. Romanova, ITMO Univ. (Russian Federation) [10690-58]

An optical system for a selective laser melting technology, Helen A. Tsyganok, Aleksandr Kononov, ITMO Univ. (Russian Federation) [10690-59]

Temperature and coupling field analysis of ring resonator, Xudong Yu, Guangfeng Lu, Xuezhi Dai, Gao Na, National Univ. of Defense Technology (China) [10690-60]

Design of the augmented reality system with the smartphone as a source of image, Tatiana A. Koneva, Galina E. Romanova, ITMO Univ. (Russian Federation) [10690-61]

Afocal compensators of optical systems aberrations, Vasilisa Ezhova, Lev Andreev, ITMO Univ. (Russian Federation) [10690-62]

Optical design of a reflective omnidirectional optical system to be used simultaneously in visible and LWIR wavelength range, Yun Jae Ju, Kyu Hang Lee, Jae Heung Jo, Hannam Univ. (Korea, Republic of) [10690-63]

CONFERENCE 10690

Analysis and composing principles for HMD optics based on FLCOS and AMOLED, Galina E. Romanova, Aleksei S. Garshin, Alexey V. Bakholdin, Vladimir N. Vasilyev, Anatoly V. Shukalov, ITMO Univ. (Russian Federation)[10690-64]

Research methods for comparison of reconstructed by a hologram projector Fresnel images, Kseniia V. Ezhova, Duy Hung Nguyen, Oleg Nikanorov, ITMO Univ. (Russian Federation)[10690-65]

Design of the HMD systems based on AMOLED display with curved combiner, Aleksei S. Garshin, Galina E. Romanova, Alexey V. Bakholdin, ITMO Univ. (Russian Federation); Aleksandr I. Efros, JSC Elektroavtomatika Design Bureau n.a. P.A. Efimov (Russian Federation)[10690-66]

Optical design and unification of optical systems of objectives for microscopes, Dmitry N. Frolov, Olga A. Vinogradova, Labor-Microscopes (Russian Federation); Vladimir N. Frolov, Pavel S. Vakulov, JSC NPP "AME" (Russian Federation)[10690-67]

Aberrational analysis of a four-component telescopic systems with variable magnification, Ivan Tarasov, Helen A. Tsyganok, ITMO Univ. (Russian Federation)[10690-68]

On the design of the polarimetric unit for the high-spectral resolution spectrograph with fiber input for the 6m SAO RAS telescope, Dmitriy E. Kukushkin, Dmitrii Sazonenko, Alexey V. Bakholdin, ITMO Univ. (Russian Federation); Gennady Valyavin, Special Astrophysical Observatory, Russian Academy of Sciences (Russian Federation)[10690-69]

Parametric model of an optical system consisting of two and three reflecting surfaces and its analysis, Kseniia V. Ezhova, Victor Zverev, Irina Tymoshchuk, Anton Chuhlamov, Dmitriy Fedorenko, Andrey Veremenko, ITMO Univ. (Russian Federation)[10690-70]

Advanced optical designs of curved detectors-based two-mirrors unobscured telescopes, Eduard R. Muslimov, Aix-Marseille Univ. (France); Emmanuel Hugot, Lab. d'Astrophysique de Marseille (France) and Aix Marseille Univ. (France) and Ctr. National de la Recherche Scientifique (France); Simona Lombardo, Lab. d'Astrophysique de Marseille (France) and Aix Marseille Univ. (France) and Ctr. National de la Recherche Scientifique (France); Melanie Roulet, Lab. d'Astrophysique de Marseille (France) and Aix Marseille Univ. (France) and Ctr. National de la Recherche Scientifique (France); Thibault Behaghel, Lab. d'Astrophysique de Marseille (France) and CEA-LETI (France) and Ctr. National de la Recherche Scientifique (France); Marc Ferrari, Wilfried Jahn, Lab. d'Astrophysique de Marseille (France) and Aix Marseille Univ. (France) and Ctr. National de la Recherche Scientifique (France); Christophe Gaschet, CEA-LETI (France) and CEA-LETI (France) and Ctr. National de la Recherche Scientifique (France); Bertrand Chambion, David Henry, CEA-LETI (France)[10690-71]

Design of the optical control unit for the millimeter range radio telescope, Timofei K. Korolev, Igor A. Konyakhin, Anton A. Nogin, ITMO Univ. (Russian Federation)[10690-72]

Optical design of a holographic head-mounted display with enhance efficiency, Ilya Guskov, Kazan National Research Technical Univ. A.N. Tupoleva - KAI (Russian Federation); Eduard R. Muslimov, Aix-Marseille Univ. (France)[10690-73]

Diffraction sensor to nonlinear and quantum optical processing, Antonio Carlos Amaro de Faria Jr., Instituto de Estudos Avançados (Brazil)[10690-74]

Optical design of imaging spectrometer for atmosphere monitoring from near-Earth orbit, Yuri Dobrolenskiy, Ilya Dziuban, Space Research Institute (Russian Federation); Yuriy Ivanov, Ivan Snyiavskiy, The National Academy of Sciences of Ukraine (Ukraine); Dmitry Ionov, Anatoly Poberovsky, Saint Petersburg State Univ. (Russian Federation); Oleg Korablev, Space Research Institute (Russian Federation); Anna Fedorova, Space Research Institute of Russian Academy of Sciences (Russian Federation); Nikita Vyazovetskiy, Space Research Institute (Russian Federation)[10690-75]

Point spread function modeling for a free space optical system, Fei Zeng, Fengyun He, Nan Zhao, Yanfeng Qiao, Changchun Institute of Optics, Fine Mechanics and Physics (China)[10690-76]

Optimization of the uniformity of brightness distribution of abstract images with a high degree of self-similarity, Nikolai V. Matveev, Galina E. Romanova, Irina Ampleeva, Alena Guseva, ITMO Univ. (Russian Federation)[10690-77]

MAORY tolerance analysis, Mauro Patti, Matteo Lombini, Emiliano Diolaiti, Fausto Cortecchia, Paolo Cillegi, INAF - Osservatorio Astronomico di Bologna (Italy); Philippe Feautrier, Institut de Planétologie et d'Astrophysique de Grenoble (France)[10690-78]

Simulative experimental research on vibration compensation of satellite platform based on fiber-coupling using FFT-estimated method, Mengnan Li, Da An, Zhuoying Zeng, China Academy of Electronic and Information Technology (China)[10690-79]

Developing and testing for the camera lens system for total solar eclipse observation in 2017, Jihun Kim, Seonghwan Choi, Ji-Hye Baek, Jongyeob Park, Su-Chan Bong, Bi-Ho Jang, Sung-Joon Park, Heesu Yang, Kyungsuk Cho, Korea Astronomy and Space Science Institute (Korea, Republic of)[10690-80]

Development of software for production of design documentation for aspherical optical components, Anastasiya D. Kozhina, Nadezhda D. Tolstoba, ITMO Univ. (Russian Federation)[10690-81]

Simulations and experimental control of x-ray deformable mirror, Chun Xie, Qi Chen, Zhong Zhang, Tongji Univ. (China)[10690-83]

Use of computer graphics methods for efficient stray light analysis in optical design, Dmitry Zhdanov, Igor S. Potemin, Andrey Zhdanov, ITMO Univ. (Russian Federation); Alexey Voloboy, M. V. Keldysh Institute of Applied Mathematics (Russian Federation); Nikolay Bogdanov, ITMO Univ. (Russian Federation)[10690-84]

Options of lightweight mirror design and mounting such mirrors in telescope, Darya Butova, Nadezhda D. Tolstoba, ITMO Univ. (Russian Federation); A.G. Fleysher, V.D. Starichenkova, S.I. Vavilov State Optical Institute (Russian Federation)[10690-85]

Digital holographic microscopy adjustment for low-precision secondary optical mount construction, Adhelia Ekarani Putri, Donny Danudirjo, Andriyan Suksmo, Institut Teknologi Bandung (Indonesia)[10690-86]

The benefits of a vertically integrated optical system supplier, Daniel Staloff, Corning Tropol Corp. (United States)[10690-87]

Lightweight mirrors of metal and ceramics for space-borne instruments, Keigo Enya, Institute of Space and Astronautical Science (Japan)[10690-88]

SnapShot multispectral imaging polarimeter for aerosol remote sensing, Ivan I. Snyiavskiy, The National Academy of Sciences of Ukraine (Ukraine)[10690-89]

Analysis and design of small laser cutting head for kilowatt fiber laser, Qiong Zhou, Wenguang Liu, Baozhu Yan, Sun Quan, Shaojun Du, National Univ. of Defense Technology (China)[10690-90]

Infrared structure light projector design for 3D sensing, Bohan Lyu, Bohan Photonics (Taiwan); Meng-Ko Tsai, Chih-Sheng Chang, Himax Technologies, Inc. (Taiwan)[10690-91]

Analysis of Seidel aberration coefficients of thick lens with arbitrary focal length, Jiri Novák, Antonin Mikš, Pavel Novák, Petr Pokorný, Filip Smejkal, Czech Technical Univ. in Prague (Czech Republic)[10690-92]

Off-axis surface tolerance analysis: tips and tricks, Vanja Da Deppo, CNR-IFN Padova (Italy) and INAF - Osservatorio Astronomico di Padova (Italy)[10690-93]

Design and analysis of silicon ring resonator for bio-sensing application, Shwetha M., Navya Krishna Reddy, Sai Vidya Institute of Technology (India); Prasant Kumar Pattnaik, BITS Pilani (India); Narayan K., Sai Vidya Institute of Technology (India)[10690-94]

Optical design for the Giant Magellan Telescope Multi-object Astronomical and Cosmological Spectrograph (GMACS): design methodology, issues, and trade-offs, Rafael A.S. Ribeiro, Univ. de São Paulo (Brazil); Damien Jones, Prime Optics (Austria); Luke M. Schmidt, Texas A&M Univ. (United States); Keith Taylor, Instruments4 (United States); Erika Cook, Darren DePoy, Texas A&M Univ. (United States); Daniel M. Faes, Univ. de São Paulo (Brazil); Cynthia Froning, Texas A&M Univ. (United States); Tae-Geun Ji, Hye-In Lee, Kyung Hee Univ. (Korea, Republic of); Jennifer L. Marshall, Texas A&M Univ. (United States); Claudia Mendes de Oliveira, Univ. de São Paulo (Brazil); Soojong Pak, Kyung Hee Univ. (Korea, Republic of); Casey Papovich, Travis Prochaska, Texas A&M Univ. (United States); Aline Souza, Univ. de São Paulo (Brazil)[10690-95]

A modified Gerchberg-Saxton algorithm for design diffractive optical elements generating light distributions with submicron features, Alexey P. Porfirev, Sergey Fomchenkov, Samara Univ. (Russian Federation)[10690-96]

Development of a simple LDV system for tube micro particles flow rate measurement, Keng-Ming Chang, Shu-Sheng Lee, National Taiwan Ocean Univ. (Taiwan); Chun-Hsiung Wang, National Taiwan Univ. (Taiwan)[10690-98]

WEDNESDAY 16 MAY

WEDNESDAY PLENARY SESSION WED 8:00 TO 8:45

High performance flat optics (Plenary Presentation)
Federico Capasso, Harvard John A. Paulson School of Engineering and Applied Sciences (United States)

See page 8 for details.

SESSION 8

LOCATION: EUROPA 1 WED 9:00 TO 10:00

Design Solutions IV

Session Chair: **Rolf Wartmann**,
Carl Zeiss Microscopy GmbH (Germany)

9:00: **Design, manufacturing, and optomechanical considerations for multimodal micro-endoscope featuring optical coherence microscopy, multiphoton microscopy, and visible navigation**, David Vega, Jennifer K. Barton, Gabriella Romano, The Univ. of Arizona (United States) [10690-32]

9:20: **Design of a dual wavelength digital holographic imaging system for the examination of layered structures**, John C. McFarland, Ting Chean Khoo, Anna Sharikova, Alexander T. Khmaladze, Univ. at Albany (United States) [10690-33]

9:40: **Modeling of hybrid polymer optical systems**, Alisa S. Ekimenkova, Anna Voznesenskaya, ITMO Univ. (Russian Federation) [10690-34]
Coffee Break Wed 10:00 to 10:30

SESSION 9

LOCATION: EUROPA 1 WED 10:30 TO 12:00

Freeforms I

Session Chair: **Thierry Lépine**, Lab. Hubert Curien (France)

10:30: **The method of confocal mirror design (Invited Paper)**, José Sasián, College of Optical Sciences, The Univ. of Arizona (United States) [10690-35]

11:00: **Micro objectives with extremely large field of view**, Bo Chen, Simon Thiele, Alois M. Herkommer, Univ. Stuttgart (Germany) [10690-36]

11:20: **Ready to use a multifocal system based on Alvarez lenses**, Anna Möhl, Sven Wickenhagen, Timo Kunisch, Ulrike Fuchs, asphericon GmbH (Germany) [10690-37]

11:40: **Aberration fields of anamorphic systems**, Dennis Ochse, JENOPTIK Optical Systems GmbH (Germany) [10690-38]
Lunch Break Wed 12:00 to 13:50

SESSION 10

LOCATION: EUROPA 1 WED 13:50 TO 15:00

Freeforms II

Session Chair: **Herbert Gross**, Friedrich-Schiller-Univ. Jena (Germany)

13:50: **Application of particle swarm optimization to the automatic design of optical systems (Invited Paper)**, Christoph Menke, Carl Zeiss AG (Germany) [10690-39]

14:20: **Design-for-manufacture of a varifocal rotation optics**, Ingo Sieber, Peter Stiller, Daniel Moser, Ulrich Gengenbach, Karlsruhe Institut für Technologie (Germany) [10690-40]

14:40: **Zernike surface contributions as an assisting tool for designing freeform optical systems**, Mateusz Oleszko, Herbert Gross, Friedrich-Schiller-Univ. Jena (Germany) [10690-41]

Coffee Break Wed 15:00 to 15:30

INTERNATIONAL DAY OF LIGHT SPECIAL EVENT

LOCATION: FOYER ROOM EUROPA 16:00 TO 18:00

SPIE would like to welcome you on the International Day of Light. All technical attendees are invited to relax, socialise, and enjoy light refreshments.

THURSDAY 17 MAY

SESSION 11

LOCATION: EUROPA 1 THU 8:30 TO 10:20

Freeforms III

Session Chair: **Laurent Mazuray**, Airbus Defence and Space (France)

8:30: **Three-mirror freeform imagers**, Jonathan C. Papa, Univ. of Rochester (United States); Joseph M. Howard, NASA Goddard Space Flight Ctr. (United States); Jannick P. Rolland, Univ. of Rochester (United States) [10690-43]

8:50: **Aberration balancing in a two mirror freeform optical system with freeform GRIN corrector elements (Invited Paper)**, Julie L. Bentley, Univ. of Rochester (United States); John P. Harmon, Don B. Conkey, Voxel, Inc. (United States); Joseph M. Howard, Garrett J. West, NASA Goddard Space Flight Ctr. (United States) [10690-365]

9:20: **Additively manufactured freeform gradient optics**, John P. Harmon, Voxel, Inc. (United States); Don B. Conkey, Voxel, Inc. (United States); George M. Williams, Voxel, Inc. (United States); Julie L. Bentley, Univ. of Rochester (United States) [10690-364]

9:40: **Investigation of optimization strategy and freeform location on imaging optical systems**, Chang Liu, Friedrich-Schiller-Univ. Jena (Germany); Herbert Gross, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [10690-44]

10:00: **Spectrographs with holographic gratings on freeform surfaces: design approach and application for the LUVOR mission**, Eduard R. Muslimov, Aix-Marseille Univ. (France) and Lab. d'Astrophysique de Marseille (France) and Ctr. National de la Recherche Scientifique (France); Emmanuel Hugot, Lab. d'Astrophysique de Marseille (France) and Aix Marseille Univ. (France) and Ctr. National de la Recherche Scientifique (France); Simona Lombardo, Lab. d'Astrophysique de Marseille (France) and Aix Marseille Univ. (France) and Ctr. National de la Recherche Scientifique (France); Gerard Lemaitre, Marc Ferrari, Robert Grange, Lab. d'Astrophysique de Marseille (France) and Aix Marseille Univ. (France) and Ctr. National de la Recherche Scientifique (France) [10690-45]
Coffee Break Thu 10:20 to 10:50

SESSION 12

LOCATION: EUROPA 1 THU 10:50 TO 12:10

Space Applications I

Session Chair: **Laurent Mazuray**, Airbus Defence and Space (France)

10:50: **Optical and mechanical design of the multi-band SWIR receiver for the Lunar Flashlight CubeSat mission**, Quentin Vinckier, Jet Propulsion Lab. (United States); Karlton Crabtree, Photon Engineering LLC (United States); Christopher Smith, Megan Gibson, Sierra Lobo, Inc. (United States); Paul Hayne, Udo Wehmeier, Robert G. Sellar, Jet Propulsion Lab. (United States) [10690-46]

11:10: **Sentinel-5 short-wave infrared spectrometer optical design**, Alessandro Boni, Alessio Taiti, Claudio Pasqui, Alessandro Bini, Leonardo (Italy) [10690-47]

11:30: **Integration of the x-ray silicon pore optics of the ATHENA space mission**, Dervis Vernani, Elisabetta Rugi, Thales Alenia Space Switzerland (Switzerland); Marcos Bavdaz, Eric Wille, European Space Agency (Netherlands); Steffen Blum, Thibault Seure, Thales Alenia Space Switzerland (Switzerland) [10690-48]

11:50: **The optical design of the MAJIS instrument on board of the JUICE mission**, Irene Guerri, Anna Fabbri, Leonardo Tommasi, Leonardo (Italy); Marilena Amoroso, Raffaele Mugnuolo, Agenzia Spaziale Italiana (Italy); Gianrico Filacchione, INAF - Istituto di Astrofisica e Planetologia Spaziali (Italy); Sergio Fonti, Univ. del Salento (Italy); Giuseppe Piccioni, INAF - Istituto di Astrofisica e Planetologia Spaziali (Italy); Bortolino Saggin, Politecnico di Milano (Italy); Federico Tosi, Massimo Zambelli, INAF - Istituto di Astrofisica e Planetologia Spaziali (Italy) [10690-49]
Lunch Break Thu 12:10 to 13:40

SESSION 13

LOCATION: EUROPA 1 THU 13:40 TO 14:20

Space Applications II

Session Chair: **Laurent Mazuray**, Airbus Defence and Space (France)

13:40: **Optical design of NEID: the new exoplanet finding spectrometer at the WIYN telescope**, Christian Schwab, Macquarie Univ. (Australia); Andrew Rakich, GMTO Corp. (United States); Qian Gong, NASA Goddard Space Flight Ctr. (United States); Samuel Halverson, Univ. of Pennsylvania (United States); Arpita Roy, Caltech (United States); Ryan Terrien, Carleton College (United States); Andrew Monson, Eric Levi, Paul Robertson, The Pennsylvania State Univ. (United States); Julian Stuermer, The Univ. of Chicago (United States); Yulia V. Gurevich, Univ. Heidelberg (Germany); Chad Bender, The Univ. of Arizona (United States); Cullen Blake, Univ. of Pennsylvania (United States); Fred Hearty, The Pennsylvania State Univ. (United States); Michael McElwain, NASA Goddard Space Flight Ctr. (United States); Lawrence Ramsey, Suvrath Mahadevan, The Pennsylvania State Univ. (United States) [10690-50]

14:00: **Optical instrumentation for CubeSat based UV space payloads**, Joice Mathew, Indian Institute of Astrophysics (India); Sreejith A.G., Institut für Weltraumforschung, Österreichische Akademie der Wissenschaften (Austria); Binu Kumar, Jayant Murthy, Indian Institute of Astrophysics (India) [10690-52]

CONFERENCE 10691

LOCATION: ALLIANCE

Monday–Thursday 14–17 May 2018 • Proceedings of SPIE Vol. 10691

SPONSORED BY



Advances in Optical Thin Films VI

Conference Chairs: **Michel Lequime**, Institut Fresnel (France); **H. Angus Macleod**, Thin Film Center, Inc. (United States); **Detlev Ristau**, Laser Zentrum Hannover e.V. (Germany)

Program Committee: **Claude Amra**, Institut Fresnel (France); **Franck Delmotte**, Institut d'Optique Graduate School (France); **Angela Duparré**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Chang Kwon Hwangbo**, INHA Univ. (Korea, Republic of); **Norbert Kaiser**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Juan Ignacio Larruquert**, Consejo Superior de Investigaciones Científicas (Spain); **Cheng Chung Lee**, National Chung Hsing Univ. (Taiwan); **Xu Liu**, Zhejiang Univ. (China); **Ludvik Martinu**, Ecole Polytechnique de Montréal (Canada); **Angela M. Piegari**, ENEA (Italy); **Francis Placido**, Univ. of the West of Scotland (United Kingdom); **Ulrike Schulz**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Christopher J. Stolz**, Lawrence Livermore National Lab. (United States); **Alexander Tikhonravov**, Lomonosov Moscow State Univ. (Russian Federation); **Hrvoje Zorc**, Institut Ruder Boškovic (Croatia)

MONDAY 14 MAY

MONDAY PLENARY SESSION MON 8:15 TO 10:10

- 8:15 to 8:25: **Welcome and Introductions**
- 8:25 to 8:30: **A.E. Conrady Award**
presented to:
Philip J. Rogers, VNF Ltd. (United Kingdom)
- 8:30 to 9:15: **Current and future NASA telescopes**
(*Plenary Presentation*)
Joseph M. Howard, NASA Goddard Space Flight Ctr.
(United States)
- 9:15 to 10:00: **Optics for Virtual Reality: state of the art and future challenges** (*Plenary Presentation*)
Pablo Benítez, Univ. Politécnica de Madrid (Spain)
- 10:00 to 10:10: **2018 Michael Kidger Memorial Scholarship Award**
presented to:
Caleb D. Gannon, Univ. of Arizona, College of Optical Sciences (United States)
See page 8 for details.

Coffee Break Mon 10:10 to 10:30

SESSION 1

LOCATION: ALLIANCE MON 10:30 TO 12:15

Opening Session

Session Chair: **Detlev Ristau**, Laser Zentrum Hannover e.V. (Germany)
10:30: **Opening Remarks**, Detlev Ristau, Laser Zentrum Hannover e.V. (Germany)

10:45: **Surface functionalization: the key to the development of competitive future concepts and products in optics** (*Invited Paper*), Norbert Kaiser, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [10691-1]

11:15: **Multilayer enhanced metasurfaces with high efficiency and additional functionalities** (*Invited Paper*), Xinbin Cheng, Tao He, Zhou Zhou, Jinlong Zhang, Hongfei Jiao, Zhanshan Wang, Tongji Univ. (China) . . [10691-2]

11:45: **Spatial and temporal phase delay dispersion in stratified media: from equivalent layers up to metalayers** (*Invited Paper*), Michel Lequime, Claude Amra, Institut Fresnel (France) [10691-3]

Lunch Break Mon 12:15 to 13:30

SESSION 2

LOCATION: ALLIANCE MON 13:30 TO 15:10

Design and Modelling

Session Chair: **Alexander V. Tikhonravov**, M.V. Lomonosov Moscow State Univ. (Russian Federation)

13:30: **Design of all-dielectric planar structures for optimised giant field enhancement**, Myriam Zerrad, Fabien Lemarchand, Aude Lereu, Institut Fresnel (France); Ali Passian, Oak Ridge National Lab. (United States); Juan Antonio Zapiens, City Univ. of Hong Kong (Hong Kong, China); Michel Lequime, Claude Amra, Institut Fresnel (France) [10691-4]

13:50: **Analysis of HfO₂ virtual materials for different discrete deposition energies and saturation rates**, Holger Badorreck, Marco Jupé, Detlev Ristau, Laser Zentrum Hannover e.V. (Germany) [10691-5]

14:10: **Analysis of various designs and fabrication procedures for the production of high-performance bandpass filters**, Fabien Lemarchand, Thomas Bégou, Julien Lumeau, Institut Fresnel (France) [10691-6]

14:30: **Broadband loss-less optical thin-film depolarising devices**, Quentin Ailloud, Myriam Zerrad, Claude Amra, Institut Fresnel (France) [10691-7]

14:50: **High performance atomistic simulation of thin films porosity and surface structure**, Fedor V. Grigoriev, Vladimir B. Sulimov, Alexander V. Tikhonravov, M.V. Lomonosov Moscow State Univ. (Russian Federation) [10691-8]

Coffee Break Mon 15:10 to 15:40

SESSION 3

LOCATION: ALLIANCE MON 15:40 TO 17:30

Deposition Processes

Session Chair: **Juan I. Larruquert**, Consejo Superior de Investigaciones Científicas (Spain)

15:40: **Investigation of a novel ion beam sputtering system** (*Invited Paper*), Harro Hagedorn, Jürgen Pistner, Alex Ribeaud, Bühler Alzenau GmbH (Germany) [10691-9]

16:10: **Glancing angle ion beam sputtering of optical thin films**, Mathias Mende, Wolfgang Ebert, LASEROPTIK GmbH (Germany) . . [10691-10]

16:30: **Stable, durable, low-absorbing, low-scattering MgF₂ films without heat or added fluorine**, Ronald R. Willey, Willey Optical Consultants (United States); Reza Shakoury, Imam Khomeini International Univ. (Iraq) . . [10691-11]

16:50: **Atomic layer deposition of iridium: nucleation and film growth**, Paul Schenk, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Norbert Kaiser, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Adriana Viorica Szeghalmi, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany) [10691-12]

17:10: **Manipulation of mechanical stress in Al₂O₃ thin films**, Vivek Beladiya, Friedrich-Schiller-Univ. Jena (Germany); Tahsin Faraz, Erwin W. M. M. Kessels, Technische Univ. Eindhoven (Netherlands); Andreas Tünnermann, Adriana Viorica Szeghalmi, Friedrich-Schiller-Univ. Jena (Germany) [10691-13]

TUESDAY 15 MAY

TUESDAY PLENARY SESSION TUE 8:00 TO 8:45

Demystifying etendue (*Plenary Presentation*)
Bill J. Cassarly, Synopsys, Inc. (United States)

See page 8 for details.

