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biophotonics to lasers and quantum technologies**

29 March–2 April 2020

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Strasbourg, France

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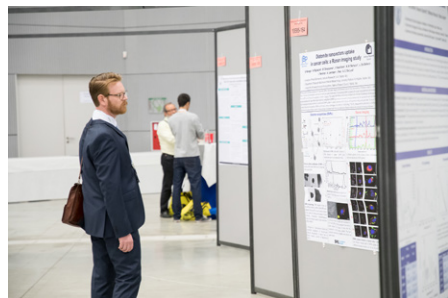


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Conferences p. 27–108

Hear presentations on the latest advances—from digital optics to quantum technologies to biophotonics.

Nano- and Quantum Sciences

11344	Metamaterials XII (MacDonald, Staude, Zayats)	27
11345	Nanophotonics VIII (Andrews, Bain, Kauranen, Nunzi)	31
11346	Advances in Ultrafast Condensed Phase Physics II (Haacke, Sharma, Yakovlev)	36
11347	Quantum Technologies 2020 (Diamanti, Ducci, Treppe, Whitlock)	38
11348	Terahertz Photonics (Jarrahi, Preu, Turchinovich)	41

Optical Imaging and Sensing

11349	3D Printed Optics and Additive Photonic Manufacturing II (Herkommer, von Freymann, Flury)	44
11350	Digital Optics for Immersive Displays II (DOID20) (Kress, Peroz)	46
11351	Unconventional Optical Imaging II (Fournier, Georges, Popescu)	47
11352	Optics and Photonics for Advanced Dimensional Metrology (de Groot, Leach, Picart)	51
11353	Optics, Photonics and Digital Technologies for Imaging Applications VI (Schelkens, Kozacki)	54
11354	Optical Sensing and Detection VI (Berghmans, Mignani)	57

Lasers and Nonlinear Optics

11355	Micro-Structured and Specialty Optical Fibres VI (Kalli, Peterka, Bunge)	62
11356	Semiconductor Lasers and Laser Dynamics IX (Sciamanna, Michalzik, Panajotov, Höfling)	65
11357	Fiber Lasers and Glass Photonics: Materials through Applications II (Ferrari, Mackenzie, Taccheo)	68
11358	Nonlinear Optics and its Applications 2020 (Broderick, Dudley, Peacock)	73

Biophotonics

11359	Biomedical Spectroscopy, Microscopy, and Imaging (Popp, Gergely)	77
11360	Neurophotonics (Pavone, Cognet, Kuner)	81
11361	Biophotonics in Point-of-Care (Canva, Giannetti, Altug, Moreau)	83
11362	Clinical Biophotonics (Elson, Gioux, Pogue)	86
11363	Tissue Optics and Photonics (Tuchin, Blondel, Zalevsky)	89

Applications of Photonic Technology

11364	Integrated Photonics Platforms: Fundamental Research, Manufacturing and Applications (Baets, O'Brien, Vivien)	94
11365	Organic Electronics and Photonics: Fundamentals and Devices II (Reineke, Vandewal, Maes)	98
11366	Photonics for Solar Energy Systems VIII (Sprafke, Goldschmidt, Pandraud)	100
11367	Photosensitive Materials and their Applications (McLeod, Pascual Villalobos, Tomita, Sheridan)	102

Emerging Topics

11368	Photonics and Plasmonics at the Mesoscale (Lecler, Astratov, Minin)	105
FS100	Light Shaping Focus Session (Wyrowski, Meuret, Sheridan)	106
WS200	6th annual Sino-French “Photonics and Optoelectronics” PHOTONET International Research Network Workshop (Blondel, Gralak, Peucheret, Zhang, Gao, Bai)	107

Plenary Sessions pp. 6-9

Don't miss these world-class speakers talking on the latest advancements and most promising breakthroughs.

Special Events pp. 10-19

These important events and sessions will provide valuable information and networking opportunities.

Industry Programme pp. 11

Join your peers at these free sessions in which you will hear industry leaders speak to the markets and opportunities for photonics in Europe.