SESSION 4

LOCATION: ALLIANCE TUE 9:00 TO 10:10

Deposition Monitoring and Characterization I

Session Chair: **Franck Delmotte**, Institut d'Optique Graduate School (France)

9:00: **Broad band optical monitoring of large area coatings produced using planetary rotation** (*Invited Paper*), Alexander V. Tikhonravov, M.V. Lomonosov Moscow State Univ. (Russian Federation); Valeryi Zhupanov, Viktor Fedoseev, Dmitry Pavlyshin, Pavel Novikov, Scientific Research Institution Lutch (Russian Federation); Ivan Kozlov, M.V. Lomonosov Moscow State Univ. (Russian Federation) [10691-14]

9:30: **Method for the determination of all-optical monitoring strategies of complex optical interference filters**, Mael Vignaux, Fabien Lemarchand, Thomas Bégou, Institut Fresnel (France); Catherine Grèzes-Besset, CILAS (France); Julien Lumeau, Institut Fresnel (France). [10691-15]

9:50: **Time resolved detection of particle contamination during thin film deposition**, Anna Karoline Rüsseler, Istvan Balasa, Laser Zentrum Hannover e.V. (Germany); Hans-Ulrich Kricheldorf, Michael Vergöhl, Fraunhofer-Institut für Schicht- und Oberflächentechnik (Germany); Detlev Ristau, Laser Zentrum Hannover e.V. (Germany) [10691-16]

Coffee Break. Tue 10:10 to 10:40

SESSION 5

LOCATION: ALLIANCE TUE 10:40 TO 12:00

Deposition Monitoring and Characterization II

Session Chair: **Angela M. Piegari**, ENEA (Italy)

10:40: **New method for in-situ monitoring of thin-film deposition using real-time phase measurement**, Séverin L. Nadjji, Michel Lequime, Thomas Bégou, Cihan Koc, Institut Fresnel (France); Catherine Grèzes-Besset, CILAS (France); Julien Lumeau, Institut Fresnel (France) [10691-17]

11:00: **Implementation of a closed-loop in-situ control scheme improving stability and uniformity in ion-beam sputtering processes**, Florian Carstens, Henrik Ehlers, Detlev Ristau, Laser Zentrum Hannover e.V. (Germany) [10691-18]

11:20: **Intrinsic limitation of effective thin-film filter rejection by scattering phenomena**, Michel Lequime, Myriam Zerrad, Institut Fresnel (France); Markus Tilsch, Viavi Solutions Inc. (United States); Claude Amra, Institut Fresnel (France) [10691-19]

11:40: **Optical characterisation of thin films using a new universal measurement accessory for the Agilent Cary UV-Vis-NIR spectrophotometers**, Andreas Kerstan, Agilent Technologies Deutschland GmbH & Co. KG (Germany) [10691-20]

Lunch Break Tue 12:00 to 13:50

SESSION 6

LOCATION: ALLIANCE TUE 13:50 TO 15:00

Deposition Monitoring and Characterization III

Session Chair: **Claude Amra**, Institut Fresnel (France)

13:50: **Optical and mechanical properties of layers typically used in the mid-infrared spectral range (Invited Paper)**, Tatiana V. Amotchkina, Ludwig-Maximilians-Univ. München (Germany); Michael Trubetskov, Max-Planck-Institut für Quantenoptik (Germany); Vladimir Pervak, Ludwig-Maximilians-Univ. München (Germany) [10691-21]

14:20: **Optical characterisation of silver mirrors protected with transparent overcoats**, Anna Sytchkova, ENEA (Italy); Stefan Schwinde, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Maria Lucia Protopapa, Martino Palmisano, Angela Piegari, ENEA (Italy); Mark Schürmann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [10691-22]

14:40: **Real time comparison of the optical constants of a dielectric layer deposited on different substrates**, Séverin L. Nadjji, Michel Lequime, Cihan Koc, Thomas Bégou, Institut Fresnel (France); Catherine Grèzes-Besset, CILAS (France); Julien Lumeau, Institut Fresnel (France) [10691-23]

Coffee Break. Tue 15:00 to 15:30

SESSION 7

LOCATION: ALLIANCE TUE 15:30 TO 17:40

Short Wavelengths Coatings

Session Chair: **Norbert Kaiser**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

15:30: **Nanoscale V/Sc multilayer for high reflectance water window mirrors (Invited Paper)**, Zhanshan Wang, Qiushi Huang, Tongji Univ. (China); Qiang Yi, Institute of Nuclear Physics and Chemistry (China); Runze Qi, Wenbin Li, Zhong Zhang, Tongji Univ. (China) [10691-24]

16:00: **Soft x-ray optical constants and aging of sputtered chromium thin films**, Franck Delmotte, Institut d'Optique Graduate School (France); Julia Meyer-Ilse, Farhad Salmassi, Eric Gullikson, Lawrence Berkeley National Lab. (United States); Regina Soufli, Lawrence Livermore National Lab. (United States); Jennifer Rebellato, Arnaud Jérôme, Institut d'Optique Graduate School (France); Ian Vickridge, Emrick Briand, Institut des NanoSciences de Paris (France) [10691-25]

16:20: **High reflection optical film used in Einstein Probe (EP) telescope**, Yang Yang, Qiushi Huang, Hangjian Ni, Zhong Zhang, Zhanshan Wang, Tongji Univ. (China) [10691-26]

16:40: **Far UV enhanced reflectance of Al mirrors protected with hot-deposited MgF₂**, Juan Ignacio Larruquert, Consejo Superior de Investigaciones Científicas (Spain); Luis V. Rodríguez-de Marcos, Consejo Superior de Investigaciones Científicas (Spain) and National Univ. of Singapore (Singapore); José A. Méndez, Nuria Gutiérrez-Luna, Lucía Espinosa-Yáñez, Carlos Honrado-Benitez, Consejo Superior de Investigaciones Científicas (Spain) [10691-27]

17:00: **Aperiodic x-ray multilayer interference coatings with high reflectance and large field of view**, Catherine Burcklen, Tom Pardini, Jennifer Alameda, Jeff Robinson, Lawrence Livermore National Lab. (United States); Yuriy Platonov, Rigaku Innovative Technologies, Inc. (United States); Eberhard Spiller, Chris Walton, Paul Mirkarimi, Stefan P. Hau-Riege, Regina Soufli, Lawrence Livermore National Lab. (United States) . . . [10691-28]

17:20: **Influence of various FeCo layers on the interlayer thickness of the direct current magnetron sputtered FeCo/Si multilayers**, Zhong Zhang, Yang Liu, Qiushi Huang, Zhanshan Wang, Tongji Univ. (China) [10691-29]

TUESDAY POSTER SESSION

LOCATION: FOYER CONNECTING HALL 4 TO HALL 3 TUE 18:00 TO 19:30

Conference attendees are invited to attend the joint poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster authors must set up their poster between 10:00 and 16:00 on Tuesday 15 May.

Investigation of Sc₂O₃ for high laser durability ultraviolet coating applications, Jing Du, Jue Wang, Gary A. Hart, Jean Francois Oudard, Corning Incorporated (United States) [10691-50]

Scalable, cost-effective plasmonic-interference coupling design, Dukhyun Choi, Kyung Hee Univ. (Korea, Republic of); Kwun-Bum Chung, Dongguk Univ. (Korea, Republic of); Dongseob Kim, Korea Institute of Industrial Technology (Korea, Republic of) [10691-51]

Design and fabrication of narrowband 121.6nm minus filters, Xiaodong Wang, Changchun Institute of Optics, Fine Mechanics and Physics (China) [10691-52]

Stress and reflectivity study on the large-m neutron supermirror with different working gas pressures and structure, Runze Qi, Zhong Zhang, Yang Yang, Zhanshan Wang, Tongji Univ. (China) [10691-53]

Novel optical filter for thermal imaging region, Shih-Hao Chan, Chia-Yin Chen, Shao-Ze Tseng, National Central Univ. (Taiwan); Shiang-Feng Tang, Shun-Lung Yen, Kun-Chi Lo, National Science Council (Taiwan); Sheng-Hui Chen, National Central Univ. (Taiwan) [10691-54]

High optoelectronic performance of layer-by-layer assembled carbon nanotube thin films as transparent electrodes for LC cell, Yong Tae Park, Myongji Univ. (Korea, Republic of); Hojin Lee, Soongsil Univ. (Korea, Republic of); Dongseob Kim, Korea Institute of Industrial Technology (Korea, Republic of) [10691-55]

Research VIS-NIR optical constants of Si films deposited by different techniques, Dandan Liu, Tianjin Key Lab. of Optical Thin Film (China); Huasong Liu, Tianjin Key Lab. of Optical Thin Film (China) and China Aerospace Science & Industry Corp. (China); Yiqin Ji, Tianjin Key Lab. of Optical Thin Film (China) and National Key Lab. of Science and Technology on Tunable Laser (China); Yugang Jiang, Yuzhe Xing, Jian Leng, Ke-wen Zhuang, Tianjin Key Lab. of Optical Thin Film (China) [10691-56]

Optical emission spectroscopy of Si₃N₄ using high power impulse magnetron sputtering, Wei-Bo Liao, Ya-Chen Chang, Cheng-Feng Wu, Cheng Chung Lee, National Central Univ. (Taiwan); Wen-Hao Cho, National Applied Research Labs. (Taiwan); Chien-Cheng Kuo, National Central Univ. (Taiwan) [10691-57]

Improvement to the LIDT of high-reflection coatings by planarization of nodular defects, Lingyun Xie, Tao He, Jinlong Zhang, Hongfei Jiao, Bin Ma, Zhanshan Wang, Xinbin Cheng, Tongji Univ. (China) [10691-58]

Design and fabrication of broadband infrared durable antireflection coatings on Ge, Aleksandr Baranov, ITMO Univ. (Russian Federation) and S.I. Vavilov State Optical Institute (Russian Federation); Lyudmila Gubanova, ITMO Univ. (Russian Federation) [10691-60]

Design of reflective filter based on metal-dielectric thin films for radiation wavelength of carbon dioxide, Huasong Liu, Peng Sun, Dandan Liu, Yiqin Ji, Xiao Yang, Tianjin Jinhang Institute of Technology Physics (China) [10691-61]

Design and fabrication of ultra-broadband and highly absorbing multilayer for amplified spontaneous emission suppression, Xinshang Niu, Hongfei Jiao, Ganghua Bao, Jinlong Zhang, Xinbin Cheng, Zhanshan Wang, Tongji Univ. (China) [10691-62]

Hyperbolic metamaterials based on metal-dielectric thin layers, Elena Mikheeva, Institut Fresnel (France) and Multiwave Innovation SAS (France); Redha Abdeddaim, Institut Fresnel (France); Tryfon Antonakakis, Multiwave Technologies AG (Switzerland); Stefan Enoch, Fabien Lemarchand, Antonin Moreau, Jérôme Wenger, Julien Lumeau, Institut Fresnel (France) [10691-63]

CONFERENCE 10691

Analyses of tabulated optical constants for thin films in the EUV range and application to solar physics multilayer coatings. Jennifer Rebellato, Lab. Charles Fabry (France) and Ctr. National d'Études Spatiales (France); Franck Delmotte, Evgueni Meltchakov, Lab. Charles Fabry (France); Regina Soufli, Lawrence Livermore National Lab. (United States); Sébastien de Rossi, Lab. Charles Fabry (France); Xueyan Zhang, Frédéric Auchère, Institut d'Astrophysique Spatiale (France) [10691-64]

Enhancement of optical resistance in high reflectivity mirrors using sculptured thin films, Tomas Tolenis, Lina Grineviciute, Rytis Buzelis, Ctr. for Physical Sciences and Technology (Lithuania); Lina Mažule, Vilnius Univ. (Lithuania); Giedrius Abromavicius, Simonas Kicas, Ctr. for Physical Sciences and Technology (Lithuania) [10691-65]

Influence of substrate cleaning on the laser resistance of antireflection coatings, Thomas Gischkat, Rhysearch (Switzerland); Sven Günther, Ultrasonic Cleaning Machines AG (Switzerland); Roelene Botha, Rhysearch (Switzerland) and NTB Interstaatliche Hochschule für Technik Buchs (Switzerland); Igor Stevanovic, Rhysearch (Switzerland); Marco Cucinelli, NTB Interstaatliche Hochschule für Technik Buchs (Switzerland); Andreas Bächli, Rhysearch (Switzerland) [10691-66]

Scandium oxide films prepared by reactive magnetron sputtering for laser optics application, Alexandr Belosludtsev, Kęstutis Juškevičius, Lukas Ceizaris, Sandra Stanionyte, Vitalija Jasulaitiene, Ctr. for Physical Sciences and Technology (Lithuania) [10691-67]

Design and optimisation of metal-dielectric multilayer non-polarising coating for optical components, Audrius Valavicius, Povilas Jurkšaitis, Aleksandr Belosludtsev, Ctr. for Physical Sciences and Technology (Lithuania) [10691-68]

Modeling and manufacture of an interference filter with a defective layer for narrow spectral selection, Sergey Fomchenkov, Alexey Porfirev, Samara Univ. (Russian Federation) [10691-69]

Dielectric polarisers for normal incidence applications, Lina Grineviciute, Lukas Ramalis, Rytis Buzelis, Tomas Tolenis, Ctr. for Physical Sciences and Technology (Lithuania) [10691-70]

Fabrication of phase diffractive optical elements by direct laser writing process in aluminum thin films, Sergey Fomchenkov, Alexey Porfirev, Samara Univ. (Russian Federation) [10691-71]

Study on contamination control of optical thin films with First Contact, Baozhu Yan, Shengfu Yuan, Qiong Zhou, Shaojun Du, Yi Yang, National Univ. of Defense Technology (China) [10691-72]

Plasma treatment of fused silica substrates for enhancement of resistance to UV laser radiation, Giedrius Abromavicius, Tomas Juodagalvis, Rytis Buzelis, Ramutis Drazdys, Simonas Kicas, Ctr. for Physical Sciences and Technology (Lithuania) [10691-73]

Design, fabrication, and characterisation of wire grid polarizers for the deep UV spectral range, Luis V. Rodríguez-de Marcos, Leong Ong Bin, Teguh Citra Asmara, Sascha Pierre Heussler, Mark H. B. Breese, Andriwo Rusydi, Singapore Synchrotron Light Source (Singapore) [10691-74]

Stress compensation for iridium based x-ray mirror coatings, Thorsten Döhring, Anne-Catherine Probst, Florian Emmerich, Hochschule Aschaffenburg (Germany); Julien Lumeau, Thomas Bégou, Institut Fresnel (France) [10691-75]

Characterization and application of nonlinear optical properties in thin films, Morten Steinecke, Marco Jupé, Tarik Kellermann, Detlev Ristau, Laser Zentrum Hannover e.V. (Germany) [10691-76]

Fluorescence studies on optical coatings, Thimotheus Alig, Lars Jensen, Detlev Ristau, Laser Zentrum Hannover e.V. (Germany) [10691-77]

Organic framework engineering in mesoporous Nb₂O₅ thin films used as an active medium for organic vapors sensing, Rosen Georgiev, Darinka Christova, Biliana Georgieva, Tsvetanka Babeva, Bulgarian Academy of Sciences (Bulgaria) [10691-78]

WEDNESDAY 16 MAY

WEDNESDAY PLENARY SESSION WED 8:00 TO 8:45

High performance flat optics (Plenary Presentation)
Federico Capasso, Harvard John A. Paulson School of Engineering and Applied Sciences (United States)

See page 8 for details.

SESSION 8

LOCATION: ALLIANCE WED 9:20 TO 10:00

Post-deadline Session

Session Chair: **Detlev Ristau,** Laser Zentrum Hannover e.V. (Germany)

9:20: **High fluence transport mirrors on the National Ignition Facility,** Christopher J. Stolz, Roger Qiu, Raluca A. Negres, Philip E. Miller, David A. Cross, James Davis, Stanley C. Sommer, Clay C. Widmayer, Brian J. MacGowan, Pam K. Whitman, Lawrence Livermore National Lab. (United States) [10691-79]

9:40: **Effects of adhesion layer composition on the environmental durability of protected silver mirrors,** Kelsey A Folgner, Aerospace Corporation (United States); Chung-Tse Chu, Scott D. Sitzman, Sean C. Stuart, Zachary Lingley, James D. Barrie, The Aerospace Corp. (United States) [10691-80]

Coffee Break Wed 10:00 to 10:30

SESSION 9

LOCATION: ALLIANCE WED 10:30 TO 12:20

Materials

Session Chair: **Ulrike Schulz,** Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

10:30: **Optimisation of thin film designs for the efficient generation of the third harmonic (Invited Paper),** Marco Jupé, Morten Steinecke, Detlev Ristau, Laser Zentrum Hannover e.V. (Germany); Amir Khabbazi Oskouei, Luke Emmert, Cristina Rodriguez, Wolfgang Rudolph, The Univ. of New Mexico (United States) [10691-30]

11:00: **Colour neutral antireflection coatings for strongly curved lenses using organic nanostructures as low-n template,** Peter Munzert, Heiko Knopf, Friedrich Rickelt, Ulrike Schulz, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [10691-31]

11:20: **Photosensitive As₂S₃ thin layers: fabrication, characterisation, and applications,** Antoine Bourgade, Julien Lumeau, Institut Fresnel (France) and Aix-Marseille Univ. (France) and Ecole Centrale Marseille (France) . . [10691-32]

11:40: **Reproducibility and stability of nanoporous SiO₂ thin film coatings,** Lilit Ghazaryan, Adriana Viorica Szeghalmi, Friedrich-Schiller-Univ. Jena (Germany) [10691-33]

12:00: **Comparison of Ta₂O₅ and TiO₂ as suitable high-index materials for optical coatings,** Marcus V. Daniel, Sebastian Stark, scia Systems GmbH (Germany) [10691-34]

Lunch Break Wed 12:20 to 13:50

SESSION 10

LOCATION: ALLIANCE WED 13:50 TO 15:20

Coatings and Lasers

Session Chair: **Liu Xu,** Zhejiang Univ. (China)

13:50: **Broadband Si/SiO₂ dispersive mirrors for the 2–3.2 µm spectral range (Invited Paper),** Vladimir Pervak, Ludwig-Maximilians-Univ. München (Germany); Michael Trubetskov, Max-Planck-Institut für Quantenoptik (Germany); Tatiana V. Amotchkina, Oleg Pronin, Ludwig-Maximilians-Univ. München (Germany); Ka Fai Mak, Max-Planck-Institut für Quantenoptik (Germany); Ferenc Krausz, Ludwig-Maximilians-Univ. München (Germany) [10691-35]

14:20: **Decrease of nanosecond LIDT of UV optics under large incident angle,** Sebastian Paschel, Heinrich Mädebach, Laser Zentrum Hannover e.V. (Germany); Xinbin Cheng, Zhanshan Wang, Tongji Univ. (China); Istvan Balasa, Detlev Ristau, Laser Zentrum Hannover e.V. (Germany) [10691-36]

14:40: **Nonlinear optical thin films for super-resolved direct laser writing,** Charles Moisset, Antoine Bourgade, Aix-Marseille Univ. (France) and Ecole Centrale Marseille (France) and Institut Fresnel (France); Feng Liu, Institut Fresnel (France); Carine Perrin-Pellegrino, Aix-Marseille Univ. (France); Julien Lumeau, Hassan Akhouayri, Jean-Yves Natoli, Konstantinos Iliopoulos, Aix-Marseille Univ. (France) and Ecole Centrale Marseille (France) and Institut Fresnel (France) [10691-37]

15:00: **Laser-induced damage threshold of high-reflection laser mirrors,** Ya-Chen Chang, Wei-Bo Liao, Chian-Rou Wu, Hung-Sen Wei, Hung-Pin Chen, Cheng-Chung Lee, Sheng-Hui Chen, Chien-Cheng Kuo, National Central Univ. (Taiwan) and Thin Film Technology Ctr. (Taiwan) [10691-38]

Coffee Break Wed 15:20 to 16:00

INTERNATIONAL DAY OF LIGHT SPECIAL EVENT

LOCATION: FOYER ROOM EUROPA 16:00 TO 18:00

SPIE would like to welcome you on the International Day of Light. All technical attendees are invited to relax, socialise, and enjoy light refreshments.

THURSDAY 17 MAY

SESSION 11

LOCATION: ALLIANCE THU 8:10 TO 10:00

Filters and Manufacturing I

Session Chair: **Michel Lequime**, Institut Fresnel (France)

8:10: **Fabrication of variable filters by magnetron sputtering technology** (*Invited Paper*), Thomas Bégou, Frédéric Lemarquis, Fabien Lemarchand, Antonin Moreau, Julien Lumeau, Institut Fresnel (France) and Aix-Marseille Univ. (France) and Ecole Centrale Marseille (France); Holger Reus, Detlev Arhlinger, Harro Hagedorn, Bühler Alzenau GmbH (Germany). [10691-39]

8:40: **Development of a broadband dielectric beam splitter with reduced spectral wavefront error**, Michael Vergöhl, Chris Britze, Stefan Bruns, Fraunhofer-Institut für Schicht- und Oberflächentechnik (Germany); Bernd Schäfer, Klaus Mann, Laser-Lab. Göttingen e.V. (Germany); Volker Kirschner, European Space Research and Technology Ctr. (Netherlands). [10691-40]

9:00: **Design and fabrication of broadband polarising beam splitter cubes**, Martin Bischoff, Qioptiq Photonics GmbH & Co. KG (Germany) [10691-41]

9:20: **Manufacturing of high performance VIS-NIR beam splitters by plasma assisted thin film deposition technologies**, Thomas Weber, Marc Lappschies, Stefan Jakobs, Optics Balzers Jena GmbH (Germany) [10691-42]

9:40: **ALD for the production AR-coatings for the harmonics of the Nd:Yag-laser**, Hao Liu, Lars Jensen, Detlev Ristau, Laser Zentrum Hannover e.V. (Germany). [10691-43]

Coffee Break. Thu 10:00 to 10:30

SESSION 12

LOCATION: ALLIANCE THU 10:30 TO 12:30

Filters and Manufacturing II

Session Chair: **Marco Jupé**, Laser Zentrum Hannover e.V. (Germany)

10:30: **Fabrication of a glancing-angle-deposited distributed polarization rotator for ultraviolet applications**, James B. Oliver, Chris Smith, John Spaulding, Justin Foster, Brittany Hoffman, Semyon Papernov, Terry J. Kessler, Sara MacNally, Univ. of Rochester (United States) . [10691-44]

10:50: **Design, optimisation, and fabrication of UV-enhanced silver mirrors**, Antonin Moreau, Frédéric Lemarquis, Thomas Bégou, Julien Lumeau, Institut Fresnel (France) [10691-45]

11:10: **Si/SiO₂-based filter coatings for astronomical applications in the IR spectral range**, Ralph Schlegel, Mark Schürmann, Dieter Gäbler, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Roman Follert, Thüringer Landessternwarte Tautenburg (Germany); Ulf Seemann, Georg-August-Univ. Göttingen (Germany); Ernesto Oliva, INAF - Osservatorio Astrofisico di Arcetri (Italy); Stefan Schwinde, Felix Dreisow, Kevin Grabowski, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Jochen Greiner, Max-Planck-Institut für extraterrestrische Physik (Germany); Silvio Klose, Thüringer Landessternwarte Tautenburg (Germany) [10691-46]

11:30: **Enhanced antireflection performance for advanced quadruple-junction III-V semi-conductor solar cell**, Siyu Dong, Hongfei Jiao, Jinlong Zhang, Ganghua Bao, Tongji Univ. (China); Yiming Zhao, Jing Li, Beijing Research Institute of Telemetry (China); Zhanshan Wang, Xinbin Cheng, Tongji Univ. (China) [10691-47]

11:50: **The linear variable filter with two-dimensional modeling application for visible and near IR range**, Cheng-Hao Ko, National Taiwan Univ. of Science and Technology (Taiwan) [10691-48]

12:10: **Improvement of the IR detectors by plasmon resonance using transparent nanoparticles obtained by the colloid dispersion synthesis**, Ruslana S. Udovytyska, Alex B. Smirnov, Rada K. Savkina, V.E. Lashkaryov Institute of Semiconductor Physics (Ukraine) [10691-49]

CONCLUDING REMARKS

LOCATION: ALLIANCE 12:30 TO 12:45

Session Chair: **Michel Lequime**, Institut Fresnel (France)

SPIE

MEMBERSHIP

A long-term investment that pays off



Join or Renew your SPIE Membership

1 year \$125 | 3 years \$350 | Lifetime \$995

Discounts for students and early career professionals

- Complimentary SPIE Journal of your choice
- Free online professional development courses
- 10 SPIE Digital Library downloads
- Discounts on events, publications, SPIE Digital Library, and courses
- Exclusive access to Member networking events
- Career advancement and peer recognition
- Complimentary *SPIE Professional* magazine

Your Resource. Your Society.

spie.org/membership

CONFERENCE 10692

LOCATION: CONCORDE

Tuesday–Thursday 15–17 May 2018 • Proceedings of SPIE Vol. 10692

Optical Fabrication, Testing, and Metrology VI

Conference Chairs: **Sven Schröder**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Roland Geyl**, Safran Reosc (France)

Program Committee: **Xinbin Cheng**, Tongji Univ. (China); **Sead Doric**, Doric Lenses Inc. (Canada); **Angela Duparré**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); **Oliver W. Föhnle**, FISBA AG (Switzerland); **Pierre Gloesener**, AMOS Ltd. (Belgium); **Philippe Godefroy**, Winlight System S.A. (France); **James E. Harvey**, Photon Engineering LLC (United States); **François Houbre**, Savimex (France); **Shay Joseph**, Rafael Advanced Defense Systems Ltd. (Israel); **Sven R. Kiontke**, asphericon GmbH (Germany); **François Leprêtre**, Thales Angénieux S.A. (France); **Jérôme Néauport**, Commissariat à l'Énergie Atomique (France); **Miloslav Ohlídal**, Brno Univ. of Technology (Czech Republic); **Manfred Prantl**, Alicona Imaging GmbH (Austria); **Reinhard Völkel**, SUSS MicroOptics SA (Switzerland); **Lingli Wang**, Jos. Schneider Optische Werke GmbH (Germany); **Alexander Yascovich**, Space Research Institute (Russian Federation)

TUESDAY 15 MAY

TUESDAY PLENARY SESSION TUE 8:00 TO 8:45

Demystifying etendue (*Plenary Presentation*)
Bill J. Cassarly, Synopsys, Inc. (United States)

See page 8 for details.

OPENING REMARKS

LOCATION: CONCORDE 9:00 TO 9:05

Session Chair: **Sven Schröder**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

SESSION 1

LOCATION: CONCORDE TUE 9:05 TO 10:15

Optical Systems

Session Chair: **Peter Hartmann**, SCHOTT AG (Germany)

9:05: **Optical windows detachment using 3-axis hotwire system** (*Invited Paper*), Saar Zomerstein, Yarden Weber, Shay Joseph, Avichai Levi, Doron Yadiovker, Arit-Eva Shinman-Avraham, Rafael Advanced Defense Systems Ltd. (Israel) [10692-1]

9:35: **Automated centration measurement and quality inspection of aspheric lenses**, Felix Hahne, Patrik Langehanenberg, TRIOPTICS GmbH (Germany) [10692-2]

9:55: **Mechanical strength of optical glasses**, Peter Hartmann, SCHOTT AG (Germany) [10692-3]

Coffee Break Tue 10:15 to 10:40

SESSION 2

LOCATION: CONCORDE TUE 10:40 TO 12:00

Microoptics

Session Chair: **Reinhard Voelkel**, SUSS MicroOptics SA (Switzerland)

10:40: **Tunable diffractive Moiré lenses**, Stefan Bernet, Martin Bawart, Monika Ritsch-Martel, Medizinische Univ. Innsbruck (Austria) [10692-4]

11:00: **Evaluation of lenslet fabrication technologies for micro-optical array projectors**, Robert Leitel, Peter Dannberg, Sylke Kleinle, Sophie Sauva, Stephanie Fischer, Peter Schreiber, Erik Beckert, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [10692-5]

11:20: **Improved calibration of vertical scanning optical profilometers for spherical profiles measurement**, Jeremy Béguelin, SUSS MicroOptics SA (Switzerland); Toralf Scharf, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Wilfried Noell, Reinhard Voelkel, SUSS MicroOptics SA (Switzerland) [10692-6]

11:40: **Holographic prism based on photo-thermo-refractive glass: new facilities for metrological application**, Valerii Granovskii, Concern CSRI Elektropribor, JSC (Russian Federation); Aleksandr Angervaks, ITMO Univ. (Russian Federation); Konstantin Gorokhovskiy, Concern CSRI Elektropribor, JSC (Russian Federation); Van Bak Doan, Sergey Ivanov, Roman Okun, Nikolay Nikonorov, Aleksandr Ryskin, ITMO Univ. (Russian Federation) [10692-7]

Lunch Break Tue 12:00 to 13:20

SESSION 3

LOCATION: CONCORDE TUE 13:20 TO 15:10

Space Optics

Session Chair: **Monika Kroneberger**, OHB-System AG (Germany)

13:20: **World Space Observatory Ultraviolet mission: instrumentation update and status 2017** (*Invited Paper*), Mikhail Sachkov, Institute of Astronomy (Russian Federation) [10692-8]

13:50: **Preparing the optical manufacturing of MicroCarb satellite freeform optics**, Roland Geyl, Eric Ruch, Hervé Leplan, Safran Reosc (France) [10692-9]

14:10: **EUCLID: design, analysis, fabrication, and test of a 1.3m collimator for the on-ground characterization of the EUCLID Payload module**, Grégory P. Lousberg, Virgile Monamy, Katja Rieth, Fabien Lemagne, Pierre Gloesener, Carlo Flebus, Olivier Pirnay, AMOS Ltd. (Belgium) [10692-10]

14:30: **Additive manufacturing of metal mirrors for TMA telescope**, Nils Heidler, Enrico Hilpert, Johannes Hartung, Henrik von Lukowicz, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [10692-11]

14:50: **The MTG-SSA multi-purpose and multi-wavelength infrared test bench**, Francois Riguet, Frédéric Barré, Romain Berruée, Christophe Cloutrier, Laurent-Daniel Haret, Thierry Haumont, Manon Koszo, Denis Monaci, Fabien Moreau, Bertrand Plainchamp, Jacques Rodolfo, Safran Reosc (France) [10692-12]

Coffee Break Tue 15:10 to 15:40

SESSION 4

LOCATION: CONCORDE TUE 15:40 TO 18:00

Gratings and Functional Surfaces

Session Chair: **Robert Leitel**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

15:40: **Simulation, understanding, and suppression of defect-induced scattering in multilayer coatings** (*Invited Paper*), Xinbin Cheng, Lei Zhang, Jinlong Zhang, Tongji Univ. (China); Sven Schröder, Marcus Trost, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Hongfei Jiao, Zhanshan Wang, Tongji Univ. (China) [10692-13]

16:10: **Robust multifunctional optics for underwater applications**, Nadja Felde, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. (Germany); Luisa Coriand, Sven Schröder, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Andreas Tünnermann, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. (Germany) [10692-14]

16:30: **Scattering from reflective diffraction gratings: the challenges of measurement and verification** (*Invited Paper*), Monika Kroneberger, Andreas Mezger, OHB-System AG (Germany) [10692-15]

17:00: **Optical gratings with low wavefront aberrations and low straylight for enhanced spectroscopical applications**, Peter Triebel, Torsten Diehl, Tobias Moeller, Carl Zeiss Spectroscopy GmbH (Germany); Alexandre Gatto, Dennis Lehr, Alexander Pesch, Lars Erdmann, Matthias Burkhardt, Alexander Kalies, Felix Koch, Carl Zeiss Jena GmbH (Germany) [10692-16]

17:20: **Diffuse scattering of lamellar optical gratings due to line edge roughness**, Martin Heusinger, Friedrich-Schiller-Univ. Jena (Germany); Michael Banasch, Vistec Electron Beam GmbH (Germany); Dirk Michaelis, Thomas Flügel-Paul, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Uwe D. Zeitner, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) and Friedrich-Schiller-Univ. Jena (Germany) [10692-17]

17:40: **Development of high accuracy in-situ measurement system for spectral reflectance of thermal control coatings**, Pengsong Zhang, Hongsong Li, Bolun Zhang, Linhua Yang, Institute of Spacecraft System Engineering (China) [10692-18]

TUESDAY POSTER SESSION

LOCATION: FOYER CONNECTING HALL 4 TO HALL 3. TUE 18:00 TO 19:30

Conference attendees are invited to attend the joint poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster authors must set up their poster between 10:00 and 16:00 on Tuesday 15 May.

Modeling of luminous stream in photovoltaic systems, Kamil Plachta, Wrocław Univ. of Science and Technology (Poland) [10692-43]

The study of sub-surface damage of fused silica after ultrasonic assisted grinding process, Ching-Hsiang Kuo, Chien-Yao Huang, Zong-Ru Yu, Shyu-Cheng Shu, Keng-Shou Chang, Instrument Technology Research Ctr. (Taiwan) [10692-44]

Analysis of method of determination of refractive index and Abbe number of lens, Jiří Novák, Antonín Mikš, Pavel Novák, Petr Pokorný, Filip Šmejkal, Michal Šmejkal, Czech Technical Univ. in Prague (Czech Republic) [10692-45]

Effect of visibility of the fringes on the tilt measurement using a cyclic interferometer and polarization phase shifting, Valiyaparambil Chacko Pretheesh Kumar, Angarai R. Ganesan, Indian Institute of Technology Madras (India); Avery Krovetz, Charles Joenathan, Ashley Bernal, Rose-Hulman Institute of Technology (United States) [10692-46]

The matters of producing optical elements for educational purposes, Maria K. Orekhova, Daria Butova, Nadezhda Tolstoba, Anastasia Kozhina, Ksenia Zavatskaya, Dmitry Lyamets, Alina Belyaeva, Diana Nurpeisova, ITMO Univ. (Russian Federation) [10692-47]

Hyperspectral spectrometer based on curved prism fabrication for space application, Lei Feng, Academy of Opto-Electronics CAS (China); Jinsong Zhou, Juanjuan Jing, Lidong Wei, Yacan Li, Academy of Opto-Electronics, CAS (China) [10692-48]

A non-contact measurement method based on curved prism, Jinsong Zhou, Juanjuan Jing, Lei Feng, Yacan Li, Academy of Opto-Electronics, CAS (China) [10692-49]

Dynamic null-screens: a proposal for characterizing the PTSC with adaptive patterns, Manuel Campos-García, Andrés Peña-Conzuelo, Ulises Espinoza-Nava, José Rufino Díaz-Urbe, Univ. Nacional Autónoma de México (Mexico) [10692-50]

Analysis of industrial production environments and derivation of a novel channel model towards optical wireless communication, Daniel Schneider, Holger Flatt, Jürgen Jasperneite, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany); Oliver Stübbe, Ostwestfalen-Lippe Univ. of Applied Sciences (Germany) [10692-51]

WEDNESDAY 16 MAY

WEDNESDAY PLENARY SESSION WED 8:00 TO 8:45

High performance flat optics (Plenary Presentation)
Federico Capasso, Harvard John A. Paulson School of Engineering and Applied Sciences (United States)

See page 8 for details.

SESSION 5

LOCATION: CONCORDE WED 9:00 TO 12:30

Freeforms

Session Chairs: **Pierre Gloesener**, AMOS Ltd. (Belgium); **Francois Riguet**, Safran Reosc (France)

9:00: **Novel technologies and applications based on freeform technologies (Invited Paper)**, Johannes Hartung, Matthias Beier, Stefan Risse, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [10692-19]

9:30: **Larger format freeform fabrication and metrology**, Matthew Brunelle, Todd Blalock, Jessica Nelson, Optimax Systems, Inc. (United States) [10692-20]

9:50: **A novel sub-millimeter ion beam tool for figure error correction of optical devices**, Jens Bauer, Fred Pietag, Melanie Ulitschka, Thomas Arnold, Leibniz-Institut für Oberflächenmodifizierung e.V. (Germany) [10692-21]

Coffee Break. Wed 10:10 to 10:40

10:40: **Advanced techniques for robotic polishing of aluminium mirrors**, Hongyu Li, David Walker, Xiao Zheng, Guoyu Yu, Univ. of Huddersfield (United Kingdom); Christina Dunn, Univ. College London (United Kingdom); Tony Li, Univ. of Huddersfield (United Kingdom); Wang Zhang, Univ. College London (United Kingdom) [10692-22]

11:00: **Shape measurement of freeform optics (Invited Paper)**, Andreas Beutler, Mahr GmbH (Germany) [10692-23]

11:30: **Advanced optical freeform substrates fabricated by ceramic 3D printing and controlled by deflectometry**, Nicolas Rousselet, 3DCeram (France); Thierry Lépine, Lab. Hubert Curien (France); Yves Surrel, Yves Surel Expertise & Consultancy (France); Thomas Houllier, Sophia Conseil (France) [10692-24]

11:50: **Fabrication and measurement of dreeform mirror for head -up display system**, Yuan-Chieh Cheng, Wei-Jei Peng, Instrument Technology Research Ctr. (Taiwan); Abou-El-Hossein Khaled, Nelson Mandela Metropolitan University (South Africa); Hsiao-Yu Chou, Fong-Zhi Chen, Instrument Technology Research Ctr. (Taiwan) [10692-25]

12:10: **Robotic light scattering sensor for large freeform surfaces**, Tobias Herfurth, Marcus Trost, Sven Schröder, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [10692-26]

Lunch Break. Wed 12:30 to 14:00

SESSION 6

LOCATION: CONCORDE WED 14:00 TO 15:30

Low-Loss Optics and Metrology

Session Chair: **Sven Schröder**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

14:00: **Laser induced deflection (LID): absolute photo-thermal absorption measurement for low-loss optics (Invited Paper)**, Christian Muehlig, Leibniz-Institut für Photonische Technologien e.V. (Germany) [10692-27]

14:30: **Fabrication and characterization of large-area crystalline coatings for next-generation gravitational wave detectors**, Christoph Deutsch, Crystalline Mirror Solutions GmbH (Austria); Garrett D. Cole, David Follman, Paula Heu, Crystalline Mirror Solutions, LLC (United States); Dominic Bachmann, Crystalline Mirror Solutions GmbH (Austria); Philip Koch, Harald Lück, Max-Planck-Institut für Gravitationsphysik (Germany); Alexander von Finck, Sven Schröder, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Ashish Rai, Tobias Zederbauer, Crystalline Mirror Solutions GmbH (Austria) ... [10692-28]

14:50: **Scattering issues in the case of two-side coated filters**, Myriam Zerrad, Michel Lequime, Claude Amra, Institut Fresnel (France) [10692-29]

15:10: **Spectroscopy of the residual absorption in low-loss bulk optical materials and coatings**, Frank Kühnemann, Tobias Trendle, Jens Kiessling, Fraunhofer IPM (Germany) [10692-53]

Coffee Break. Wed 15:30 to 16:00

INTERNATIONAL DAY OF LIGHT SPECIAL EVENT

LOCATION: FOYER ROOM EUROPA. 16:00 TO 18:00

SPIE would like to welcome you on the International Day of Light. All technical attendees are invited to relax, socialise, and enjoy light refreshments.

CONFERENCE 10692

THURSDAY 17 MAY

SESSION 7

LOCATION: CONCORDE THU 8:00 TO 11:20

Optical Fabrication

Session Chair: **Roland Geyl**, Safran Reosc (France)

8:00: **ESO ELT optical systems: a construction challenge** (*Invited Paper*), Marc Cayrel, European Southern Observatory (Germany) [10692-52]

8:20: **Pushing SiC optics polishing capabilities for advanced applications**, Roland Geyl, Hervé Leplan, Gilles Chaussat, Safran Reosc (France) [10692-30]

8:40: **Three wagons method to analyze ductile mode grinding processes** (*Invited Paper*), Oliver W. Föhnle, FISBA AG (Switzerland); Marius Doetz, Olaf Dambon, Fraunhofer-Institut für Produktionstechnologie IPT (Germany); Eckhard Langenbach, FISBA AG (Switzerland) [10692-33]

9:00: **Ductile grinding of tungsten carbide applying standard CNC machines: a process analysis**, Marius Doetz, Olaf Dambon, Fritz Klocke, Fraunhofer-Institut für Produktionstechnologie IPT (Germany); Christian Vogt, Rolf Rascher, Technische Hochschule Deggendorf (Germany); Oliver W. Föhnle, FISBA AG (Switzerland) [10692-34]

9:20: **Process control in ductile mode grinding of tungsten carbide** (*Invited Paper*), Marius Doetz, Olaf Dambon, Fritz Klocke, Fraunhofer-Institut für Produktionstechnologie IPT (Germany); Eckhard Langenbach, Oliver W. Föhnle, FISBA AG (Switzerland) [10692-31]

9:50: **Load controlled process window analysis of feed controlled CNC grinding**, Christian Vogt, Rolf Rascher, Technische Hochschule Deggendorf (Germany); Oliver W. Föhnle, FISBA AG (Switzerland) [10692-32]

Coffee Break Thu 10:10 to 10:40

10:40: **Advanced polymer optics: what is up, what is ongoing** (*Invited Paper*), Francois Houbre, Savimex (France) [10692-56]

11:00: **High efficient fabrication of high-precision off-axis aspheric optics**, Chaoyang Wei, Chen Hu, Haojin Gu, Jianda Shao, Shanghai Institute of Optics and Fine Mechanics (China) [10692-35]

Lunch Break Thu 11:20 to 13:10

SESSION 8

LOCATION: CONCORDE THU 13:10 TO 14:40

Metrology I

Session Chair: **Claude Amra**, Institut Fresnel (France)

13:10: **Optical metrology** (*Invited Paper*), Wolfgang Osten, Christof Pruss, Institut für Technische Optik (Germany) [10692-54]

13:40: **Polarization metrology for high numerical aperture DUV objectives**, Robert Grejda, Duncan Spaulding, Paul Michaloski, Robert Michaels, Stephen Mack, Paul Dewa, Corning Tropel Corp. (United States) [10692-42]

14:00: **Obtaining the topography of human corneas with the null-screen testing method**, Manuel Campos-García, Victor Emanuel Armengol-Cruz, Daniel Aguirre-Aguirre, Univ. Nacional Autónoma de México (Mexico); Christian Camargo Fierro, Instituto Politécnico Nacional (Mexico) [10692-37]

14:20: **Optoelectronic system modulation transfer function measurement based on the method of summation over different frequencies harmonic functions**, Oleg A. Perezyabov, Nadezhda K. Maltseva, ITMO Univ. (Russian Federation); Aleksandr V. Ilinski, S.I. Vavilov State Optical Institute (Russian Federation) [10692-40]

SESSION 9

LOCATION: CONCORDE THU 14:40 TO 16:40

Metrology II

Session Chair: **Christof Pruss**, Institut für Technische Optik (Germany)

14:40: **White light scattering and related techniques in far field roughness characterization** (*Invited Paper*), Claude Amra, Myriam Zerrad, Michel Lequime, Institut Fresnel (France) [10692-55]

15:10: **Characterization of optical components in UV and IR for space applications**, Sakina Achour, Quentin Kuperman-Le Bihan, Light Tec (France); Pierre Etcheto, Ctr. National d'Études Spatiales (France) [10692-38]

Coffee Break Thu 15:30 to 16:00

16:00: **Angle resolved scattering microscope**, Yusuf Sekman, Friedrich-Schiller-Univ. Jena (Germany); Sven Schröder, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Herbert Gross, Friedrich-Schiller-Univ. Jena (Germany) [10692-39]

16:20: **Optical diffractometry based surface plasmon resonance sensor for measuring refractive index of liquids**, Rasoul Aalipour, Shahram Esmaeili, Azarbaijan Shahid Madani Univ. (Iran, Islamic Republic of) [10692-41]

CLOSING REMARKS

LOCATION: CONCORDE 16:40 TO 16:45

Session Chair: **Sven Schröder**, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany)

CONFERENCE 10693

LOCATION: ENTENTE

Monday–Wednesday 14–16 May 2018 • Proceedings of SPIE Vol. 10693

Illumination Optics V

Conference Chairs: **Tina E. Kidger**, Kidger Optics Associates (United Kingdom); **Stuart David**, Synopsys, Inc. (United States)

Program Committee: **Peter Brick**, OSRAM Opto Semiconductors GmbH (Germany); **Cristina Canavesi**, LighTopTech Corp. (United States); **William Cassarly**, Synopsys, Inc. (United States); **Fabian Duerr**, Vrije Univ. Brussel (Belgium); **Florian R. Fournier**, Synopsys, Inc. (United States); **R. John Koshel**, College of Optical Sciences, The Univ. of Arizona (United States); **Juan Minano**, Univ. Politécnica de Madrid (Spain); **Rubén Mohedano**, Light Prescriptions Innovators Europe, S. L. (Spain); **Julius A. Muschaweck**, ARRI Inc. (Germany); **Steffen Reichel**, Pforzheim Univ. (Germany); **Jannick P. Rolland**, Univ. of Rochester (United States); **Andreas L. Timinger**, Lumileds Germany GmbH (Germany)

MONDAY 14 MAY

SESSION 2

MONDAY PLENARY SESSION. MON 8:15 TO 10:10
8:15 to 8:25: Welcome and Introductions
8:25 to 8:30: A.E. Conrady Award presented to: Philip J. Rogers , VNF Ltd. (United Kingdom)
8:30 to 9:15: Current and future NASA telescopes (Plenary Presentation) Joseph M. Howard , NASA Goddard Space Flight Ctr. (United States)
9:15 to 10:00: Optics for Virtual Reality: state of the art and future challenges (Plenary Presentation) Pablo Benítez , Univ. Politécnica de Madrid (Spain)
10:00 to 10:10: 2018 Michael Kidger Memorial Scholarship Award presented to: Caleb D. Gannon , Univ. of Arizona, College of Optical Sciences (United States) <i>See page 8 for details.</i>

LOCATION: ENTENTE MON 13:40 TO 17:00

Freeform Techniques I

Session Chair: **Fabian Duerr**, Vrije Univ. Brussel (Belgium)

13:40: Designing two freeform surfaces with Monge-Ampère equation method for point-like sources (Invited Paper), Rengmao Wu, Zhenrong Zheng, Zhejiang Univ. (China) [10693-5]
14:10: Solving the Monge-Ampère equation on triangle-meshes for use in optical freeform design , Rolf Wester, Fraunhofer-Institut für Lasertechnik (Germany); Annika Völl, Michael Berens, Jochen Stollenwerk, Peter Loosen, RWTH Aachen Univ. (Germany) [10693-6]
14:30: Application of the multiple Cartesian oval method for glass lens design , Ulf Geyer, Ansgar Hellwig, Thomas Hessling, Marc C. Hübner, Auer Lighting GmbH (Germany) [10693-7]
14:50: Design of freeform TIR optical elements generating narrow-angle light distribution , Kseniya Andreeva, Sergey Kravchenko, Samara Univ. (Russian Federation) and Image Processing Systems Institute, Russian Academy of Sciences (Russian Federation); Mikhail Moiseev, Leonid Doskolovich, Image Processing Systems Institute, Russian Academy of Sciences (Russian Federation) and Samara Univ. (Russian Federation) [10693-8]
Coffee Break Mon 15:10 to 15:40