World-Class Exhibition pp. 12-12

Don't miss your chance to speak face-to-face with top suppliers. Walk the floor and see the latest technology innovations and future applications in detection, imaging, sensing, lasers, and their supporting components and devices.

Courses pp. 20-23

Take advantage of this unique opportunity to sign up for courses from a recognized expert in industry. Choose from 4 half-day courses offering efficient training for career enhancement.

Proceedings page 95

General Information pages 96-97

Registration · Author/Presenter Information · Policies · Food and Beverage · Onsite Services · Parking and Car Rental

SPIE Policies pages 98-99



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- Student must be the leading author of the manuscript
- Papers submitted by graduate and undergraduate students are eligible
- Student must enter the best student paper award by responding to an award announcement e-mail
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SPIE Photonics Europe is organised for the fifth time in Strasbourg's city centre conference facility, Palais de la Musique et des Congrès.

Photonics Europe is the place to be. It brings together different disciplines, technologies, and perspectives from across Europe and around the world. As a participant, you will be among the leaders who are presenting research, developing new contacts, and learning about the latest funding opportunities.

- Photonics Europe is conferences, workshops, seminars, and an exhibition that will combine into a dynamic learning environment.
- Photonics Europe has programmes and experts on new business development and bridges the gap between academia and industry.
- Photonics Europe serves as the platform for information updates on the European Union's new Framework Programme for Research and Innovation Horizon 2020.
- Photonics Europe features a daily comprehensive Hot Topics session, and will include a unique welcome reception, daily coffee breaks, plus other technical and social events.
- Photonics Europe presents the Innovation Village: a window on creative products developed by universities and research centres.
- Photonics Europe hosts the European Village: a display on European Research and Innovation Actions, Coordinate and Support Actions, and other EC-funded initiatives that showcase their consortium as well as their newest breakthroughs.
- Photonics Europe features the art/science exhibition "Light Work/s": two contemporary artists' work in photonics and imaging contributing to the cultural input of the congress and raising pertinent questions in this particular area of research.

The casual atmosphere of historical Strasbourg set in the beautiful region of Alsace provides a backdrop of good food, comfortable facilities, and easy transportation. The leadership of Photonics Europe 2020 has selected many of the toughest issues facing optical and photonics technologies today as the basis for their programmes. 2020 sees the creation of the complete track on biophotonics with five new conferences on photonics for healthcare, and new conferences on terahertz photonics, photosensitive materials, and photonics and plasmonics at the mesoscale. The research issues presented at Photonics Europe will drive the development of new products for years to come.

Attend Photonics Europe 2020 and be among the leaders!

PLENARY EVENTS



Hear from leading experts

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

Hot Topics I

Monday 30 March 2020 • 9:00 - 11:00

Location: Schweitzer Auditorium, Niveau/Level 09:00 to 9:20

SPIE WELCOME AND AWARD PRESENTATION

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SPIE President

WELCOME

Paul Montgomery

Univ. of Strasbourg, France
2019 Symposium Chair

City of Strasbourg Welcome

9:25-9:30

INTRODUCTION TO HOT TOPICS

Paul Montgomery

Univ. of Strasbourg, France
2019 Symposium Chair

9:30 to 10:15

NATURALLY FAST AND LOW POWER ELECTRO-OPTIC POLYMER OPTICAL DEVICES ARE IDEALLY POSITIONED FOR THE NEXT-GENERATION INTERNET PHOTONICS ROADMAP



Michael Lebbly

CEO Lightwave Logic, United Kingdom

Over the past few decades, EO (electro-optic) polymers have been developed into modulator devices that have incredible speed and low power. The talk will explore how advanced EO polymer materials can fill in the gaps of the photonics roadmap through extremely high performance.

As the appetite for increased traffic continues unabated, there are needs to look for faster and lower power consuming optoelectronic devices. One such device that merits potential that can be integrated on a photonics platform as a PIC (photonic integrated circuit) is the EO polymer modulator that is attractive not only in raw speed, but also in low power consumption for systems through direct driving without the use of dedicated (and often expensive) driver chips. Polymer modulator data will be presented that aligns with industry-based photonics roadmaps.