Coffee Break Mon 10:10 to 10:30

SESSION 1

LOCATION: ENTENTE MON 10:30 TO 12:10

Optical Modelling, Effects, and Techniques I

Session Chair: **Julius A. Muschaweck**, ARRI Inc. (Germany)

10:30: Design of an optical refocusing illumination system for use in laser-scanning devices (Invited Paper), Lien Smeesters, Wendy Meulebroeck, Hugo Thienpont, Vrije Univ. Brussel (Belgium) . [10693-1]
11:00: Prescribed intensity patterns for extended sources by means of a wavefront-matching procedure (Invited Paper), Simone Sorgato, Vrije Univ. Brussel (Belgium); Julio Chaves, Rubén Mohedano, Light Prescriptions Innovators Europe, S. L. (Spain); Pablo Benítez, Light Prescriptions Innovators Europe, S. L. (Spain) and Univ. Politécnica de Madrid (Spain); Hugo Thienpont, Fabian Duerr, Vrije Univ. Brussel (Belgium) [10693-2]
11:30: Etendue conserving light shaping using micro-lens arrays with irregular lenslets , Chen Li, Peter Schreiber, Dirk Michaelis, Christoph Wächter, Stephanie Fischer, Uwe Zeitner, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany) [10693-3]
11:50: CSLM illumination for 1D and 2D encoded holographic 3D displays , Gerald Fütterer, Hochschule Deggendorf Technologiecampus Teisnach (Germany) [10693-4]
Lunch Break Mon 12:10 to 13:40

15:40: Monge-Ampère type equations for freeform illumination optics , Jan ten Thije Boonkkamp, Technische Univ. Eindhoven (Netherlands); Wilbert IJzerman, Philips Lighting B.V. (Netherlands); Lotte Romijn II, Nitin Yadav II, Technische Univ. Eindhoven (Netherlands) [10693-9]
16:00: Designing freeform reflectors using source-target mapping method , Evgeniy Andreev, Egor Byzov, Image Processing Systems Institute, Russian Academy of Sciences (Russian Federation) and Samara Univ. (Russian Federation); Mikhail Moiseev, Leonid Doskolovich, Image Processing Systems Institute, Russian Academy of Sciences (Russian Federation) [10693-10]
16:20: Irradiance and phase control with two freeform surfaces using partial differential equations , Christoph Bösel, Friedrich-Schiller-Univ. Jena (Germany); Johannes Hartung, Fraunhofer-Institut für Angewandte Optik und Feinmechanik (Germany); Herbert Gross, Friedrich-Schiller-Univ. Jena (Germany) [10693-11]
16:40: Speaking the language of your system: communicating with AI through spherical harmonics for self generated freeform lenses , Caleb D. Gannon, College of Optical Sciences, The Univ. of Arizona (United States) [10693-41]

TUESDAY 15 MAY

TUESDAY PLENARY SESSION TUE 8:00 TO 8:45
Demystifying etendue (Plenary Presentation) Bill J. Cassarly , Synopsys, Inc. (United States) <i>See page 8 for details.</i>

CONFERENCE 10693

SESSION 3

LOCATION: ENTENTE TUE 9:00 TO 12:00

Freeform Techniques II

Session Chair: **Fabian Duerr**, Vrije Univ. Brussel (Belgium)

9:00: **Freeform road lighting lens design** (*Invited Paper*), Zexin Feng, Dewen Cheng, Yongtian Wang, Beijing Institute of Technology (China) [10693-12]

9:30: **Design of a freeform, luminance spreading illumination lens with a continuous surface**, Karel Desnijder, KU Leuven (Belgium) [10693-13]

9:50: **Design of a waveguide head-up display with the eyebox extended orthogonally**, Luo Gu, Dewen Cheng, Yongtian Wang, Beijing Institute of Technology (China) [10693-14]

Coffee Break Tue 10:10 to 10:40

10:40: **Modeling of free-form optical surfaces for forming required light distribution**, Iana Mazur, Anna O. Voznesenskaya, ITMO Univ. (Russian Federation) [10693-15]

11:00: **Design of freeform micro-optical elements with hexagonally shaped irradiance distributions and their application in a thin direct-lit luminaire**, Claude Leiner, Franz P. Wenzl, Christian Sommer, JOANNEUM RESEARCH Forschungsgesellschaft mbH (Austria) [10693-16]

11:20: **Free-form optics for non-idealized light sources in 3D: a phase-space approach**, Annika Völl, RWTH Aachen Univ. (Germany); Rolf Wester, Fraunhofer-Institut für Lasertechnik (Germany); Paul Buske, Michael Berens, RWTH Aachen Univ. (Germany); Jochen Stollenwerk, Peter Loosen, RWTH Aachen Univ. (Germany) and Fraunhofer-Institut für Lasertechnik (Germany) [10693-17]

11:40: **Developments in extended-source 3D irradiance tailoring using edge-ray footprint-tracing**, Adam P. Hirst, Univ. Politécnica de Madrid (Spain); Julius Muschaweck, ARRI Inc. (Germany) [10693-18]

Lunch Break Tue 12:00 to 13:50

SESSION 4

LOCATION: ENTENTE TUE 13:50 TO 16:10

Optical Modelling, Effects, and Techniques II

Session Chair: **Peter Brick**, OSRAM Opto Semiconductors GmbH (Germany)

13:50: **Illumination optics of LED luminaires** (*Invited Paper*), Gilles Visser, Philips Lighting B.V. (Netherlands) [10693-19]

14:20: **Methods to precisely generate arbitrary spectra using multi-coloured LED light engines**, Aleix Llenas, Josep Carreras, Ledmotive Technologies SL (Spain) [10693-21]

14:40: **Recent discoveries in the rich landscape of aplanatic optics**, Daniel Feuermann, Heylal Mashaal, Jeffrey M. Gordon, Ben-Gurion Univ. of the Negev (Israel) [10693-22]

Coffee Break Tue 15:00 to 15:30

15:30: **Opto-thermal simulation model for optimizing laser-excited remote phosphor systems**, Elisavet Chatzizyrlis, Nadine Tinne, Laser Zentrum Hannover e.V. (Germany); Roland Lachmayer, Leibniz Univ. Hannover (Germany); Jörg Neumann, Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany) [10693-23]

15:50: **Problems of using the PMA adaptive mesh method in lens-array design for LED signal lighting**, Mahmoud Essameldin, Friedrich Fleischmann, Thomas Henning, Hochschule Bremen Univ. of Applied Sciences (Germany) [10693-25]

TUESDAY POSTER SESSION

LOCATION: FOYER CONNECTING HALL 4 TO HALL 3 TUE 18:00 TO 19:30

Conference attendees are invited to attend the joint poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster authors must set up their poster between 10:00 and 16:00 on Tuesday 15 May.

Flare light analysis and suppression in zoomable tactical LED flashlight, Kwang-Woo Park, Korea Photonics Technology Institute (Korea, Republic of) [10693-32]

Modeling of LED scheme for street lighting on the basis of chip-on-board scheme, Xuanlin Qiao, ITMO Univ. (Russian Federation) and Capital Univ. of Science & Technology (China); Anna O. Voznesenskaya, Galina Romanova, ITMO Univ. (Russian Federation) [10693-33]

Design of single and two-lens laser flat-top reshaping systems, Maria K. Orekhova, Anna O. Voznesenskaya, ITMO Univ. (Russian Federation) [10693-34]

Research on multi-wavelength and multi-beam illumination for improving object illumination uniformity, Quan Sun, Yu Ning, Yi Yang, Qiong Zhou, Shaojun Du, National Univ. of Defense Technology (China) [10693-35]

Efficient methods of BSDF reconstruction from the micro-relief dataset for the lighting simulation tasks, Dmitry Zhdanov, ITMO Univ. (Russian Federation); Sergey Ershov, M. V. Keldysh Institute of Applied Mathematics (Russian Federation); Igor S. Potemin, ITMO Univ. (Russian Federation); Vladimir Galaktionov, M. V. Keldysh Institute of Applied Mathematics (Russian Federation); Nikolay Bogdanov, ITMO Univ. (Russian Federation) [10693-36]

Analysis and study of the optical schemes for LED street lighting, Marat Tibeev, Galina Romanova, ITMO Univ. (Russian Federation) [10693-37]

Optimization based reconstruction of volume scattering medium parameters, Vadim Sokolov, M. V. Keldysh Institute of Applied Mathematics (Russian Federation); Dmitry Zhdanov, Igor S. Potemin, ITMO Univ. (Russian Federation); Boris Barladian, M. V. Keldysh Institute of Applied Mathematics (Russian Federation); Nikolay Bogdanov, ITMO Univ. (Russian Federation) [10693-38]

Non-imaging designs for diode laser driven single crystal phosphor light engines, A. Burak Cunbul, Mustafa H. Balci, Univ. College of Southeast Norway (Norway); Oyvind Svensen, Barco Fredrikstad AS (Norway); Xuyuan Chen, Muhammad Nadeem Akram, Univ. College of Southeast Norway (Norway) [10693-39]

Calculation and computer modeling of radiation-tolerant LED luminaire, Elena Starostina, Nadezhda K. Maltseva, Oleg A. Pereziabov, ITMO Univ. (Russian Federation) [10693-40]

WEDNESDAY 16 MAY

WEDNESDAY PLENARY SESSION WED 8:00 TO 8:45

High performance flat optics (*Plenary Presentation*)

Federico Capasso, Harvard John A. Paulson School of Engineering and Applied Sciences (United States)

See page 8 for details.

SESSION 5

LOCATION: ENTENTE WED 9:00 TO 10:00

Illumination Applications

Session Chair: **Bill J. Cassarly**, Synopsys, Inc. (United States)

9:00: **Optical realization and calibration of a light field generator**, Johannes Meyer, Karlsruher Institut für Technologie (Germany); Thomas Längle, Jürgen Beyerer, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany) [10693-26]

9:20: **User evaluation study on illumination requirements to design an augmented reality projector for open liver surgeries**, Shivaraman Ilango, Marvin Knöchelmann, Lüder Alexander Kahrs, Alexander Wolf, Roland Lachmayer, Tobias Ortmaier, Leibniz Univ. Hannover (Germany) [10693-27]

9:40: **Development of LED lighting system for pressurized water reactor**, Radda A. Iureva, Andrey S. Timko, ITMO Univ. (Russian Federation); Nadezhda K Maltseva, ITMO University (Russian Federation) [10693-28]

Coffee Break Wed 10:00 to 10:30

SESSION 6

LOCATION: ENTENTE WED 10:30 TO 11:50

Trends in Automotive Lighting

Session Chair: **Steffen Reichel**, Pforzheim Univ. (Germany)

10:30: **Optimization approach to design sizes and angles of prismatic light extraction elements to achieve desired spatial and angular distributions in automotive exterior lighting applications** (*Invited Paper*), Thomas L. R. Davenport, Synopsys, Inc. (United States) [10693-29]

11:00: **Automotive interior illumination: challenges and requirements** (*Invited Paper*), Robert Isele, BMW Group Forschungs- und Innovationszentrum (Germany); Karlheinz Blankenbach, Pforzheim Univ. (Germany) [10693-30]

11:30: **On a partially color corrected illumination system**, Holger Weigand, Sascha Heib, Technische Hochschule Köln (Germany) [10693-31]

INTERNATIONAL DAY OF LIGHT SPECIAL EVENT

LOCATION: FOYER ROOM EUROPA 16:00 TO 18:00

SPiE would like to welcome you on the International Day of Light. All technical attendees are invited to relax, socialise, and enjoy light refreshments.

CONFERENCE 10694

LOCATION: CONSENS

Wednesday–Thursday 16–17 May 2018 • Proceedings of SPIE Vol. 10694

Computational Optics 2018

Conference Chairs: Daniel G. Smith, Nikon Research Corp. of America (United States); Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany); Andreas Erdmann, Fraunhofer-Institut für Integrierte Systeme und Bauelementetechnologie IISB (Germany)

Program Committee: Miguel A. Alonso, Univ. of Rochester (United States); Sven Burger, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany); Donis G. Flagello, Nikon Research Corp. of America (United States); Ari T. Friberg, Univ. of Eastern Finland (Finland); Hans Peter Herzig, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Roarke Horstmeyer, Duke Univ. (United States); Olivier J. F. Martin, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Carsten Rockstuhl, Karlsruher Institut für Technologie (Germany); Michael Totzeck, Carl Zeiss SMT GmbH (Germany); H. Paul Urbach, Technische Univ. Delft (Netherlands); Wei Wang, Heriot-Watt Univ. (United Kingdom); Zeev Zalevsky, Bar-Ilan Univ. (Israel)

TUESDAY 15 MAY

TUESDAY POSTER SESSION

LOCATION: FOYER CONNECTING HALL 4 TO HALL 3. TUE 18:00 TO 19:30

Conference attendees are invited to attend the joint poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster authors must set up their poster between 10:00 and 16:00 on Tuesday 15 May.

3D raytracing model for laser beams influenced by thermal lensing in solid state gain media, Phillip Lino Rall, Ramon Springer, Christoph Pflaum, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [10694-29]

Analysis of three-dimensional diffraction wavefront error for point diffraction interferometer, Fen Gao, Xi'an Technological Univ. (China) and Heriot-Watt Univ. (United Kingdom); Jinping Ni, Xi'an Technological Univ. (China); Wei Wang, Heriot-Watt Univ. (United States) [10694-32]

Sharp-edge diffraction theory revisited: a catastrophic perspective, Riccardo Borghi, Univ. degli Studi di Roma Tre (Italy) [10694-33]

Multi-mode computing optical imaging technology based on software definition micro-nano satellite, Yangyang Liu, Qunbo Lv, Zheng Tan Sr., Linlin Pei, Weiyang Li, Jianwei Wang, Bin Xiangli, Academy of Opto-Electronics, CAS (China) [10694-34]

Study on time distribution of coherent GSM beams through multi aperture complex optical system, Congmiao Shan, Aerospace Engineering Univ. (China) [10694-35]

10:40: **Optimization of photonic wire bonds**, Fernando Negredo, Matthias Blaicher, Aleksandar Nestic, Pascal Kraft, Julian Ott, Willy Dörfler, Christian Koos, Carsten Rockstuhl, Karlsruher Institut für Technologie (Germany) [10694-4]

11:00: **Hybrid digital-optical imaging design for reducing surface asphericity cost while keeping high performance**, Javier Portilla, Sergio Barbero, Consejo Superior de Investigaciones Científicas (Spain) [10694-5]

11:20: **Optimising diffractive optical elements using machine-learning algorithms**, Martin Hammerschmidt, Philipp-Immanuel Schneider, Xavier Garcia Santiago, Lin Zschiedrich, Sven Burger, JCMwave GmbH (Germany) [10694-6]

11:40: **Application of deep learning algorithms for characterization of defects on lithographic masks**, Dereje Shewaseged Woldeamanual, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Andreas Erdmann, Fraunhofer-Institut für Integrierte Systeme und Bauelementetechnologie IISB (Germany); Andreas Maier, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [10694-7]

Lunch Break Wed 12:00 to 13:30

SESSION 2

LOCATION: CONSENS WED 13:30 TO 15:20

Computational Imaging

Session Chair: **Andreas Erdmann**, Fraunhofer-Institut für Integrierte Systeme und Bauelementetechnologie IISB (Germany)

13:30: **Computational holographic imaging and reconstruction (Invited Paper)**, Edmund Y. M. Lam, The Univ. of Hong Kong (Hong Kong, China) [10694-8]

14:00: **Characterization of systematic detector errors using ptychographic diffraction imaging**, Lars Lötgering, Hochschule Koblenz Univ. of Applied Sciences (Germany); Max Rose, Deutsches Elektronen-Synchrotron (Germany); Kahraman Keskinbora, Margarita Baluktsian, Gül Dogan, Umut T. Sanli, Luliya Bykova, Markus Weigand, Gisela Schütz, Max-Planck-Institut für Intelligente Systeme (Germany); Thomas Wilhein, Hochschule Koblenz Univ. of Applied Sciences (Germany) [10694-9]

14:20: **Fourier ptychography for lithography high NA systems**, Atoosa Dejkameh, Erlangen Master Programme in Advanced Optical Technologies (Germany); Andreas Erdmann, Peter Evanschitzky, Fraunhofer-Institut für Integrierte Systeme und Bauelementetechnologie IISB (Germany); Yasin Ekinci, Patrick Helfenstein, Paul Scherrer Institut (Switzerland) [10694-10]

14:40: **Optical phase retrieval using four rotated versions of a single binary mask**, Varis Karitans, Edgars Nitiss, Andrejs Tokmakovs, Kaspars Pudzs, Institute of Solid State Physics, Univ. of Latvia (Latvia) [10694-11]

15:00: **Realistic image synthesis in presence of birefringent media by backward ray tracing technique**, Dmitry Zhdanov, ITMO Univ. (Russian Federation); Sergey Ershov, Lev Shapiro, Vadim Sokolov, Alexey Voloboy, Vladimir Galaktionov, M. V. Keldysh Institute of Applied Mathematics (Russian Federation); Igor S. Potemin, Nikolay Bogdanov, ITMO Univ. (Russian Federation) [10694-12]

Coffee Break Wed 15:20 to 15:50

INTERNATIONAL DAY OF LIGHT SPECIAL EVENT

LOCATION: FOYER ROOM EUROPA 16:00 TO 18:00

SPIE would like to welcome you on the International Day of Light. All technical attendees are invited to relax, socialise, and enjoy light refreshments.

WEDNESDAY 16 MAY

WEDNESDAY PLENARY SESSION WED 8:00 TO 8:45

High performance flat optics (Plenary Presentation)
Federico Capasso, Harvard John A. Paulson School of Engineering and Applied Sciences (United States)

See page 8 for details.

SESSION 1

LOCATION: CONSENS WED 9:00 TO 12:00

Design and Optimization

Session Chair: **Frank Wyrowski**, Friedrich-Schiller-Univ. Jena (Germany)

9:00: **Multi-resonant silicon nanoantennas by evolutionary multi-objective optimization (Invited Paper)**, Peter R. Wiecha, Arnaud Arbouet, Christian Girard, Ctr. d'Elaboration de Matériaux et d'Etudes Structurales (France); Aurélie Lecestre, Guilhem Larrieu, Lab. d'Analyse et d'Architecture des Systèmes du CNRS (France); Vincent Paillard, Ctr. d'Elaboration de Matériaux et d'Etudes Structurales (France) [10694-1]

9:30: **Optimization and tolerancing of highly dispersive multilayer gratings for laser applications**, Felix Koch, Dennis Lehr, Tilman Glaser, Carl Zeiss Jena GmbH (Germany) [10694-2]

9:50: **An application of the virtual prototyping approach to design of VR, AR, and MR devices free from the vergence-accommodation conflict**, Igor S. Potemin, Irina Livshits, Dmitry Zhdanov, Andrey Zhdanov, Nikolay Bogdanov, ITMO Univ. (Russian Federation) [10694-3]

Coffee Break Wed 10:10 to 10:40

CONFERENCE 10694

THURSDAY 17 MAY

SESSION 3

LOCATION: CONSENS THU 8:10 TO 10:00

Microstructures and Illumination

Session Chair: **Daniel G. Smith**,
Nikon Research Corp. of America (United States)

8:10: **Material sensitive reconstruction of nanostructures based on finite-element simulations of complementary x-rays measurements** (*Invited Paper*), Victor Soltwisch, Philipp Hönicke, Mika Pflüger, Yves Kayser, Analía Fernández Herrero, Burkhard Beckhoff, Physikalisch-Technische Bundesanstalt (Germany); Sven Burger, JCMwave GmbH (Germany); Frank Scholze, Physikalisch-Technische Bundesanstalt (Germany) . [10694-13]

8:40: **Rigorous modeling of light absorption in nanostructured materials using a parallel high order finite element time-domain technique**, Stéphane Lanteri, Alexis Gobé, INRIA Sophia Antipolis - Méditerranée (France); Urs Aeberhard, Karsten Bittkau, Forschungszentrum Jülich GmbH (Germany) [10694-14]

9:00: **The concept of bidirectional operators and its application to the modelling of microstructures**, Christian Hellmann, Wyrowski Photonics UG (Germany); Olga Baladron-Zorita, Friedrich-Schiller-Univ. Jena (Germany); Huiying Zhong, Site Zhang, Friedrich-Schiller-Univ. Jena (Germany) and LightTrans International UG (Germany); Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany) [10694-15]

9:20: **Simulation study of illumination effects in high-NA EUV lithography**, Mohamed Ismail, Peter Evanschitzky, Andreas Erdmann, Fraunhofer-Institut für Integrierte Systeme und Bauelementetechnologie IISB (Germany); Gerardo Bottiglieri, Eelco van Setten, Timon F. Flervoet, ASML Netherlands B.V. (Netherlands) [10694-16]

9:40: **Fast-physical optics modeling of microscopy system with structured illumination**, Rui Shi, Friedrich-Schiller-Univ. Jena (Germany) and LightTrans International UG (Germany); Norik Janunts, Rainer Heintzmann, Leibniz-Institut für Photonische Technologien e.V. (Germany); Christian Hellmann, Wyrowski Photonics UG (Germany); Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany) [10694-17]

Coffee Break Thu 10:00 to 10:30

SESSION 4

LOCATION: CONSENS THU 10:30 TO 11:50

Physical Optics I

Session Chair: **Miguel A. Alonso**, Univ. of Rochester (United States)

10:30: **Surface polarization scattering generated from a birefringent material with rough surface**, Jonas Ritter, Univ. Stuttgart (Germany) and Heriot-Watt Univ. (Germany); Ning Ma, Heriot-Watt Univ. (United Kingdom); Wolfgang Osten, Univ. Stuttgart (Germany); Mitsuo Takeda, Utsunomiya Univ. (Japan); Wei Wang, Heriot-Watt Univ. (United Kingdom) [10694-19]

10:50: **Physical-optics modeling for optical components made out of birefringent materials**, Site Zhang, LightTrans International UG (Germany); Christian Hellmann, Wyrowski Photonics UG (Germany); Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany) [10694-20]

11:10: **Fast propagation of electromagnetic fields in graded-index media**, Huiying Zhong, LightTrans International UG (Germany) and Friedrich-Schiller-Univ. Jena (Germany); Site Zhang, LightTrans International UG (Germany); Rui Shi, Friedrich-Schiller-Univ. Jena (Germany); Christian Hellmann, Wyrowski Photonics UG (Germany); Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany) [10694-21]

11:30: **Accurate propagation of ultrashort pulses in nonlinear waveguides using propagation models for the analytic signal**, Oliver Melchert, Hannoversches Zentrum für Optische Technologien (Germany); Uwe Morgner, Leibniz Univ. Hannover (Germany); Bernhard Roth, Hannoversches Zentrum für Optische Technologien (Germany); Ihar Babushkin, Ayhan Demircan, Leibniz Univ. Hannover (Germany) [10694-22]

Lunch Break Thu 11:50 to 13:20

SESSION 5

LOCATION: CONSENS THU 13:20 TO 15:10

Physical Optics II

Session Chair: **Martin Hammerschmidt**, JCMwave GmbH (Germany)

13:20: **Density estimation in optical phase space for optimizing micro-optical elements on freeform surfaces** (*Invited Paper*), Michael Berens, Annika Völl, RWTH Aachen Univ. (Germany); Rolf Wester, Fraunhofer-Institut für Lasertechnik (Germany); Jochen Stollenwerk, Peter Loosen, RWTH Aachen Univ. (Germany) and Fraunhofer-Institut für Lasertechnik (Germany) [10694-23]

13:50: **Semi-analytical Fourier transform and its application to physical-optics modelling**, Zongzhao Wang, Friedrich-Schiller-Univ. Jena (Germany) and Wyrowski Photonics UG (Germany); Site Zhang, Friedrich-Schiller-Univ. Jena (Germany) and LightTrans International UG (Germany); Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany); Christian Hellmann, Wyrowski Photonics UG (Germany) [10694-24]

14:10: **Using the pupil difference probability density to understand OTF**, Kevin Liang, Miguel A. Alonso, Univ. of Rochester (United States) . [10694-25]

14:30: **The Gouy phase shift reinterpreted via the geometric Fourier transform**, Olga Baladron-Zorita, Friedrich-Schiller-Univ. Jena (Germany) and LightTrans GmbH (Germany); Zongzhao Wang, Friedrich-Schiller-Univ. Jena (Germany) and Wyrowski Photonics UG (Germany); Christian Hellmann, Wyrowski Photonics UG (Germany); Frank Wyrowski, Friedrich-Schiller-Univ. Jena (Germany) [10694-26]

14:50: **Efficient optical simulation of nano structures in thin-film solar cells**, Julian Hornich, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [10694-28]

CONFERENCE 10695

LOCATION: CONSENS

Monday–Tuesday 14–15 May 2018 • Proceedings of SPIE Vol. 10695

Optical Instrument Science, Technology, and Applications

Conference Chairs: **Nils Haverkamp**, Carl Zeiss Industrielle Messtechnik GmbH (Germany); **Richard N. Youngworth**, Riyo LLC (United States)

Program Committee: **Nandini Bhattacharya**, Technische Univ. Delft (Netherlands); **Harald Bosse**, Physikalisch-Technische Bundesanstalt (Germany); **Markus Deguenther**, Carl Zeiss SMT GmbH (Germany); **Simon Hall**, Colour Holographic Ltd. (United Kingdom);

Alois M. Herkommer, Univ. Stuttgart (Germany); **Wolfgang Högele**, Carl Zeiss Optotechnik GmbH (Germany); **Keith J. Kasunic**, Optical Systems Group, LLC (United States); **Stefan Kück**, Physikalisch-Technische Bundesanstalt (Germany); **Michael Layh**, Hochschule Kempten (Germany); **Daniel Rotter**, Swarovski Optik KG (Austria); **Breann N. Sitarski**, GMTO Corp. (United States)

MONDAY 14 MAY

SESSION 2

LOCATION: CONSENS MON 13:40 TO 15:20

Optical and Photonic Instrument Applications

Session Chair: **Michael Layh**, Hochschule Kempten (Germany)

13:40: **The hazard of accommodation and scanning LIDARs**, Thorsten Beuth, Daniel Thiel, Michael G. Erfurth, Markus Hippler, Valeo Schalter und Sensoren GmbH (Germany) [10695-6]

14:00: **Performance enhancements from telescope optics in a polygon mirror-based, spectral filter for Swept Source Optical Coherence Tomography (SS-OCT)**, Michael Everson, George Dobre, Univ. of Kent (United Kingdom); Virgil-Florin Duma, Aurel Vlaicu Univ. of Arad (Romania) [10695-7]

14:20: **Image formation in trans-illumination interferometry**, Marija Strojnik-Scholl, Centro de Investigaciones en Óptica, A.C. (Mexico) [10695-8]

14:40: **Open indirect ophthalmoscope: a novel, low cost optical solution to capture high-resolution retinal images**, Sandeep Vempati, LV Prasad Eye Institute (India); Tristan B. Swedish, Massachusetts Institute of Technology (United States); Dhruv Joshi, Stanford Univ. (United States); Devesh Jain, Jay Kumar Chhablani M.D., LV Prasad Eye Institute (India) [10695-9]

15:00: **Investigation the effect of shapes, size, and orientation of dielectric rods on the photonic band gap for various lattices in 2D anisotropic photonic crystals**, Mahsa Hadadi Moghadam, Behrooz Rezaei, Ali Soltani Vala, Manouchehr Kalafi, Univ. of Tabriz (Iran, Islamic Republic of) [10695-10]

Coffee Break Mon 15:20 to 15:50

SESSION 3

LOCATION: CONSENS MON 15:50 TO 17:30

Computational Methods and Prototyping

Session Chair: **Alois M. Herkommer**, Univ. Stuttgart (Germany)

15:50: **Numerical prediction and approximate inversion of optoacoustic signals in tissue phantoms**, Oliver Melchert, Merve Meinhardt-Wollweber, Elias Blumenröther, Bernhard Roth, Hannoversches Zentrum für Optische Technologien (Germany) [10695-11]

16:10: **Resolution and accuracy of non-linear regression of PSF with artificial neural networks**, Alexander Braun, Matthias Lehmann, Christian Wittpahl, Joseph Hitzenbichler, Hochschule Düsseldorf (Germany) [10695-12]

16:30: **Measurement of 2nd-order phenomenon with spatial light modulator**, Chieh-En Lee, Jia-Wei Hong, Che-Chen Chen, Chung-Hao Tien, National Chiao Tung Univ. (Taiwan) [10695-13]

16:50: **Virtual prototyping as an approach to optimizing starting point selection for camera lenses in mass-production**, Irina L. Livshits, Yan Wang, Igor S. Potemin, Dmitry D. Zhdanov, ITMO Univ. (Russian Federation) [10695-14]

17:10: **Z-domain modelling of a quadruple asymmetrical micro optical ring resonator and its performance as optical filter**, Sanjoy Mandal, Suchita Lakra, Suman Ranjan, Indian Institute of Technology (Indian School of Mines), Dhanbad (India) [10695-15]

MONDAY PLENARY SESSION MON 8:15 TO 10:10

8:15 to 8:25: **Welcome and Introductions**

8:25 to 8:30: **A.E. Conrady Award**
presented to:
Philip J. Rogers, VNF Ltd. (United Kingdom)

8:30 to 9:15: **Current and future NASA telescopes**
(Plenary Presentation)
Joseph M. Howard, NASA Goddard Space Flight Ctr. (United States)

9:15 to 10:00: **Optics for Virtual Reality: state of the art and future challenges** (Plenary Presentation)
Pablo Benitez, Univ. Politécnica de Madrid (Spain)

10:00 to 10:10: **2018 Michael Kidger Memorial Scholarship Award**
presented to:
Caleb D. Gannon, Univ. of Arizona, College of Optical Sciences (United States)

See page 8 for details.

Coffee Break Mon 10:10 to 10:30

SESSION 1

LOCATION: CONSENS MON 10:30 TO 11:50

Space and Remote Sensing

Session Chair: **Wolfgang Högele**, Carl Zeiss Optotechnik GmbH (Germany)

10:30: **Algorithm design for image-based wavefront control without wavefront sensing**, Orestis Kazasidis, Sven Verpoort, Ulrich Wittrock, Fachhochschule Münster (Germany) [10695-1]

10:50: **Formation flying metrology system for the ESA-PROBA3 mission: the Shadow Positioning Sensors (SPS)**, Davide Loreggia, INAF - Osservatorio Astronomico di Torino (Italy); Silvano Fineschi, INAF - Osservatorio Astrofisico di Torino (Italy); Alessandro Bemporad, INAF - Osservatorio Astronomico di Torino (Italy); Marta Casti, INAF - Osservatorio Astrofisico di Torino (Italy); Vladimiro Noce, INAF - Osservatorio Astrofisico di Arcetri (Italy); Gerardo Capobianco, Gianalfredo Nicolini, INAF - Osservatorio Astrofisico di Torino (Italy); Luca Zangrilli, INAF - Osservatorio Astronomico di Torino (Italy); Federico Landini, Cristian Baccani, INAF - Osservatorio Astrofisico di Arcetri (Italy); Marco Romoli, Univ. degli Studi di Firenze (Italy); Steve Buckley, SensL Technologies Ltd. (Ireland); Cédric Thizy, François Denis, Philippe Ledent, Benoît Marquet, Ctr. Spatial de Liège (Belgium); Damien Galano, European Space Agency (Netherlands); Massimiliano Belluso, INAF - Osservatorio Astrofisico di Catania (Italy); Luciano Accatino, AC Consulting (Italy); Luca Terenzi, Gianluca Morgante, INAF - IASF Bologna (Italy); Marco Riva, Manuele Moschetti, INAF - Osservatorio Astronomico di Brera (Italy); Carlo Calderoni, DTM Technologies (Italy); Stefano Pieraccini, CGS S.p.A. Compagnia Generale per lo Spazio (Italy) [10695-2]

11:10: **Adaptive wireless sensor for aerospace application**, George E. Dovgalenko, Advanced Sensor Technologies Inc. (United States) and Stratford Univ. (United States); Kadir Altintepe, Thomas Nelson Community College (United States) [10695-3]

11:30: **A novel method to calculate the OI 135.6nm dayglow emission in the ionosphere**, Yongchao Zhang, Keli Zhang, Jun Zhu, Huan Yin, Aerospace DongFangHong Satellite Co., Ltd. (China) [10695-4]

Lunch Break Mon 11:50 to 13:40

CONFERENCE 10695

TUESDAY 15 MAY

TUESDAY PLENARY SESSION TUE 8:00 TO 8:45

Demystifying etendue (Plenary Presentation)
Bill J. Cassarly, Synopsys, Inc. (United States)

See page 8 for details.

Coffee Break Tue 10:00 to 10:30

SESSION 4

LOCATION: CONSENS TUE 10:30 TO 12:10

Metrology and Applications

Session Chair: **Richard N. Youngworth**, Riyo LLC (United States)

10:30: **Measurement of spherical, aspherical, and freeform specular surfaces using experimental raytracing in simulation and measurement**, Tobias Binkele, David Hilbig, Thomas Henning, Friedrich Fleischmann, Hochschule Bremen Univ. of Applied Sciences (Germany) [10695-16]

10:50: **Functional tolerancing using full surface metrology**, Robert Grejda, Katherine Ballman, Christopher Lee, Corning Tropol Corp. (United States) [10695-17]

11:10: **Fast and precision displacement/3D profile measuring interferometers using sinusoidal frequency/phase modulation without lock-in amplifiers**, Masato Aketagawa, Takehiro Nakagawa, Dong Wei, Nagaoka Univ. of Technology (Japan) [10695-18]

11:30: **Interferometric characterization of large-stroke nano-positioning stage using an optical fiber interferometer with subatomic resolution**, Tao Jin, Univ. of Shanghai for Science and Technology (China) [10695-19]

11:50: **New light absorbing material for grazing angles**, Alexander Yevtushenko, Dina Katsir, Acktar Ltd. (Israel) [10695-20]

TUESDAY POSTER SESSION

LOCATION: FOYER CONNECTING HALL 4 TO HALL 3 TUE 18:00 TO 19:30

Space and Remote Sensing

Conference attendees are invited to attend the joint poster session to network, enjoy light refreshments, and view the poster papers. Attendees are required to wear their conference registration badge. Authors of poster papers will be present to answer questions concerning their papers. Poster authors must set up their poster between 10:00 and 16:00 on Tuesday 15 May.

Autonomous tracking device for location of the Sun position using the global positioning system, Kamil Plachta, Wroclaw Univ. of Science and Technology (Poland) [10695-21]

The compact light-weighted hyperspectral imager based on curved prisms: calibration and laboratory test, Juanjuan Jing, Yacan Li, Jinsong Zhou, Academy of Opto-Electronics, CAS (China); Lei Yang, Academy of Opto-Electronics (China) and University of Chinese Academy of Sciences (China); Lei Feng, Academy of Opto-Electronics, CAS (China); Xiaoying he, Lidong Wei, Academy of Opto-Electronics (China); Xiaohan Wang, PLA 61336 force (China) [10695-22]

Optical and Photonic Instrument Application

A novel noise analysis method for multi-oscillator ring laser gyro, Zhenfang Fan, Guangfeng Lu, Yu Xudong, National Univ. of Defense Technology (China) [10695-23]

The development of optical fiber neurosystem for deep-lying brain tumors phototheranostics, Alina Sharova, National Research Nuclear Univ. MEPhI (Russian Federation); Luliia S. Maklygina, Alexander Borodkin, Anastasia V. Ryabova, Daria Pominova, Victor Loschenov, A. M. Prokhorov General Physics Institute of the Russian Academy of Sciences (Russian Federation) [10695-24]

Portable spectrometer for fast assessment of skin engraftment via exogenous and endogenous fluorophores, Dina Farrakhova, National Research Nuclear Univ. MEPhI (Russian Federation); Vladimir Makarov, Alexander Borodkin, A. M. Prokhorov General Physics Institute of the Russian Academy of Sciences (Russian Federation) [10695-25]

Computer vision system selection for control of rapid prototyping processes, Daniil V. Izmaylov, Kirill Bodrov, Nadezhda D. Tolstoba, ITMO Univ. (Russian Federation) [10695-26]

Black coatings for highly sensitive to contamination optical systems, Dina Katsir, Acktar Ltd. (Israel) [10695-27]

Computational Methods and Prototyping

Hough transform based image processing algorithm in the optical-electronic joined-channel angle measuring device, Anton A. Nogin, Igor A. Konyakhin, ITMO Univ. (Russian Federation) [10695-28]

Efficiency analysis of optical schemes for the development of high power laser diode modules, Ekaterina Kotova, Galina E. Romanova, Maxim A. Odnoblyudov, Vladislav E. Bougrov, H. A. Tsyganok, ITMO Univ. (Russian Federation) [10695-30]

Analysis of image filtering algorithms in case of image segmentation problem, Dmitriy Fedorenko, Kseniia V. Ezhova, Andrey Veremenko, ITMO Univ. (Russian Federation) [10695-31]

Metrology and Applications

Processing method of surface topography interferogram in four-wavelength interferometry, Liangen Yang, Fan Liu, Hubei Univ. of Technology (China) [10695-32]

Fiber Brillouin amplifiers for optical frequency transfer over long distance telecommunication fibre links, Alexander Kuhl, Gesine Grosche, Physikalisch-Technische Bundesanstalt (Germany) [10695-33]

Determination of balance degree (precession) of spinning gyro wheels by using optical feedback interferometry, Can Candan, Mehmet Tiken, 5th Main Maintenance Factory Directorate (Turkey); Elif Orhan, Gazi Univ. (Turkey); Halil Berberoglu, Gazi University, Polatli Fen Edebiyat Faculty (Turkey) [10695-34]

Proceedings.

Paid conference registration includes online Proceedings of SPIE. In the tables below you will find product order numbers to use on the registration form.

Available as part of registration:

Online Proceedings Volume—access to a single conference proceedings volume via the SPIE Digital Library. Available as papers are published.

Online Proceedings Collection—access to multiple related proceedings volumes via the SPIE Digital Library. Available as papers are published.

Conference Attendees: You may purchase additional online collections for \$175 each or additional online proceedings volumes for \$60 each. Print conference proceedings volumes are also available; see pricing below.

Accessing Online Proceedings

To access your proceedings:

- Go to <http://spiedigitallibrary.org> and sign in. If you do not have an SPIE account, create one using the email address you used to register for the conference.
- Click the My Account link at the top of the page, then find the My Conference Proceedings tab, which will show your available proceedings volumes.

You can also access this content via your organization's SPIE Digital Library account.

For assistance, contact SPIE:

Email: SPIEDLsupport@spie.org

Phone (North America): +1 888 902 0894

Phone (Rest of World): +1 360 685 5580

Online Proceedings Volumes

Conference Attendees The price for additional online proceedings volumes is \$60 each.

Product Order Number		Volume Title/Volume Editors	Price for separate purchase
Print Volume	Online Volume		Meeting Attendees
10690	DL 10690	Optical Design and Engineering VII <i>Laurent Mazuray, Rolf Wartmann, Andrew P. Wood</i>	\$123.75
10691	DL 10691	Advances in Optical Thin Films VI <i>Michel Lequime, H. Angus Macleod, Detlev Ristau</i>	\$97.50
10692	DL 10692	Optical Fabrication, Testing, and Metrology VI <i>Sven Schröder, Roland Geyl</i>	\$78.75
10693	DL 10693	Illumination Optics V <i>Tina E. Kidger, Stuart David</i>	\$67.50
10694	DL 10694	Computational Optics II <i>Daniel G. Smith, Frank Wyrowski, Andreas Erdmann</i>	\$60.00
10695	DL 10695	Optical Instrument Science, Technology, and Applications <i>Nils Haverkamp, Richard N. Youngworth</i>	\$60.00

Online Proceedings Collections

Product Order Number	Collection Title/Included Volumes (See next page for volume titles and editors)	Price for separate purchase
		Meeting Attendees
DLC698	SPIE Optical Systems Design 2018 <i>Volumes #:10690, 10691, 10692, 10693, 10694, 10695</i>	\$175.00

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

A

Aalipour, Rasoul [10692-41] S9
Abdeddaim, Redha [10691-63] SPTue
Abromavicius, Giedrius [10691-65] SPTue, [10691-73] SPTue
Accatino, Luciano [10695-2] S1
Achour, Sakina [10692-38] S9
Aeberhard, Urs [10694-14] S3
Aguirre-Aguirre, Daniel [10692-37] S8
Aickara Gopinathan, Sreejith [10690-52] S13
Ailloud, Quentin [10691-7] S2
Aketagawa, Masato [10695-18] S4
Akhouayri, Hassan [10691-37] S10
Akram, Muhammad Nadeem [10693-39] SPTue
Alameda, Jennifer B. [10691-28] S7
Alig, Thimotheus [10691-77] SPTue
Allanche, Timothe [10690-24] S6
Allioux, Renaud [10690-18] S5
Alonso, Miguel A. 10694 Program Committee, 10694 S4 Session Chair, [10694-25] S5
Altintepe, Kadir [10695-3] S1
Amaro de Faria Júnior, Antonio Carlos [10690-74] SPTue
Amoroso, Marilena [10690-49] S12
Amotchkina, Tatiana V. [10691-21] S6, [10691-35] S10
Ampleeva, Irina [10690-77] SPTue
Amra, Claude 10691 Program Committee, 10691 S6 Session Chair, [10691-19] S5, [10691-3] S1, [10691-4] S2, [10691-7] S2, 10692 S8 Session Chair, [10692-29] S6, [10692-55] S9
An, Da [10690-79] SPTue
Andreev, Evgeniy [10693-10] S2
Andreev, Lev [10690-62] SPTue
Andreeva, Kseniya [10693-8] S2
Angervaks, Aleksandr E. [10692-7] S2
Antier, Catherine 10690 Program Committee
Antonakakis, Tryfon [10691-63] SPTue
Arbouet, Arnaud [10694-1] S1
Arcidiacono, Carmelo [10690-51] S7
Arhilger, Detlef [10691-39] S11
Armengol-Cruz, Victor de Emanuel [10692-37] S8
Arnold, Thomas [10692-21] S5
Auchère, Frédéric [10691-64] SPTue

B

Babeva, Tsvetanka [10691-78] SPTue
Babington, James [10690-11] S3
Babushkin, Ihar [10694-22] S4
Baccani, Cristian [10690-20] S5, [10695-2] S1
Bächli, Andreas [10691-66] SPTue
Bachmann, Dominic [10692-28] S6
Badorreck, Holger [10691-30] S9, [10691-5] S2

Baek, Ji-Hye [10690-80] SPTue
Bakholdin, Alexey V. [10690-64] SPTue, [10690-66] SPTue, [10690-69] SPTue
Baladron-Zorita, Olga [10694-15] S3, [10694-26] S5
Balasa, Istvan [10691-16] S4, [10691-36] S10
Balci, Mustafa H. [10693-39] SPTue
Ballman, Katherine [10695-17] S4
Baluktsian, Margarita [10694-9] S2
Banasch, Michael [10692-17] S4
Bao, Ganghua [10691-47] S12, [10691-62] SPTue
Baranov, Aleksandr [10691-60] SPTue
Barbero, Sergio [10690-16] S4, [10694-5] S1
Barladian, Boris K. [10693-38] SPTue
Barré, Frédéric [10692-12] S3
Barrie, James D. [10691-80] S8
Barton, Jennifer K. [10690-32] S8
Bauer, Jens [10692-21] S5
Bauer, Tobias 10690 Program Committee
Bavdaz, Marcos [10690-48] S12
Bawart, Martin [10692-4] S2
Beckert, Erik [10692-5] S2
Beckhoff, Burkhard [10694-13] S3
Bégou, Thomas [10691-15] S4, [10691-17] S5, [10691-23] S6, [10691-39] S11, [10691-45] S12, [10691-6] S2, [10691-75] SPTue
Béguelin, Jeremy [10692-6] S2
Behaghel, Thibault [10690-71] SPTue
Beier, Matthias [10692-19] S5
Beladiya, Vivek [10691-13] S3
Belluso, Massimiliano [10695-2] S1
Belosludtsev, Alexandr [10691-67] SPTue, [10691-68] SPTue
Belyaeva, Alina [10692-47] SPWed
Bemporad, Alessandro [10695-2] S1
Bender, Chad F. [10690-50] S13
Benítez, Pablo [10690-502] SPlen, [10693-2] S1
Bentley, Julie L. [10690-362] S3, [10690-364] S11, [10690-365] S11
Berberoglu, Halil [10695-34] SPTue
Berens, Michael [10693-17] S3, [10693-6] S2, [10694-23] S5
Bernal, Ashley L. [10692-46] SPWed
Berner, Andrea [10690-15] S4
Bernet, Stefan [10692-4] S2
Berruée, Romain [10692-12] S3
Beuth, Thorsten [10695-6] S2
Beutler, Andreas [10692-23] S5
Beyerer, Jürgen [10693-26] S5
Bhattacharya, Nandini 10695 Program Committee
Bini, Alessandro [10690-47] S12
Binkele, Tobias [10695-16] S4
Bischoff, Martin [10691-41] S11
Bittkau, Karsten [10694-14] S3
Blaicher, Matthias [10694-4] S1
Blake, Cullen H. [10690-50] S13

Blalock, Todd [10692-20] S5
Blankenbach, Karlheinz [10693-30] S6
Blum, Steffen [10690-48] S12
Blumenröther, Elias [10695-11] S3
Bociort, Florian [10690-2] S1
Bodrov, Kirill [10695-26] SPTue
Boehme, Beate [10690-27] S7
Bogdanov, Nikolay [10690-14] S3, [10693-36] SPTue, [10693-38] SPTue, [10694-3] S1
Bong, Su-Chan [10690-80] SPTue
Boni, Alessandro [10690-47] S12
Borghi, Riccardo [10694-33] SPTue
Borodkin, Alexander [10695-24] SPTue, [10695-25] SPTue
Bösel, Christoph [10693-11] S2
Bosse, Harald 10695 Program Committee
Botha, Roelene [10691-66] SPTue
Bottiglieri, Gerardo [10694-16] S3
Bougrov, Vladislav E. [10695-30] SPTue
Boukenter, Aziz [10690-24] S6
Bourgade, Antoine [10691-32] S9, [10691-37] S10
Braun, Alexander [10695-12] S3
Breese, Mark H. B. [10691-74] SPTue
Briand, Emrick [10691-25] S7
Brick, Peter 10693 Program Committee, 10693 S4 Session Chair
Britze, Chris [10691-40] S11
Brunelle, Matthew J. [10692-20] S5
Bruns, Stefan [10691-40] S11
Buckley, Steve [10695-2] S1
Burcklen, Catherine [10691-28] S7
Burger, Sven 10694 Program Committee, [10694-13] S3, [10694-6] S1
Burkhardt, Matthias [10692-16] S4
Buske, Paul [10693-17] S3
Butova, Darya [10690-85] SPTue, [10692-47] SPWed
Buzelis, Rytis [10691-65] SPTue, [10691-70] SPTue, [10691-73] SPTue
Bykova, Iuliia [10694-9] S2
Byzov, Egor V. [10693-10] S2

C

Calderoni, Carlo [10695-2] S1
Camargo Fierro, Christian [10692-37] S8
Campos-García, Manuel [10692-37] S8, [10692-50] SPWed
Canavesi, Cristina 10693 Program Committee
Candan, Can [10695-34] SPTue
Capasso, Federico [10690-503] SPlen
Capobianco, Gerardo [10695-2] S1
Carreras, Josep [10693-21] S4
Carstens, Florian [10691-18] S5
Casagli, Nicola [10690-20] S5
Cassarly, Bill J. [10690-501] SPlen, 10693 Program Committee, 10693 S5 Session Chair
Casti, Marta [10695-2] S1