Biography: **Michael S. Lebbly** joined Lightwave Logic as a member of the Board of Directors in 2015. In May 2018, Dr. Lebbly assumed the role of CEO, Lightwave Logic Inc (LWLG:OTCQB). Lightwave Logic is a leading technological company commercializing Electro-Optical polymers.

Dr. Lebbly (born 1961, London, UK) is an Anglo-American entrepreneur and intrapreneur in the fields of optoelectronics/photonic electronics and semiconductors. Dr. Lebbly's career started with the British Government in 1977 in telecommunications and he did research at their research labs (RSRE Malvern) in the early 1980s. Dr. Lebbly worked at AT&T's research labs: Bell Labs (1985-1989) in photonics, and subsequently drove the development (and co-authored the first patent) of the oxide VCSEL diode laser at Motorola in the 1990s (which is now used in laser mice, 3D sensing/FaceID in mobile phones, optical interconnects; where volumes of the laser are over 1B units today). From 2005-2010 he led the USA trade association in optoelectronics (OIDA) and represented the optoelectronics and photonics industry on Capitol Hill.

Dr. Lebbly has run technical start-ups and commercialized optoelectronic and photonics technology into volume manufacturing. Dr. Lebbly has also had roles as a Venture Capitalist specializing in Optical Communications. He is currently a technical expert to the European Commission. He is a Fellow member of IEEE and OSA, and has been voted PIC (Photonic Integrated Circuit) business leader of the year by the PIC International Conference in 2018.

Dr. Lebbly holds over 450 issued international patents in photonics and electronics, that have been derived from over 220 issued USPTO utility patents, mostly in the field of optoelectronics, photonics and semiconductors. He has been cited by the USPTO to be in the most prolific 75 inventors in USA from 1988-1997.

Dr. Lebbly is passionate about photonics and has focused his efforts over the last 30 years to drive new photonics manufacturing programs in USA and Europe as well as industry-based photonics technology roadmaps.

10:15 to 11:00

3D PRINTED MICRO-OPTICS: STATE OF THE ART AND FUTURE CHALLENGES



Harald Giessen

University of Stuttgart, Germany

3D printing using femtosecond lasers gives submicron resolution when polymerizing plastics by two-photon absorption. The small voxel size well below the diffraction limit and the combination with high-speed scanners and high-precision piezo stages allows for the creation of millimeter-sized 3D optics with unprecedented design freedom. We will demonstrate that such complex optics with aspherical and freeform surfaces without rotational symmetry can lead to novel miniature optics with wavefront aberrations as small as $\lambda/10$. Multiple materials can be combined with different refractive indices and dispersions, thus allowing for Fraunhofer-type achromats. Diffractive optics can be 3D printed as well, and stacking several Fresnel-type surfaces leads to aplanatic imaging systems. Hybrids that combine diffractive and refractive surfaces as well as transparent and opaque materials enhance the imaging capabilities even further. When combined with imaging fibers or CMOS imaging sensors, an entire new class of miniature optical devices can be created which will revolutionize augmented and virtual reality as well as self-driving cars. Fiber-based optical trapping, side-looking OCT endoscopes, the smallest imaging endoscope in the world, as well as applications in quantum technology pave the way towards future functionalities and applications [1-7].

[1] T. Gissibl et al., *Optica* 3, 448 (2016).

[2] T. Gissibl et al., *Nature Communications* 7, 11763 (2016).

[3] T. Gissibl et al., *Nature Photonics* 10, 554 (2016).

[4] S. Thiele et al., *Opt. Lett.* 41, 3029 (2016).

[5] S. Thiele et al., *Science Advances* 3, e1602655 (2017); S. Fischbach et al., *ACS Photonics* 4, 1327 (2017).

[6] M. Sartison et al., *Sci. Rep.* 7, 39916 (2017).

[7] M. Schmid et al., *Opt. Lett.* 43, 5837 (2018).