Cau, Francoise 10690 Program Committee
Cayrel, Marc [10692-52] S7
Ceizaris, Lukas [10691-67] SPTue
Cen, Zhaofeng [10690-5] S1
Chambion, Bertrand [10690-71] SPTue
Champagnat, Frédéric [10690-22] S6
Chan, Shih-Hao [10691-54] SPTue
Chang, Chih-Sheng [10690-91] SPTue
Chang, Keng-Ming [10690-98] SPTue
Chang, Keng-Shou [10692-44] SPWed
Chang, Ya-Chen [10691-38] S10, [10691-57] SPTue
Chatzizyri, Elisavet [10693-23] S4
Chaussat, Gilles [10692-30] S7
Chaves, Julio Cesar Pinto [10693-2] S1
Chen, Bo [10690-36] S9
Chen, Che-Chen [10695-13] S3
Chen, Chia-Yin [10691-54] SPTue
Chen, Fong-Zhi [10692-25] S5
Chen, Hung-Pin [10691-38] S10
Chen, Qi [10690-83] SPTue
Chen, Sheng-Hui [10691-38] S10, [10691-54] SPTue
Chen, Xuyuan [10693-39] SPTue
Chen, Yen-Nan [10690-3] S4
Cheng, Dewen [10693-12] S3, [10693-14] S3
Cheng, Xinbin [10691-2] S1, [10691-36] S10, [10691-47] S12, [10691-58] SPTue, [10691-62] SPTue, 10692 Program Committee, [10692-13] S4
Cheng, Yuan-Chieh [10692-25] S5
Chhablani, Jay [10695-9] S2
Cho, Kyung-Suk [10690-80] SPTue
Cho, Wen-Hao [10691-57] SPTue
Choi, Dukhyun [10691-51] SPTue
Choi, Seonghwan [10690-80] SPTue
Chou, Hsiao-Yu [10692-25] S5
Christova, Darinka [10691-78] SPTue
Chu, Chung-Tse [10691-80] S8
Chukhramov, Anton [10690-70] SPTue
Chung, Kwun-Bum [10691-51] SPTue
Cifuentes, Andrés 10690 Program Committee
Cillegi, Paolo [10690-51] S7, [10690-78] SPTue
Citra Asmara, Teguh [10691-74] SPTue
Cloutier, Christophe [10692-12] S3
Cole, Garrett D. [10692-28] S6
Conkey, Don B. [10690-364] S11, [10690-365] S11
Cook, Erika [10690-95] SPTue
Coriand, Luisa [10692-14] S4
Cortecchia, Fausto [10690-51] S7, [10690-78] SPTue
Court, Andrew 10690 Program Committee

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

Crabtree, Karlton [10690-46] S12
Cross, David A. [10691-79] S8
Cucinelli, Marco [10691-66] SPTue
Cumar, Dipak [10690-10] S2
Cunbul, A. Burak [10693-39] SPTue

D

Da Deppo, Vania [10690-93] SPTue
Dai, Xuezhi [10690-60] SPTue
Dainty, Christopher [10690-28] S7
Dambon, Olaf [10692-31] S7, [10692-33] S7, [10692-34] S7
Daniel, Marcus V. [10691-34] S9
Dannberg, Peter [10692-5] S2
Danudirjo, Donny [10690-86] SPTue
Davenport, Thomas L. R. [10693-29] S6
David, Stuart 10693 Conference Chair
Davies, Tom [10690-13] S3
Davis, James [10691-79] S8
de la Barrière, Florence [10690-22] S6
de Rossi, Sébastien [10691-64] SPTue
Deguenther, Markus 10695 Program Committee
Dejameh, Atoosa [10694-10] S2
Delmotte, Franck 10691 Program Committee, 10691 S4 Session Chair, [10691-25] S7, [10691-64] SPTue
Demircan, Ayhan [10694-22] S4
Denis, François [10695-2] S1
DePoy, Darren L. [10690-95] SPTue
Desnijder, Karel [10693-13] S3
Deutsch, Christoph [10692-28] S6
Dewa, Paul G. [10692-42] S8
Diaz-Uribe, José Rufino [10692-50] SPWed
Diehl, Torsten [10692-16] S4
Dilworth, Donald C. [10690-6] S2
Dimb, Alexandru-Lucian [10690-26] S6
Diolaiti, Emiliano [10690-51] S7, [10690-78] SPTue
Dmitriev, Vladimir [10690-29] S7
Dobre, George M. [10695-7] S2
Dobrolenskiy, Yury [10690-75] SPTue
Doetz, Marius [10692-31] S7, [10692-33] S7, [10692-34] S7
Dogan, Gül [10694-9] S2
Döhring, Thorsten [10691-75] SPTue
Dong, Siyu [10691-47] S12
Dörfler, Willy [10694-4] S1
Doric, Sead 10692 Program Committee
Doskolovich, Leonid L. [10693-10] S2, [10693-8] S2
Dovgalenko, George E. [10695-3] S1
Dovillaire, Guillaume 10690 Program Committee
Drazdys, Ramutis [10691-73] SPTue

Dreisow, Felix [10691-46] S12
Druart, Guillaume [10690-18] S5, [10690-22] S6
Du, Jing [10691-50] SPTue
Du, Shaojun [10690-82] SPTue, [10690-90] SPTue, [10691-72] SPTue, [10693-35] SPTue, [10694-30] SPTue, [10694-31] SPTue
Duerr, Fabian 10693 Program Committee, 10693 S2 Session Chair, 10693 S3 Session Chair, [10693-2] S1
Duma, Virgil-Florin [10690-26] S6, [10695-7] S2
Dunn, Christina R. [10692-22] S5
Duparré, Angela 10691 Program Committee, 10692 Program Committee
Duparré, Michael 10690 Program Committee
Durieux, Alain 10690 Program Committee
Dziuban, Iliia [10690-75] SPTue

E

Ebert, Wolfgang [10691-10] S3
Eckert, Mandy [10691-34] S9
Efras, Aleksandr I. [10690-66] SPTue
Ehlers, Henrik [10691-18] S5
Ekimenkova, Alisa S. [10690-34] S8
Ekinci, Yasin [10694-10] S2
Emmerich, Florian [10691-75] SPTue
Emmert, Luke A. [10691-30] S9
Enoch, Stefan [10691-63] SPTue
Enya, Keigo [10690-88] SPTue
Erdmann, Andreas 10694 Conference Chair, 10694 S2 Session Chair, [10694-10] S2, [10694-16] S3, [10694-7] S1
Erdmann, Lars H. [10692-16] S4
Erfurth, Michael G. [10695-6] S2
Ershov, Sergey [10693-36] SPTue, [10694-12] S2
Esmailie, Shahram [10692-41] S9
Espinosa-Yáñez, Lucía [10691-27] S7
Espinoza-Nava, Ulises [10692-50] SPWed
Essameldin, Mahmoud [10693-25] S4
Etcheto, Pierre [10692-38] S9
Evanschitzky, Peter [10694-10] S2, [10694-16] S3
Everson, Michael [10695-7] S2
Ezhova, Kseniia V. [10690-65] SPTue, [10690-70] SPTue, [10695-31] SPTue
Ezhova, Vasilisa [10690-62] SPTue

F

Fabbri, Anna [10690-49] S12
Faes, Daniel M. [10690-95] SPTue
Fähnle, Oliver W. 10692 Program Committee, [10692-31] S7, [10692-32] S7, [10692-33] S7, [10692-34] S7
Fan, Zhenfang [10695-23] SPTue
Faraz, Tahsin [10691-13] S3
Farrakhova, Dina [10695-25] SPTue
Feautrier, Philippe [10690-51] S7, [10690-78] SPTue
Fedorenko, Dmitriy [10690-70] SPTue, [10695-31] SPTue
Fedorova, Anna A. [10690-75] SPTue
Fedoseev, Viktor [10691-14] S4
Felde, Nadja [10692-14] S4
Feng, Lei [10692-48] SPWed, [10695-22] SPTue
Feng, Lei [10692-49] SPWed
Feng, Zexin [10693-12] S3
Fernández Herrero, Analia [10694-13] S3
Ferrari, Marc [10690-45] S11, [10690-71] SPTue
Feuermann, Daniel [10693-22] S4
Filacchione, Gianrico [10690-49] S12
Fineschi, Silvano [10695-2] S1
Fischer, Stephanie [10692-5] S2, [10693-3] S1
Fitzgerald, Niamh M. [10690-28] S7
Flagello, Donis G 10694 Program Committee
Flatt, Holger [10692-51] SPWed
Flebus, Carlo [10692-10] S3
Fleischmann, Friedrich [10693-25] S4, [10695-16] S4
Fleysher, Alexander G. [10690-85] SPTue
Fliervoet, Timon F. [10694-16] S3
Flügel-Paul, Thomas [10692-17] S4
Focardi, Mauro [10690-20] S5
Folgnier, Kelsey A. [10691-80] S8
Follert, Roman [10691-46] S12
Follman, David [10692-28] S6
Fomchenkov, Sergey A. [10690-25] S6, [10690-96] SPTue, [10691-69] SPTue, [10691-71] SPTue
Fonti, Sergio [10690-49] S12
Foster, Justin [10691-44] S12
Fournier, Florian R. 10693 Program Committee
Friberg, Ari T. 10694 Program Committee
Frolov, Dmitry N. [10690-67] SPTue
Frolov, Vladimir N. [10690-67] SPTue
Froning, Cynthia S. [10690-95] SPTue
Fuchs, Ulrike [10690-37] S9
Fütterer, Gerald [10693-4] S1

G

Gäbler, Dieter [10691-46] S12
Galaktionov, Vladimir A. [10693-36] SPTue, [10694-12] S2
Galano, Damien [10695-2] S1
Ganesan, Angarai R. [10692-46] SPWed
Gannon, Caleb D. [10693-41] S2
Gao, Fen [10694-32] SPTue
García Santiago, Xavier [10694-6] S1
Garshin, Aleksei S. [10690-64] SPTue, [10690-66] SPTue
Gärtner, Sandra [10690-17] S4
Gatto, Alexandre [10692-16] S4
Gengenbach, Ulrich [10690-40] S10
Georgiev, Rosen [10691-78] SPTue
Georgieva, Biliana [10691-78] SPTue
Geyer, Ulf [10693-7] S2
Geyl, Roland 10692 Conference Chair, 10692 S7 Session Chair, [10692-30] S7, [10692-9] S3
Ghazaryan, Lilit [10691-33] S9
Gibson, Megan [10690-46] S12
Girard, Christian [10694-1] S1
Girard, Sylvain [10690-24] S6
Gischkat, Thomas [10691-66] SPTue
Glaser, Tilman [10694-2] S1
Gloesener, Pierre 10692 Program Committee, 10692 S5 Session Chair, [10692-10] S3
Gobé, Alexis [10694-14] S3
Godefroy, Philippe 10692 Program Committee
Goncharov, Alexander V. [10690-19] S5, [10690-28] S7
Gong, Qian [10690-50] S13
Gordon, Jeffrey M. [10693-22] S4
Gorokhovskiy, Konstantin [10692-7] S2
Grabowski, Kevin [10691-46] S12
Grange, Robert [10690-45] S11
Granovskii, Valerii [10692-7] S2
Grasser, Regis 10690 Program Committee
Greenbaum, Aaron [10690-362] S3
Greiner, Jochen [10691-46] S12
Grejda, Robert [10692-42] S8, [10695-17] S4
Grèzes-Besset, Catherine [10691-15] S4, [10691-17] S5, [10691-23] S6
Grigoriev, Fedor V. [10691-8] S2
Grineviciute, Lina [10691-65] SPTue, [10691-70] SPTue
Grosche, Gesine Erika [10695-33] SPTue
Gross, Herbert 10690 Program Committee, 10690 S10 Session Chair, [10690-15] S4, [10690-17] S4, [10690-3] S4, [10690-41] S10, [10690-44] S11, [10692-39] S9, [10693-11] S2
Gu, Haojin [10692-35] S7
Gu, Luo [10693-14] S3
Gubanova, Lyudmila A. [10691-60] SPTue
Guérineau, Nicolas [10690-22] S6
Guerri, Irene [10690-49] S12
Gullikson, Eric M. [10691-25] S7

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

Günther, Sven [10691-66] SPTue
Guo, Meng [10690-30] S7
Guo, Xiaohu [10690-30] S7
Gurevich, Yulia V. [10690-50] S13
Guseva, Alena [10690-77] SPTue
Guskov, Ilia [10690-73] SPTue
Gutiérrez-Luna, Nuria [10691-27] S7

H

Hadadi Moghadam, Mahsa [10695-10] S2
Hagedorn, Harro [10691-39] S11, [10691-9] S3
Hahne, Felix [10692-2] S1
Hall, Simon R. G. 10695 Program Committee
Halverson, Samuel [10690-50] S13
Hammerschmidt, Martin 10694 S5 Session Chair, [10694-6] S1
Hanford, Keith [10690-8] S2
Haret, Laurent-Daniel [10692-12] S3
Harmon, John P. [10690-364] S11, [10690-365] S11
Hart, Gary A. [10691-50] SPTue
Hartmann, Peter [10690-17] S4, [10690-3] S4, 10692 S1 Session Chair, [10692-3] S1, [10692-36] S8
Hartung, Johannes [10692-11] S3, [10692-19] S5, [10693-11] S2
Harvey, James E. 10692 Program Committee
Haumont, Thierry [10692-12] S3
Hau-Riege, Stefan P. [10691-28] S7
Haverkamp, Nils 10695 Conference Chair, 10695 S1 Session Chair
Hayne, Paul O. [10690-46] S12
He, Fengyun [10690-76] SPTue
He, Tao [10691-2] S1, [10691-58] SPTue
He, Xiaoying [10695-22] SPTue
Hearty, Frederick R. [10690-50] S13
Heib, Sascha Tobias [10693-31] S6
Heidler, Nils [10692-11] S3
Heintzmann, Rainer [10694-17] S3
Helfenstein, Patrick [10694-10] S2
Hellmann, Christian [10694-15] S3, [10694-17] S3, [10694-20] S4, [10694-21] S4, [10694-24] S5, [10694-26] S5
Hellwig, Ansgar [10693-7] S2
Henning, Thomas [10693-25] S4, [10695-16] S4
Henry, David [10690-71] SPTue
Herfurth, Tobias [10692-26] S5
Herkommer, Alois M. [10690-36] S9, 10695 Program Committee, 10695 S3 Session Chair
Herzig, Hans Peter 10694 Program Committee
Hessling, Thomas [10693-7] S2
Heu, Paula [10692-28] S6
Heusinger, Martin [10692-17] S4
Heussler, Sascha P. [10691-74] SPTue

Hilbig, David [10695-16] S4
Hilpert, Enrico [10692-11] S3
Hippler, Markus [10695-6] S2
Hirst, Adam P. [10693-18] S3
Hitzenbichler, Joseph [10695-12] S3
Hoffman, Brittany N. [10691-44] S12
Högele, Wolfgang 10695 Program Committee
Hong, Jia-Wei [10695-13] S3
Hönicke, Philipp [10694-13] S3
Honrado-Benitez, Carlos [10691-27] S7
Hornich, Julian [10694-28] S5
Horstmeyer, Roarke 10694 Program Committee
Hou, Zhe [10690-2] S1
Houbre, Francois 10692 Program Committee, [10692-56] S7
Houllier, Thomas [10692-24] S5
Howard, Joseph M. [10690-365] S11, [10690-43] S11, [10690-500] SPlen
Hu, Chen [10692-35] S7
Huang, Chien-Yao [10692-44] SPWed
Huang, Qiushi [10691-24] S7, [10691-26] S7, [10691-29] S7
Hübner, Marc C. [10693-7] S2
Hugot, Emmanuel [10690-45] S11, [10690-71] SPTue
Hwangbo, Chang Kwon 10691 Program Committee

I

Ijzerman, Wilbert L. [10693-9] S2
Ilango, Shivaraman [10693-27] S5
Ilinski, Aleksandr V. [10692-40] S8
Iliopoulos, Konstantinos [10691-37] S10
Ionov, Dmitry [10690-75] SPTue
Isele, Robert [10693-30] S6
Ismail, Mohamed [10694-16] S3
Iureva, Radda A. [10690-56] SPTue, [10690-57] SPTue, [10693-28] S5
Ivanov, Sergei A. [10692-7] S2
Ivanov, Yurii [10690-75] SPTue
Izmaylov, Daniil V. [10695-26] SPTue

J

Jahn, Wilfried [10690-71] SPTue
Jain, Devesh [10695-9] S2
Jakobs, Stefan [10691-42] S11
Jang, Bi-Ho [10690-80] SPTue
Janunts, Norik Ararat [10694-17] S3
Jasperneite, Jürgen [10692-51] SPWed
Jasulaitiene, Vitalija [10691-67] SPTue
Jedamzik, Ralf [10692-36] S8
Jensen, Lars O. [10691-43] S11, [10691-77] SPTue
Jérome, Arnaud [10691-25] S7
Ji, Tae-Geun [10690-95] SPTue
Ji, Yiqin [10691-56] SPTue, [10691-61] SPTue
Jiang, Yugang [10691-56] SPTue
Jiao, Hongfei [10691-2] S1, [10691-47] S12, [10691-58] SPTue, [10691-62] SPTue, [10692-13] S4
Jin, Tao [10695-19] S4

Jing, Juanjuan [10692-48] SPWed, [10692-49] SPWed, [10695-22] SPTue
Jo, Jae Heung [10690-63] SPTue
Joenathan, Charles [10692-46] SPWed
Jones, Damien J. [10690-95] SPTue
Joseph, Shay 10692 Program Committee, [10692-1] S1
Joshi, Dhruv [10695-9] S2
Ju, Yun Jae [10690-63] SPTue
Juodagalvis, Tomas [10691-73] SPTue
Jupé, Marco 10691 S12 Session Chair, [10691-30] S9, [10691-5] S2, [10691-76] SPTue
Jurkšaitis, Povilas [10691-68] SPTue
Juškevičius, Kęstutis [10691-67] SPTue

K

K., Narayan [10690-94] SPTue
Kahrs, Lüder Alexander [10693-27] S5
Kaiser, Norbert 10691 Program Committee, 10691 S7 Session Chair, [10691-1] S1, [10691-12] S3
Kalafi, Manouchehr [10695-10] S2
Kalies, Alexander [10692-16] S4
Kallmann, Ulrich [10690-13] S3
Kang, Zuming [10690-30] S7
Kärcher, Hans J. [10690-23] S6
Karitans, Varis [10694-11] S2
Kasperkiewicz, Ewa [10690-15] S4
Kasunic, Keith J. 10695 Program Committee
Katsir, Dina [10695-20] S4, [10695-27] SPTue
Kayser, Yves [10694-13] S3
Kazasidis, Orestis [10695-1] S1
Kellermann, Tarik [10691-76] SPTue
Kerstan, Andreas Meeting VIP, [10691-20] S5
Keskinbora, Kahraman [10694-9] S2
Kessels, Erwin W.M.M. [10691-13] S3
Kessler, Terrance J. [10691-44] S12
Khmaladze, Alexander T. [10690-33] S8
Khonina, Svetlana N. [10690-25] S6
Khoo, Ting Chean [10690-33] S8
Kicas, Simonas [10691-65] SPTue, [10691-73] SPTue
Kidger, Tina E. Symposium Chair, 10693 Conference Chair
Kiessling, Jens [10692-53] S6
Kim, Dongseob [10691-51] SPTue, [10691-55] SPTue
Kim, Jihun [10690-80] SPTue
Kim, Wooyoun [10690-362] S3
Kiontke, Sven R. 10692 Program Committee
Kirschner, Volker [10691-40] S11
Kleinle, Sylke [10692-5] S2
Klocke, Fritz [10692-31] S7, [10692-34] S7
Klose, Sylvio [10691-46] S12

Knöchelmann, Marvin [10693-27] S5
Knopf, Heiko [10691-31] S9
Ko, Cheng-Hao [10690-21] S5, [10691-48] S12
Koc, Cihan [10691-17] S5, [10691-23] S6
Koch, Felix [10692-16] S4, [10694-2] S1
Koch, Philip [10692-28] S6
Koneva, Tatiana A. [10690-61] SPTue
Kong, Lingqin [10690-30] S7
Kononov, Aleksandr [10690-59] SPTue
Konyakhin, Igor A. [10690-72] SPTue, [10695-28] SPTue
Koos, Christian [10694-4] S1
Korablev, Oleg [10690-75] SPTue
Korolev, Timofei K. [10690-72] SPTue
Koshel, R. John 10693 Program Committee
Koszo, Manon [10692-12] S3
Kotova, Ekaterina [10695-30] SPTue
Kozhina, Anastasiya D. [10690-81] SPTue, [10692-47] SPWed
Kozlov, Ivan [10691-14] S4
Kracht, Dietmar [10693-23] S4
Kraft, Pascal [10694-4] S1
Krausz, Ferenc [10691-35] S10
Kravchenko, Sergey V. [10693-8] S2
Kricheldorf, Hans-Ulrich [10691-16] S4
Kroneberger, Monika 10692 S3 Session Chair, [10692-15] S4
Krovetz, Avery [10692-46] SPWed
Krüger, Ullrich 10690 Program Committee
Kück, Stefan 10695 Program Committee
Kuhl, Alexander [10695-33] SPTue
Kühnemann, Frank [10692-53] S6
Kukushkin, Dmitriy E. [10690-69] SPTue
Kunisch, Timo [10690-37] S9
Kuo, Chien-Cheng [10691-38] S10, [10691-57] SPTue
Kuo, Ching-Hsiang [10692-44] SPWed
Kuperman-Le Bihan, Quentin [10692-38] S9

L

Labate, Demetrio 10690 Program Committee, 10690 S2 Session Chair
Lachmayer, Roland [10693-23] S4, [10693-27] S5
Lakra, Suchita [10695-15] S3
Lam, Edmund Y.M. [10694-8] S2
Landini, Federico [10690-20] S5, [10695-2] S1
Langehanenber, Patrik [10692-2] S1
Langenbach, Eckhard [10692-31] S7, [10692-33] S7
Längle, Thomas [10693-26] S5
Lanteri, Stéphane [10694-14] S3
Laporta, Paolo 10690 Program Committee
Lappschies, Marc [10691-42] S11
Larrieu, Guilhem [10694-1] S1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

- Larruquert, Juan I. 10691
Program Committee, 10691 S3
Session Chair, [10691-27] S7
Lasfargues, Gilles [10690-22] S6
Layh, Michael 10695 Program
Committee, 10695 S2 Session
Chair
Lecestre, Aurélie [10694-1] S1
Ledent, Philippe [10695-2] S1
Lee, Cheng Chung 10691
Program Committee, [10691-
38] S10, [10691-57] SPTue
Lee, Chieh-En [10695-13] S3
Lee, Christopher A. [10695-17]
S4
Lee, Hojin [10691-55] SPTue
Lee, Hye-In [10690-95] SPTue
Lee, Kyuhang [10690-63] SPTue
Lee, Shu-Sheng [10690-98]
SPTue
Lefranc, Vincent [10690-18] S5
Lehmann, Matthias [10695-12]
S3
Lehr, Dennis [10692-16] S4,
[10694-2] S1
Leiner, Claude [10693-16] S3
Leitel, Robert 10692 S4 Session
Chair, [10692-5] S2
Lemagne, Fabien [10692-10] S3
Lemaitre, Gerard R. [10690-45]
S11
Lemarchand, Fabien [10691-15]
S4, [10691-39] S11, [10691-4]
S2, [10691-6] S2, [10691-63]
SPTue
Lemarquis, Frédéric [10691-39]
S11, [10691-45] S12
Lempa, Christina [10692-36] S8
Leng, Jian [10691-56] SPTue
Lépine, Thierry 10690 Program
Committee, 10690 S9 Session
Chair, [10690-24] S6, [10692-
24] S5
Leplan, Hervé [10692-30] S7,
[10692-9] S3
Leprêtre, François 10692
Program Committee
Lequime, Michel 10691
Conference Chair, 10691 S11
Session Chair, [10691-17] S5,
[10691-19] S5, [10691-23] S6,
[10691-3] S1, [10691-4] S2,
[10692-29] S6, [10692-55] S9
Lereu, Aude L. [10691-4] S2
Levi, Avichai [10692-1] S1
Levi, Eric I. [10690-50] S13
Li, Chen [10693-3] S1
Li, Hongsong [10692-18] S4
Li, Hongyu [10692-22] S5
Li, Jing [10691-47] S12
Li, Mengnan [10690-79] SPTue
Li, Tony [10692-22] S5
Li, Weiyan [10694-34] SPTue
Li, Wenbin [10691-24] S7
Li, Xiaotong [10690-5] S1
Li, Yacan [10692-48] SPWed,
[10692-49] SPWed, [10695-22]
SPTue
Liang, Kevin [10694-25] S5
Liao, Wei-Bo [10691-38] S10,
[10691-57] SPTue
Lingley, Zachary [10691-80] S8
Lippman, David [10690-362] S3
Liu, Chang [10690-44] S11
Liu, Dandan [10691-56] SPTue,
[10691-61] SPTue
Liu, Hao [10691-43] S11
Liu, Huasong [10691-56] SPTue,
[10691-61] SPTue
Liu, Qingsong [10694-31] SPTue
Liu, Wenguang [10690-90] SPTue
Liu, Xu 10691 Program
Committee, 10691 S10
Session Chair
Liu, Yang [10691-29] S7
Liu, Yangyang [10694-34] SPTue
Livshits, Irina L. [10690-2] S1,
[10690-6] S2, [10694-3] S1,
[10695-14] S3
Llenas Farràs, Aleix [10693-21]
S4
Lo, Kun-Chi [10691-54] SPTue
Lombardo, Simona [10690-45]
S11, [10690-71] SPTue
Lombini, Matteo [10690-51] S7,
[10690-78] SPTue
Loosen, Peter [10693-17] S3,
[10693-6] S2, [10694-23] S5
Loreggia, Davide [10695-2] S1
Loschenov, Victor B. [10695-24]
SPTue
Lötgering, Lars [10694-9] S2
Lousberg, Grégory P. [10692-10]
S3
Lu, Guangfeng [10690-60] SPTue,
[10695-23] SPTue
Lu, Tielin [10690-30] S7
Lück, Harald [10692-28] S6
Lumeau, Julien [10691-15] S4,
[10691-17] S5, [10691-23] S6,
[10691-32] S9, [10691-37] S10,
[10691-39] S11, [10691-45]
S12, [10691-6] S2, [10691-63]
SPTue, [10691-75] SPTue
Lv, Qunbo [10694-34] SPTue
Lyamets, Dmitry A. [10692-47]
SPWed
Lyu, Bohan [10690-91] SPTue
-
- M**
- M., Shwetha [10690-94] SPTue
Ma, Bin [10691-58] SPTue
Ma, Ning [10694-19] S4
MacGowan, Brian J. [10691-79]
S8
Mack, Stephen K. [10692-42] S8
Macleod, H. Angus 10691
Conference Chair
MacNally, Sara [10691-44] S12
Mädebach, Heinrich [10691-36]
S10
Magli, Serge [10690-22] S6
Mahadevan, Suvrath [10690-50]
S13
Maier, Andreas [10694-7] S1
Mak, Ka Fai [10691-35] S10
Makarov, Vladimir [10695-25]
SPTue
Maklygina, Iuliia S. [10695-24]
SPTue
Malka, Dror [10690-31] S7
Maltseva, Nadezhda K. [10690-
57] SPTue, [10692-40] S8,
[10693-28] S5, [10693-40]
SPTue
Mandal, Sanjoy [10695-15] S3
Mann, Klaus [10691-40] S11
Marquet, Benoît [10695-2] S1
Marshall, Jennifer L. [10690-95]
SPTue
Martin, Olivier J. F. 10694
Program Committee
Martinu, Ludvik 10691 Program
Committee
Mashaal, Heylal [10693-22] S4
Mathew, Joice [10690-52] S13
Matveev, Nikolai Vadimovich
[10690-77] SPTue
Mažule, Lina [10691-65] SPTue
Mazur, Iana [10693-15] S3
Mazuray, Laurent 10690
Conference Chair, 10690
S11 Session Chair, 10690
S12 Session Chair, 10690
S13 Session Chair, 10690 S3
Session Chair
McElwain, Michael W. [10690-50]
S13
McFarland, John C. [10690-33]
S8
Meinhardt-Wollweber, Merve
[10695-11] S3
Melchert, Oliver [10694-22] S4,
[10695-11] S3
Melchakov, Evgueni [10691-64]
SPTue
Mende, Mathias [10691-10] S3
Mendes de Oliveira, Claudia L.
[10690-95] SPTue
Méndez, José Antonio [10691-
27] S7
Menke, Christoph [10690-39] S10
Meulebroeck, Wendy [10693-1]
S1
Meyer, Johannes [10693-26] S5
Meyer-Ilse, Julia [10691-25] S7
Mezger, Andreas [10692-15] S4
Michaelis, Dirk [10692-17] S4,
[10693-3] S1
Michaels, Robert [10692-42] S8
Michalowski, Paul F. [10692-42] S8
Middleton, Kevin F. 10690
Program Committee
Mikheeva, Elena [10691-63]
SPTue
Mikš, Antonín [10690-92] SPTue,
[10692-45] SPWed
Miller, Philip E. [10691-79] S8
Miñano, Juan Carlos
Symposium Chair, 10693
Program Committee
Mirkarimi, Paul B. [10691-28] S7
Miyamura, Norihide [10690-97]
SPTue
Moehl, Anna [10690-37] S9
Moeller, Tobias [10692-16] S4
Mohedano, Rubén 10693
Program Committee, [10693-
2] S1
Moiseev, Mikhail A. [10693-10]
S2, [10693-8] S2
Moisset, Charles [10691-37] S10
Monaci, Denis [10692-12] S3
Monamy, Virgile [10692-10] S3
Monson, Andrew J. [10690-50]
S13
Morales, Angel [10690-362] S3
Moreau, Antonin [10691-39] S11,
[10691-45] S12, [10691-63]
SPTue
Moreau, Fabien [10692-12] S3
Moretti, Sandro [10690-20] S5
Morgante, Gianluca [10695-2] S1
Morgner, Uwe [10694-22] S4
Moschetti, Manuele [10695-2] S1
Muehlig, Christian [10692-27] S6
Mugnuolo, Raffaele [10690-49]
S12
Muller, Cyprien [10690-24] S6
Munzert, Peter [10691-31] S9
Murthy, Jayant [10690-52] S13
-
- N**
- Na, Gao [10690-60] SPTue
Nadji, Séverin Landry [10691-17]
S5, [10691-23] S6
Nair, Binukumar G. [10690-52]
S13
Nakagawa, Takao 10690
Program Committee
Nakagawa, Takehiro [10695-18]
S4
Natoli, Jean-Yves [10691-37] S10
Néauport, Jérôme 10692
Program Committee
Negredo, Fernando [10694-4] S1
Negros, Raluca A. [10691-79] S8
Neil, Iain A. 10690 Program
Committee
Nelson, Jessica [10692-20] S5
Nesic, Aleksandar [10694-4] S1
Neumann, Jörg [10693-23] S4
Nguyen, Duy Hung [10690-65]
SPTue
Ni, Hangjian [10691-26] S7
Nicolini, Gianalfredo [10695-2] S1
Nikanorov, Oleg [10690-65]
SPTue
Nikonorov, Nikolay V. [10692-7]
S2
Ning, Yu [10693-35] SPTue,
[10694-31] SPTue
Nitiss, Edgars [10694-11] S2
Niu, Xinsang [10691-62] SPTue
Nobis, Thomas 10690 Program
Committee
Noce, Vladimiro [10690-20] S5,
[10695-2] S1
Noell, Wilfried [10692-6] S2
Nogin, Anton A. [10690-72]
SPTue, [10695-28] SPTue
Novák, Jirí [10690-92] SPTue,
[10692-45] SPWed
Novák, Pavel [10690-92] SPTue,
[10692-45] SPWed
Novikov, Pavel [10691-14] S4
Nurpeisova, Diana O. [10692-47]
SPWed
-
- O**
- Ochse, Dennis [10690-38] S9
Odnoblyudov, Maxim A. [10695-
30] SPTue
Ohlidal, Miloslav 10692 Program
Committee
Okun, Roman A. [10692-7] S2
Oleszko, Mateusz [10690-41] S10
Oliva, Ernesto [10691-46] S12
Oliver, James B. [10691-44] S12
Ong Bin, Leong [10691-74]
SPTue
Orekhova, Maria K. [10692-47]
SPWed, [10693-34] SPTue
Orhan, Efe [10695-34] SPTue
Ortmaier, Tobias [10693-27] S5
Oskoue, Amir Khabbazi [10691-
30] S9
Osten, Wolfgang [10692-54] S8,
[10694-19] S4
Ott, Julian J. [10694-4] S1
Oudard, Jean Francois [10691-
50] SPTue
Ouerdane, Youcef [10690-24] S6

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

P

Paillard, Vincent [10694-1] S1
Paillet, Philippe [10690-24] S6
Pak, Soojong [10690-95] SPTue
Pallasch, David [10690-12] S3
Palmisano, Martino [10691-22] S6
Pancrazzi, Maurizio [10690-20] S5
Papa, Jonathan C. [10690-43] S11
Papernov, Semyon [10691-44] S12
Papovich, Casey [10690-95] SPTue
Pardini, Tommaso [10691-28] S7
Parent, Jocelyn [10690-7] S2
Park, Jongyeob [10690-80] SPTue
Park, Kwang-Woo [10693-32] SPTue
Park, Sung-Joon [10690-80] SPTue
Park, Yong Tae [10691-55] SPTue
Paschel, Sebastian [10691-36] S10
Pasqui, Claudio [10690-47] S12
Passian, Ali [10691-4] S2
Patti, Mauro [10690-51] S7, [10690-78] SPTue
Pattnaik, Prasant Kumar [10690-94] SPTue
Pavlyshin, Dmitriy [10691-14] S4
Pei, Linlin [10694-34] SPTue
Peña-Conzuelo, Andrés [10692-50] SPWed
Peng, Wei-Jei [10692-25] S5
Perezabov, Oleg A. [10693-40] SPTue
Perezabov, Oleg A. [10692-40] S8
Perrault, Philippe [10690-18] S5
Perrin-Pellegrino, Carine [10691-37] S10
Pervak, Vladimir [10691-21] S6, [10691-35] S10
Pesch, Alexander [10692-16] S4
Petzold, Uwe [10690-17] S4, [10692-36] S8
Peykar, Farroukh [10690-23] S6
Pflaum, Christoph [10694-29] SPTue
Pflüger, Mika [10694-13] S3
Piccioni, Giuseppe [10690-49] S12
Piegari, Angela M. 10691 Program Committee, 10691 S5 Session Chair, [10691-22] S6
Pieraccini, Stefano [10695-2] S1
Pietag, Fred [10692-21] S5
Pirnay, Olivier [10692-10] S3
Pistner, Jürgen [10691-9] S3
Plachta, Kamil [10690-55] SPTue, [10692-43] SPWed, [10695-21] SPTue
Placido, Francis 10691 Program Committee
Plainchamp, Bertrand [10692-12] S3
Platonov, Yuriy Y. [10691-28] S7
Plyer, Aurélien [10690-22] S6
Pokorný, Petr [10690-92] SPTue, [10692-45] SPWed
Pominova, Daria V. [10695-24] SPTue

Porfirev, Alexey Petrovich [10690-25] S6, [10690-96] SPTue, [10691-69] SPTue, [10691-71] SPTue
Portilla, Javier [10694-5] S1
Potemin, Igor S. [10690-14] S3, [10690-84] SPTue, [10693-36] SPTue, [10693-38] SPTue, [10694-12] S2, [10694-3] S1, [10695-14] S3
Prakash, Geetha [10690-10] S2
Prantl, Manfred 10692 Program Committee
Pretheesh Kumar, Valiyaparambil Chacko [10692-46] SPWed
Primot, Jérôme 10690 Program Committee
Probst, Anne-Catherine [10691-75] SPTue
Prochaska, Travis [10690-95] SPTue
Pronin, Oleg [10691-35] S10
Protopapa, Maria Lucia [10691-22] S6
Pruß, Christof 10692 S9 Session Chair, [10692-54] S8
Pudzis, Kaspars [10694-11] S2
Putri, Adhelia Ekarani [10690-86] SPTue

Q

Qi, Runze [10691-24] S7, [10691-53] SPTue
Qiao, Xuanlin [10693-33] SPTue
Qiao, Yan-Feng [10690-76] SPTue
Qiu, Roger [10691-79] S8
Quan, Sun [10690-82] SPTue, [10690-90] SPTue, [10693-35] SPTue

R

Rahlves, Maik [10690-9] S2
Rai, Ashish [10692-28] S6
Rakich, Andrew [10690-50] S13
Rall, Phillip Lino [10694-29] SPTue
Rimalis, Lukas [10691-70] SPTue
Ramsey, Lawrence W. [10690-50] S13
Ranjan, Suman [10695-15] S3
Rascher, Rolf [10692-32] S7, [10692-34] S7
Raskin, Evgenii O. [10690-57] SPTue
Raynor, Jeffrey M. 10690 Program Committee
Rebellato, Jennifer [10691-64] SPTue
Rebellato, Jennifer [10691-25] S7
Reddy, Navya Krishna [10690-94] SPTue
Reichel, Steffen [10690-17] S4, [10690-3] S4, [10692-36] S8, 10693 Program Committee, 10693 S6 Session Chair
Reithmeier, Eduard [10690-9] S2
Reus, Holger [10691-39] S11
Rezaei, Behrooz [10695-10] S2
Ribeaud, Alex [10691-9] S3
Ribeiro, Rafael A. S. [10690-95] SPTue
Rickelt, Friedrich [10691-31] S9
Rieth, Katja [10692-10] S3
Riguet, Francois 10692 S5 Session Chair, [10692-12] S3
Risse, Stefan [10692-19] S5

Ristau, Detlev 10691 Conference Chair, 10691 S1 Session Chair, 10691 S8 Session Chair, [10691-16] S4, [10691-18] S5, [10691-30] S9, [10691-36] S10, [10691-43] S11, [10691-5] S2, [10691-76] SPTue, [10691-77] SPTue
Ritsch-Marte, Monika [10692-4] S2
Ritter, Jonas [10694-19] S4
Riva, Marco [10695-2] S1
Robertson, Paul M. [10690-50] S13
Robinson, Jeffrey C. [10691-28] S7
Rockstuhl, Carsten 10694 Program Committee, [10694-4] S1
Rodolfo, Jacques F. [10692-12] S3
Rodriguez, Cristina [10691-30] S9
Rodriguez-de Marcos, Luis V. [10691-27] S7, [10691-74] SPTue
Rolland, Jannick P. 10690 Program Committee, [10690-43] S11, 10693 Program Committee
Romano, Gabriella [10690-32] S8
Romanova, Galina E. [10690-58] SPTue, [10690-61] SPTue, [10690-64] SPTue, [10690-66] SPTue, [10690-77] SPTue, [10693-37] SPTue, [10695-30] SPTue
Romoli, Marco [10690-20] S5, [10695-2] S1
Rose, Max [10694-9] S2
Rossi, Guglielmo [10690-20] S5
Roth, Bernhard [10690-9] S2, [10694-22] S4, [10695-11] S3
Rotter, Daniel 10695 Program Committee
Roulet, Mélanie [10690-71] SPTue
Rousselet, Nicolas [10692-24] S5
Roy, Arpita [10690-50] S13
Ruch, Eric [10692-9] S3
Rudolph, Wolfgang [10691-30] S9
Rugi Grond, Elisabetta 10690 Program Committee, [10690-48] S12
Rupp, Fabian [10692-36] S8
Rüsseler, Anna Karoline [10691-16] S4
Rusydi, Andrivo [10691-74] SPTue
Ryabova, Anastasia V. [10695-24] SPTue
Ryskin, Aleksandr I. [10692-7] S2

S

Sachkov, Mikhail [10692-8] S3
Saggini, Bortolino [10690-49] S12
Salmassi, Farhad H. [10691-25] S7
Salvatici, Teresa [10690-20] S5
Sanli, Umut Tunca [10694-9] S2
Sansone, Mark C. [10690-8] S2
Sasián, José [10690-35] S9
Sauva, Sophie [10692-5] S2
Savkina, Rada K. [10691-49] S12
Sazonenko, Dmitry A. [10690-69] SPTue
Schäfer, Bernd [10691-40] S11
Scharf, Toralf [10692-6] S2
Schenk, Paul [10691-12] S3

Schill, David [10690-13] S3
Schlegel, Ralph [10691-46] S12
Schmidt, Luke M. [10690-95] SPTue
Schmitt, Robert H. [10690-12] S3
Schneider, Daniel [10692-51] SPWed
Schneider, Philipp-Immanuel [10694-6] S1
Scholze, Frank [10694-13] S3
Schreiber, Peter [10692-5] S2, [10693-3] S1
Schröder, Sven 10692 Conference Chair, 10692 S6 Session Chair, [10692-13] S4, [10692-14] S4, [10692-26] S5, [10692-28] S6, [10692-39] S9
Schulz, Ulrike 10691 Program Committee, 10691 S9 Session Chair, [10691-31] S9
Schürmann, Mark [10691-22] S6, [10691-46] S12
Schuster, Norbert [10690-4] S1
Schütz, Gisela [10694-9] S2
Schwab, Christian [10690-50] S13
Schwiegerling, Jim [10690-1] S1
Schwinde, Stefan [10691-22] S6, [10691-46] S12
Seemann, Ulf [10691-46] S12
Seesselberg, Markus [10690-29] S7
Sekman, Yusuf [10692-39] S9
Sellar, Robert G. [10690-46] S12
Seure, Thibault [10690-48] S12
Shakoury, Reza [10691-11] S3
Shan, Congmiao [10694-35] SPTue
Shao, Jianda [10692-35] S7
Shapiro, Lev Z. [10694-12] S2
Sharikova, Anna V. [10690-33] S8
Sharma, Vishal [10690-54] SPTue
Sharova, Alina [10695-24] SPTue
Sheil, Conor J. [10690-19] S5
Shi, Rui [10694-17] S3, [10694-21] S4
Shinman-Avraham, Arit-Eva [10692-1] S1
Shu, Shyu-Cheng [10692-44] SPWed
Shukalov, Anatoly V. [10690-64] SPTue
Sidorov, Vitaly [10690-58] SPTue
Sieber, Ingo [10690-40] S10
Sitarski, Breann N. 10695 Program Committee
Sitzman, Scott D. [10691-80] S8
Smeesters, Lien [10693-1] S1
Smejkal, Filip [10690-92] SPTue, [10692-45] SPWed
Smejkal, Michal [10692-45] SPWed
Smirnov, Alexey B. [10691-49] S12
Smith, Chris [10691-44] S12
Smith, Christopher D. [10690-46] S12
Smith, Daniel G. 10694 Conference Chair, 10694 S3 Session Chair
Sokolov, Vadim G. [10693-38] SPTue, [10694-12] S2
Soltani Vala, Ali [10695-10] S2
Soltwisch, Victor [10694-13] S3
Sommer, Christian [10693-16] S3
Sommer, Stanley C. [10691-79] S8
Sorgato, Simone [10693-2] S1

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

Soufli, Regina [10691-25] S7, [10691-28] S7, [10691-64] SPTue
Souza, Aline [10690-95] SPTue
Spaulding, Duncan [10692-42] S8
Spaulding, John [10691-44] S12
Spiller, Eberhard Adolf [10691-28] S7
Springer, Ramon [10694-29] SPTue
Staloff, Daniel [10690-87] SPTue
Stanionyte, Sandra [10691-67] SPTue
Starichenkova, Valentina D. [10690-85] SPTue
Stark, Sebastian [10691-34] S9
Starostina, Elena [10693-40] SPTue
Steinecke, Morten [10691-30] S9, [10691-76] SPTue
Stern, Uri [10690-29] S7
Stevanovic, Igor [10691-66] SPTue
Stiller, Peter [10690-40] S10
Stollenwerk, Jochen [10693-17] S3, [10693-6] S2, [10694-23] S5
Stolz, Christopher J. 10691 Program Committee, [10691-79] S8
Strojinik-Scholl, Marija [10695-8] S2
Stuart, Sean C. [10691-80] S8
Stübbe, Oliver [10692-51] SPWed
Stürmer, Julian [10690-50] S13
Suar, Monali [10690-9] S2
Suksmono, Andriyan [10690-86] SPTue
Sulimov, Vladimir B. [10691-8] S2
Sun, Peng [10691-61] SPTue
Sun, Xiaoce [10690-30] S7
Surrel, Yves [10692-24] S5
Svensen, Oyvind [10693-39] SPTue
Swedish, Tristan B. [10695-9] S2
Syniavskiy, Ivan I. [10690-75] SPTue, [10690-89] SPTue
Sytchkova, Anna [10691-22] S6
Szeghalmi, Adriana Viorica [10691-12] S3, [10691-13] S3, [10691-33] S9

T

Taiti, Alessio [10690-47] S12
Takeda, Mitsuo [10694-19] S4
Tan, Zheng [10694-34] SPTue
Tang, Shiang-Feng [10691-54] SPTue
Tangari, Martin [10690-362] S3
Tarasov, Ivan [10690-68] SPTue
Taylor, Keith [10690-95] SPTue
ten Thije Boonkamp, Jan [10693-9] S2
Terenzi, Luca [10695-2] S1
Terrien, Ryan C. [10690-50] S13
Thibault, Simon 10690 Program Committee, 10690 S6 Session Chair, [10690-7] S2
Thiel, Daniel [10695-6] S2
Thiele, Simon [10690-36] S9
Thienpont, Hugo [10693-1] S1, [10693-2] S1
Thizy, Cédric [10695-2] S1
Tibeev, Marat [10693-37] SPTue
Tien, Chung-Hao [10695-13] S3
Tiken, Mehmet [10695-34] SPTue

Tikhonravov, Alexander V. 10691 Program Committee, 10691 S2 Session Chair, [10691-14] S4, [10691-8] S2
Tilsch, Markus K. [10691-19] S5
Timinger, Andreas L. 10693 Program Committee
Timko, Andrei S. [10690-56] SPTue, [10690-57] SPTue, [10693-28] S5
Tinkham, Kameron [10690-362] S3
Tinne, Nadine [10693-23] S4
Tokmakovs, Andrejs [10694-11] S2
Tolenis, Tomas [10691-65] SPTue, [10691-70] SPTue
Tolstoba, Nadezhda D. [10690-81] SPTue, [10690-85] SPTue, [10692-47] SPWed, [10695-26] SPTue
Tommasi, Leonardo [10690-49] S12
Tosi, Federico [10690-49] S12
Totzeck, Michael 10694 Program Committee
Triebel, Peter [10692-16] S4
Trost, Marcus [10692-13] S4, [10692-26] S5
Trubetskov, Michael K. [10691-21] S6, [10691-35] S10
Tsai, Meng-Ko [10690-91] SPTue
Tseng, Shao-Ze [10691-54] SPTue
Tsyganok, H. A. [10695-30] SPTue
Tsyganok, Helen A. [10690-59] SPTue, [10690-68] SPTue
Tünnermann, Andreas [10691-13] S3, [10692-14] S4
Tymoshchuk, Irina [10690-70] SPTue

U

Udovytska, Ruslana S. [10691-49] S12
Ulitschka, Melanie [10692-21] S5
Ulrich, Wilhelm Symposium Chair
Urbach, H. Paul 10694 Program Committee

V

Vakulov, Pavel S. [10690-67] SPTue
Valavicius, Audrius [10691-68] SPTue
Valyavin, Gennady G. [10690-69] SPTue
Van Bac, Doan [10692-7] S2
van Setten, Eelco [10694-16] S3
Vasilyev, Vladimir N. [10690-64] SPTue
Vega, David [10690-32] S8
Vempati, Sandeep [10695-9] S2
Veremenko, Andrey [10690-70] SPTue, [10695-31] SPTue
Vergöhl, Michael [10691-16] S4, [10691-40] S11
Vernani, Dervis [10690-48] S12
Verpoort, Sven [10695-1] S1
Vickridge, Ian [10691-25] S7
Vignaux, Mael [10691-15] S4
Vinckier, Quentin [10690-46] S12
Vinogradova, Olga Aleksandrovna [10690-67] SPTue

Vissenberg, Gilles [10693-19] S4
Voelkel, Reinhard 10692 Program Committee, 10692 S2 Session Chair, [10692-6] S2
Vogt, Christian [10692-32] S7, [10692-34] S7
Völl, Annika [10693-17] S3, [10693-6] S2, [10694-23] S5
Voloboy, Alexey G. [10690-14] S3, [10690-84] SPTue, [10694-12] S2
von Finck, Alexander [10692-28] S6
von Lukowicz, Henrik [10692-11] S3
Voznesenskaya, Anna O. [10690-34] S8, [10693-15] S3, [10693-33] SPTue, [10693-34] SPTue
Vyazovetskiy, Nikita [10690-75] SPTue

W

Wächter, Christoph A. [10693-3] S1
Walker, David D. [10692-22] S5
Walton, Christopher [10691-28] S7
Wang, Chun-Hsiung [10690-98] SPTue
Wang, Jianwei [10694-34] SPTue
Wang, Jue [10691-50] SPTue
Wang, Lingli 10692 Program Committee
Wang, Min 10690 Program Committee
Wang, Wei 10694 Program Committee, [10694-19] S4, [10694-32] SPTue
Wang, Xiaodong [10691-52] SPTue
Wang, Yan [10694-30] SPTue, [10694-31] SPTue
Wang, Yan [10695-14] S3
Wang, Yongtian [10693-12] S3, [10693-14] S3
Wang, Zhanshan [10691-2] S1, [10691-24] S7, [10691-26] S7, [10691-29] S7, [10691-36] S10, [10691-47] S12, [10691-53] SPTue, [10691-58] SPTue, [10691-62] SPTue, [10692-13] S4
Wang, Zongzhao [10694-24] S5, [10694-26] S5
Wartmann, Rolf 10690 Conference Chair, 10690 S1 Session Chair, 10690 S8 Session Chair
Weber, Thomas [10691-42] S11
Weber, Yarden [10692-1] S1
Wehmeier, Udo J. [10690-46] S12
Wei, Chaoyang [10692-35] S7
Wei, Dong [10695-18] S4
Wei, Hung-Sen [10691-38] S10
Wei, Lidong [10692-48] SPWed, [10695-22] SPTue
Weigand, Holger [10693-31] S6
Weigand, Markus [10694-9] S2
Welte, Joachim [10690-29] S7
Wenger, Jérôme [10691-63] SPTue
Wenzl, Franz-Peter [10693-16] S3
West, Garrett J. [10690-365] S11
Wester, Rolf [10693-17] S3, [10693-6] S2, [10694-23] S5
Whitman, Pam K. [10691-79] S8

Wickenhagen, Sven [10690-37] S9
Widmayer, Clay C. [10691-79] S8
Wiecha, Peter R. [10694-1] S1
Wilhein, Thomas [10694-9] S2
Wille, Eric [10690-48] S12
Willey, Ronald R. [10691-11] S3
Williams, George M. [10690-364] S11
Williamson, David M. Symposium Chair
Wittpahl, Christian [10695-12] S3
Wittrock, Ulrich [10695-1] S1
Woldeamanual, Dereje Shewaseged [10694-7] S1
Wolf, Alexander G. [10693-27] S5
Wood, Andrew P. 10690 Conference Chair, 10690 S4 Session Chair, 10690 S5 Session Chair
Wu, Cheng-Feng [10691-57] SPTue
Wu, Cian-Rou [10691-38] S10
Wu, Rengmao [10693-5] S2
Wyrowski, Frank 10694 Conference Chair, 10694 S1 Session Chair, [10694-15] S3, [10694-17] S3, [10694-20] S4, [10694-21] S4, [10694-24] S5, [10694-26] S5

X

Xi, Fengjie [10690-82] SPTue
Xiangli, Bin [10694-34] SPTue
Xie, Chun [10690-83] SPTue
Xie, Lingyun [10691-58] SPTue
Xing, Yuzhe [10691-56] SPTue

Y

Yadlovker, Doron [10692-1] S1
Yan, Baozhu [10690-90] SPTue, [10691-72] SPTue, [10694-30] SPTue
Yang, Heesu [10690-80] SPTue
Yang, Liangen [10695-32] SPTue
Yang, Linhua [10692-18] S4
Yang, Tianyi [10690-362] S3
Yang, Xiao [10691-61] SPTue
Yang, Yang [10691-26] S7, [10691-53] SPTue
Yang, Yi [10690-82] SPTue, [10691-72] SPTue, [10693-35] SPTue, [10694-30] SPTue, [10694-31] SPTue
Yaskovich, Alexander 10692 Program Committee
Yen, Shun-Lung [10691-54] SPTue
Yevtushenko, Alexander [10695-20] S4
Yi, Qiang [10691-24] S7
Yin, Huan [10695-4] S1
Youngworth, Richard N. 10690 Program Committee, 10690 S7 Session Chair, 10695 Conference Chair, 10695 S4 Session Chair
Yu, Guoyu [10692-22] S5
Yu, Xudong [10690-60] SPTue, [10695-23] SPTue
Yu, Zong-Ru [10692-44] SPWed
Yuan, Shengfu [10691-72] SPTue
Yzuel, María J. 10690 Program Committee

Index of Authors, Chairs, and Committee Members

Bold = SPIE Member

Z

Zalevsky, Zeev 10694 Program Committee
Zambelli, Massimo [10690-49] S12
Zangrilli, Luca [10695-2] S1
Zapfen, Juan Antonio [10691-4] S2
Zavatskaya, Ksenia [10692-47] SPWed
Zederbauer, Tobias [10692-28] S6
Zeitner, Uwe D. [10692-17] S4, [10693-3] S1
Zeng, Fei [10690-76] SPTue
Zeng, Zhuoying [10690-79] SPTue
Zerrad, Myriam [10691-19] S5, [10691-4] S2, [10691-7] S2, [10692-29] S6, [10692-55] S9
Zhang, Bolun [10692-18] S4
Zhang, Jinlong [10691-2] S1, [10691-47] S12, [10691-58] SPTue, [10691-62] SPTue, [10692-13] S4
Zhang, Keli [10695-4] S1
Zhang, Lei [10692-13] S4
Zhang, Pengsong [10692-18] S4

Zhang, Site [10694-15] S3, [10694-20] S4, [10694-21] S4, [10694-24] S5
Zhang, Wang [10692-22] S5
Zhang, Xuanzhe [10690-82] SPTue, [10694-30] SPTue, [10694-31] SPTue
Zhang, Xueyan [10691-64] SPTue
Zhang, Yongchao [10695-4] S1
Zhang, Yueqian [10690-15] S4, [10690-3] S4
Zhang, Zhong [10690-83] SPTue, [10691-24] S7, [10691-26] S7, [10691-29] S7, [10691-53] SPTue
Zhao, Ji [10690-30] S7
Zhao, Nan [10690-76] SPTue
Zhao, Yiming [10691-47] S12
Zhdanov, Andrey [10690-14] S3, [10690-84] SPTue, [10694-3] S1
Zhdanov, Dmitry D. [10690-14] S3, [10690-84] SPTue, [10693-36] SPTue, [10693-38] SPTue, [10694-12] S2, [10694-3] S1, [10695-14] S3
Zheng, Xiao [10692-22] S5

Zheng, Zhenrong [10693-5] S2
Zhong, Huiying [10694-15] S3, [10694-21] S4
Zhou, Jinsong [10692-48] SPWed, [10692-49] SPWed, [10695-22] SPTue
Zhou, Qiong [10690-90] SPTue, [10691-72] SPTue, [10693-35] SPTue, [10694-30] SPTue
Zhou, Zhou [10691-2] S1
Zhu, Jingjing [10690-30] S7
Zhu, Jun [10695-4] S1
Zhu, Weiwei [10690-30] S7
Zhuang, Ke-wen [10691-56] SPTue
Zhuang, Zhenfeng [10690-7] S2
Zhupanov, Valery [10691-14] S4
Zomerstein, Saar [10692-1] S1
Zorc, Hrvoje 10691 Program Committee
Zschiedrich, Lin [10694-6] S1
Zverev, Victor [10690-70] SPTue

What is the best way to learn new skills?

SPIE COURSES

Quality content. Expert instructors.
Accredited provider of IACET CEU.

Choose from a variety of options that work best for you:

- Courses at conferences
- In-company training—customized content at your facility
- Online courses

Learn from the best. Solve problems. Get ahead.

For more information, visit: www.spie.org/courses

SPIE. Education



SPIE is accredited by the International Association for Continuing Education and Training (IACET) and is authorized to issue the IACET CEU.

General Information

Registration

Onsite Registration and Badge Pick-up Hours
Entrance Foyer, Hall 4

Sunday 13 May 2018 15:00 to 17:00 hrs.
Monday 14 May 2018. 07:30 to 17:00 hrs.
Tuesday 15 May 2018 07:45 to 17:00 hrs.
Wednesday 16 May 2018 08:00 to 17:00 hrs.
Thursday 17 May 2018. 08:30 to 16:00 hrs.

CONFERENCE REGISTRATION

Includes admission to all conference sessions, plenaries, panels, and poster sessions, admission to the Exhibition, Welcome Reception, coffee breaks, and a choice of online proceedings.

EXHIBITION REGISTRATION

Exhibition-only Visitor Registration must be made with OPTATEC and is not available through SPIE. For prices and times, please visit <http://www.optatec-messe.de/en/prices-arrival>.

SPIE MEMBER, SPIE STUDENT MEMBER, AND STUDENT PRICING

- SPIE Members receive conference registration discounts. Discounts are applied at the time of registration.
- Student registration rates are available only to undergraduate and graduate students who are enrolled full time and have not yet received their Ph.D. Post-docs may not register as students. A student ID number or proof of student status is required with your registration.

PRESS REGISTRATION

For credentialed press and media representatives only. Please email contact information, title, and organization to media@spie.org.

SPIE CASHIER

Registration Area
Open during registration hours

REGISTRATION PAYMENTS

If you are paying by cash or cheque as part of your onsite registration, wish to add a course, workshop, or special event requiring payment, or have questions regarding your registration, visit the SPIE Cashier.

RECEIPT AND CERTIFICATE OF ATTENDANCE

Preregistered attendees who did not receive a receipt or attendees who need a Certificate of Attendance may obtain those from the SPIE Cashier.

BADGE CORRECTIONS

Badge corrections can be made by the SPIE Cashier. Please have your badge removed from the badge holder and marked with your changes before approaching the counter.

REFUND INFORMATION

There is a €50 service charge for processing refunds. Requests for refunds must be received by 26 April 2018; all registration fees will be forfeited after this date. Membership dues, SPIE Digital Library subscriptions, or Special Events purchased are not refundable.

Author / Presenter Information

SPEAKER CHECK-IN AND PREVIEW STATION

Hall 4

Monday through Thursday 07:30 to 17:00 hrs.

All conference rooms have a computer workstation, projector, screen, lapel microphone, and laser pointer. All presenters are requested to come to their conference room during the breaks with their memory devices or laptops to confirm their presentation display settings.

POSTER SETUP INSTRUCTIONS

Tuesday 15 May 10:00 to 16:00

Poster presenters may set up between 10:00 and 16:00 on Tuesday 15 May. Presenters who have not set up by 16:00 on Tuesday will be considered a “no show” and their manuscript will not be published. Posters not removed by 19:30 on Tuesday 15 May will be considered unwanted and will be discarded. SPIE assumes no responsibility for posters left up after 19:30 Tuesday.

Onsite Services

INTERNET ACCESS

Complimentary Wireless Internet will be available. Connection speeds will depend on the number of users. Please read the SPIE Wireless Internet Service Policy.

SPIE CONFERENCE APP

Download the free SPIE Conference App, available for iPhone and Android phones. Search and browse the programme, special events, participants, and more.

SPIE PUBLICATIONS

Registration Desk

Browse the latest SPIE Press Books and proceedings.

BUSINESS CENTRE

Messe Frankfurt offers copying, and printing options.

SPIE LUGGAGE + COAT CHECK

Hall 4

Registration Hours

Luggage, package, and coat storage are available at EU 2/piece. Please note opening hours.

URGENT MESSAGE LINE

An urgent message line is available during registration hours: **+44 29 2089 4747**. Attendees should check the message board in the registration area for any messages held for them.

Food and Beverage Services

COFFEE BREAKS

Complimentary coffee will be served twice daily, at 10:00 and 15:00 hrs. Check individual conference listings for exact times and locations.

Acceptance of Policies and Registration Conditions

The following Policies and Conditions apply to all SPIE Events. As a condition of registration, you will be required to acknowledge and accept the SPIE Registration Policies and Conditions contained herein.

Attendee Registration and Admission Policy

SPIE, or their officially designated event management, in their sole discretion, reserves the right to accept or decline an individual's registration for an event. Further, SPIE, or event management, reserves the right to prohibit entry or to remove any individual whether registered or not, be they attendees, exhibitors, representatives, or vendors, whose conduct is not in keeping with the character and purpose of the event. Without limiting the foregoing, SPIE and event management reserve the right to remove or refuse entry to anyone who has registered or gained access under false pretenses, provided false information, or for any other reason whatsoever that they deem is cause under the circumstances.

Payment Policy

Registrations must be fully paid before access to the conference is allowed. SPIE accepts VISA, MasterCard, American Express, Discover, Diner's Club, checks and wire transfers. Onsite registrations can also be paid with cash.

SPIE Safe Meeting and Misconduct Policy

SPIE is a professional, not-for-profit society committed to providing valuable and safe conference and exhibition experiences. SPIE is dedicated to equal opportunity and treatment for all its members, meeting attendees, staff, and contractors. Attendees are expected to be respectful to other attendees, SPIE staff, and contractors. Harassment and other misconduct will not be tolerated; violations will be addressed promptly and seriously. Consequences up to and including expulsion from the event as appropriate may be implemented immediately.

The SPIE anti-harassment policy can be found at <http://spie.org/policy>

Reporting of Unethical or Inappropriate Behavior

Onsite at an SPIE meeting, contact any SPIE Staff with concerns or questions for thorough follow-up. If you feel in immediate danger, please dial the local emergency number for police intervention.

SPIE has established a confidential reporting system for staff and all meetings participants to raise concerns about possible unethical or inappropriate behavior within our community. Complaints may be filed by phoning toll-free to +1-888-818-6898 from within the United States and Canada, or online at www.SPIE.ethicspoint.com and may be made anonymously.

Identification Requirement Policy

To verify registered participants and provide a measure of security, SPIE will ask attendees to present a government-issued photo identification at registration to collect registration materials.

Individuals are not allowed to pick up badges for other attendees. Further, attendees may not have some other person participate in their place at any conference-related activity. Such other individuals will be required to register on their own behalf to participate.

Access to Conference Events / Children Younger than 18

All conference technical and networking events require a badge for admission. Registered attendees may bring children with them as long as they have been issued a badge. Registration badges for children under 18 are free and available at the SPIE registration desk onsite. Children under 14 years of age must be accompanied by an adult at all times, and guardians are asked to help maintain a professional, disturbance-free conference environment.

Unauthorized Solicitation Policy

Unauthorized solicitation in the Exhibition Hall is prohibited. Any nonexhibiting manufacturer or supplier observed to be distributing information or soliciting business in the aisles, or in another company's booth, will be asked to leave immediately.

Recording Policy

Conferences, courses, and poster sessions: For copyright reasons, recordings of any kind are prohibited without prior written consent of the presenter or instructor. Attendees may not capture or use materials presented in any meeting/course room or in course notes on display without written permission. Consent forms are available at Speaker Check-In or SPIE Registration. Individuals not complying with this policy will be asked to leave a given session and/or asked to surrender their recording media. Refusal to comply with such requests is grounds for expulsion from the event.

Capture and Use of a Person's Image

By registering for an SPIE event, you grant full permission to SPIE to capture, store, use, and/or reproduce your image or likeness by any audio and/or visual recording technique and create derivative works of these images and recordings in any SPIE media now known or later developed, for any legitimate SPIE marketing or promotional purpose.

By registering for an SPIE event, you waive any right to inspect or approve the use of the images or recordings or of any written copy. You also waive any right to royalties or other compensation arising from or related to the use of the images, recordings, or materials. By registering, you release, defend, indemnify and hold harmless SPIE from and against any claims, damages or liability arising from or related to the use of the images, recordings or materials, including but not limited to claims of defamation, invasion of privacy, or rights of publicity or copyright infringement, or any misuse, distortion, blurring, alteration, optical illusion or use in composite form that may occur or be produced in taking, processing, reduction or production of the finished product, its publication or distribution.

Laser Pointer Safety Information/Policy

SPIE supplies tested and safety-approved laser pointers for all conference meeting rooms. For safety reasons, SPIE requests that presenters use provided laser pointers.

Use of a personal laser pointer represents the user's acceptance of liability for use of a non-SPIE-supplied laser pointer. If you choose to use your own laser pointer, it must be tested to ensure <5 mW power output. Laser pointers in Class II and IIIa (<5 mW) are eye safe if power output is correct, but output must be verified because manufacturer labeling may not match actual output. You are required to sign a waiver releasing SPIE of any liability for use of potentially non-safe, personal laser pointers. Waivers are available at Speaker Check-In.

Unsecured Items Policy

Personal belongings should not be left unattended in meeting rooms or public areas. Unattended items are subject to removal by security. SPIE is not responsible for items left unattended.

Wireless Internet Service Policy

At most events, SPIE provides wireless access for attendees. Properly secure your computer before accessing the public wireless network. SPIE is not responsible for computer viruses or other computer damage.

No-Smoking Policy

Smoking, including e-cigarettes, is not permitted at any SPIE event.

Agreement to Hold Harmless

Attendee agrees to release and hold harmless SPIE from any and all claims, demands, and causes of action arising out of or relating to your participation in the event you are registering to participate in and use of any associated facilities or hotels.

Event Cancellation Policy

If for some unforeseen reason SPIE should have to cancel an event, processed registration fees will be refunded to registrants. Registrants will be responsible for cancellation of travel arrangements or housing reservations and the applicable fees.

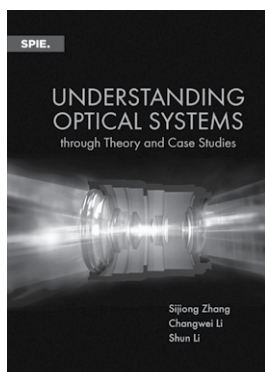
SPIE International Headquarters

PO Box 10
Bellingham, WA 98227-0010 USA
Tel: +1 360 676 3290
Fax: +1 360 647 1445
help@spie.org • www.SPIE.org

SPIE Europe Offices

2 Alexandra Gate
Ffordd Pengam, Cardiff, CF24 2SA UK
Tel: +44 29 2089 4747
Fax: +44 29 2089 4750
info@spieeurope.org • www.SPIE.org

BOOKS FROM SPIE



Understanding Optical Systems through Theory and Case Studies

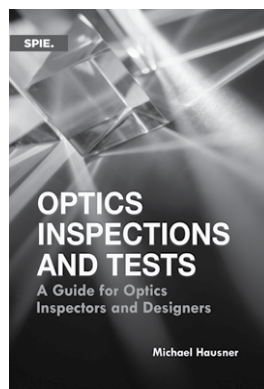
Sijiong Zhang, Changwei Li, Shun Li

Vol. PM276

Print: \$58.65 / \$69.00

eBook (PDF, ePub, Kindle):

\$50.15 / \$59.00



Optics Inspections and Tests: A Guide for Optics Inspectors and Designers

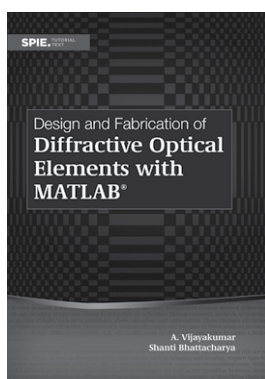
Michael Hausner

Vol. PM269

Hardcover: \$89.25 / \$105.00

eBook (PDF, ePub, Kindle):

\$75.65 / \$89.00



Design and Fabrication of Diffractive Optical Elements

with MATLAB

A. Vijayakumar

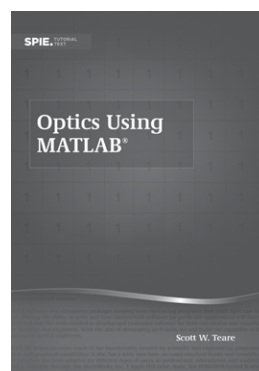
Shanti Bhattacharya

Vol. TT109

Print: \$56.10 / \$66.00

eBook (PDF, ePub, Kindle):

\$47.60 / \$56.00



Optics Using MATLAB

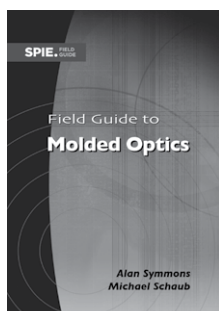
Scott W. Teare

Vol. TT111

Print: \$56.10 / \$66.00

eBook (PDF, ePub, Kindle):

\$47.60 / \$56.00



Field Guide to Molded Optics

Alan Symmons

Michael Schaub

Vol. FG37

Print: \$35.70 / \$42.00

eBook (PDF, ePub, Kindle):

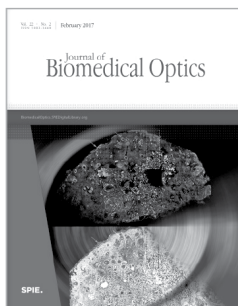
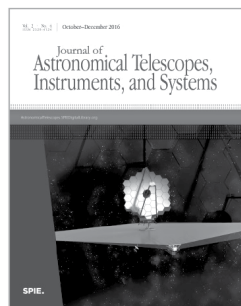
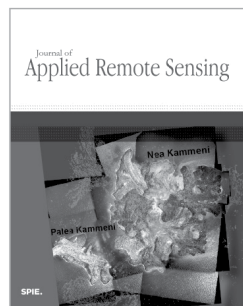
\$30.60 / \$36.00

Search hundreds of original SPIE Press books and ebooks at:
www.spie.org/books

Price key: SPIE Member \$ / Nonmember \$

SPIE.

Submit your next paper to an SPIE Journal



Optical Engineering
Michael Eismann, Editor-in-Chief

Journal of Electronic Imaging
Karen Egiazarian, Editor-in-Chief

Journal of Biomedical Optics
Brian Pogue, Editor-in-Chief

**Journal of Micro/Nanolithography,
MEMS, and MOEMS**
Chris Mack, Editor-in-Chief

Journal of Applied Remote Sensing
Ni-Bin Chang, Editor-in-Chief

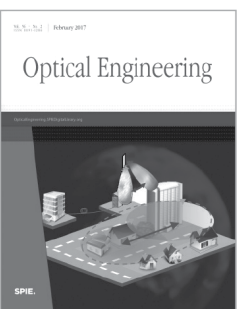
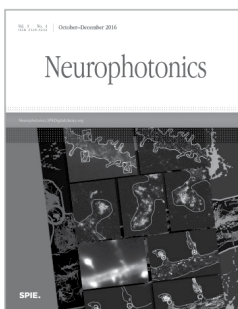
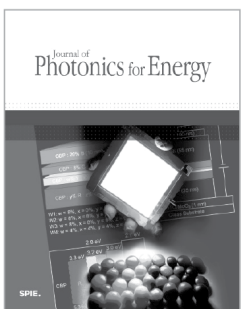
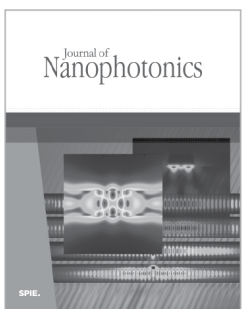
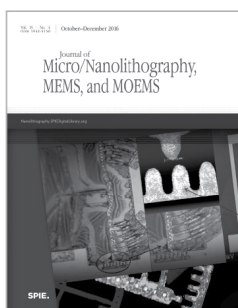
Journal of Photonics for Energy
Zakya Kafafi, Editor-in-Chief

Journal of Nanophotonics
Ali Adibi, Editor-in-Chief

Journal of Medical Imaging
Norbert Pelc, Editor-in-Chief

Neurophotonics
David Boas, Editor-in-Chief

**Journal of Astronomical Telescopes,
Instruments, and Systems**
Mark Clampin, Editor-in-Chief



All SPIE journals are part of the **SPIE Digital Library**,
the world's largest collection of optics and photonics research.

Choose Open Access for your paper and increase
its visibility: www.spie.org/JournalsOA

Neurophotonics and the *Journal of Biomedical Optics* to become fully open access in 2019.

Join SPIE and get a subscription to one online journal
with your membership, or request access from your librarian.

www.spie.org/journals

SPIE.

NOTES

SPIE is the international society for optics and photonics, an educational not-for-profit organization founded in 1955 to advance light-based science and technology. The Society serves nearly 264,000 constituents from approximately 166 countries, offering conferences and their published proceedings, continuing education, books, journals, and the SPIE Digital Library in support of interdisciplinary information exchange, professional networking, and patent precedent. SPIE provided more than \$4 million in support of education and outreach programs in 2017.

For more information, visit www.SPIE.org.

CONFERENCE PROCEEDINGS

PAPERS

PRESENTATIONS

JOURNALS

EBOOKS

Watch more than 10,000 conference presentations on the SPIE Digital Library

Enter your search term



SEARCH >



25 January 2018

Materials Innovation: It's no longer only about resolution

[Nobu Koshiba](#)



25 January 2018

Performance of combined OCT/MFI microendoscope for ovarian cancer detection

[Jennifer Barton, et al.](#)



25 January 2018

Two-photon lensless endoscopy

[Hervé Rigneault, et al.](#)

See the talks you missed onsite

SPIE. DIGITAL LIBRARY

SPIDigitalLibrary.org/videos



Plan to attend
**Optical Systems
Design
2020**

The premier European event for optical instrumentation with the latest advances in optical systems applications, materials, and processing.



Mark your calendar for Spring 2020