Biography: **Harald Giessen** (*1966) graduated from Kaiserslautern University with a diploma in Physics and obtained his M.S. and Ph.D. in Optical Sciences from the University of Arizona in 1995 as J.W. Fulbright scholar. After a postdoc at the Max-Planck-Institute for Solid State Research in Stuttgart he moved to Marburg as assistant professor. From 2001-2004, he was associate professor at the University of Bonn. Since 2005, he is full professor and holds the Chair for Ultrafast Nanooptics in the Department of Physics at the University of Stuttgart. He is also co-chair of the Stuttgart Center of Photonics Engineering, SCoPE. He was guest researcher at the University of Cambridge, and guest professor at the University of Innsbruck and the University of Sydney, at A*Star, Singapore, as well as at Beijing University of Technology. He is associated researcher at the Center for Disruptive Photonic Technologies at Nanyang Technical University, Singapore. He received an ERC Advanced Grant in 2012 for his work on complex nanoplasmonics. He was co-chair (2014) and chair (2016) of the Gordon Conference on Plasmonics and Nanophotonics. He was general chair of the conference Photonics Europe (Strasbourg 2018) and is co-chair of the biannual conference NanoMeta in Seefeld, Austria.

He is on the advisory board of the journals "Advanced Optical Materials", "Nanophotonics: The Journal", "ACS Photonics", "ACS Sensors", and "Advanced Photonics". He is a topical editor for ultrafast nanooptics, plasmonics, and ultrafast lasers and pulse generation of the journal "Light: Science & Applications" of Nature Publishing Group. He is a Fellow of the Optical Society of America. In 2018, he was named „Highly Cited Researcher“ (top 1%) by the Institute of Scientific Information. His research interests include Ultrafast Nano-Optics, Plasmonics, Metamaterials, 3D Printed Micro- and Nano-Optics, Novel mid-IR Ultrafast Laser Sources, Applications in Microscopy, Biology, and Sensing.

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PLENARY EVENTS

Hot Topics II

Tuesday 31 March 2020 • 16:30 - 6:05 PM

Location: Schweitzer Auditorium, Niveau/Level O

16.30 to 16.35

INTRODUCTION

Francis Berghmans

Vrije Univ. Brussel, Belgium
2019 Symposium Chair

16:35 to 17:20

COMPUTATIONAL MICROSCOPY



Laura Waller

University of California, Berkeley, United States

Computational imaging involves the joint design of imaging system hardware and software, optimizing across the entire pipeline from acquisition to reconstruction. Computers can replace bulky and expensive optics by solving computational inverse problems. This talk will

describe new microscopes that use computational imaging to enable 3D fluorescence and phase measurement using simple hardware and advanced image reconstruction algorithms that are based on large-scale nonlinear non-convex optimization.

Biography: **Laura Waller** is the Ted Van Duzer Associate Professor of Electrical Engineering and Computer Sciences (EECS) at UC Berkeley, a Senior Fellow at the Berkeley Institute of Data Science, and affiliated with the UCB/UCSF Bioengineering Graduate Group. She received B.S., M.Eng. and Ph.D. degrees from the Massachusetts Institute of Technology (MIT) in 2004, 2005 and 2010, and was a Postdoctoral Researcher and Lecturer of Physics at Princeton University from 2010-2012. She is a Packard Fellow for Science & Engineering, Moore Foundation Data-driven Investigator, Bakar Fellow, OSA Fellow and Chan-Zuckerberg Biohub Investigator. She has received the Carol D. Soc Distinguished Graduate Mentoring Award, Agilent Early Career Professor Award (Finalist), NSF CAREER Award and the SPIE Early Career Achievement Award.

17.20 to 18.05

SEEING THE UNSEEN IN PATIENTS: ADVANCING DISEASE PREVENTION AND TREATMENT THROUGH MICROIMAGING



Guillermo (Gary) Tearney

Harvard Medical School, Massachusetts General Hospital, United States

Today's gold standard for medical diagnosis is histology of excised biopsies or surgical specimens where tissue is removed from the body, processed, sectioned, stained, and looked at under a microscope by a pathologist. There

are many limitations to this paradigm, including the facts that it is inherently invasive, time consuming, costly, and dangerous for some organs. Furthermore, oftentimes the diseased tissue is not readily seen by visual inspection. In these instances, the tissue is sampled at a random location, which can be highly inaccurate. If we could instead conduct microscopy inside the body, then we could overcome these limitations and provide real-time tools for screening, targeting biopsies, making diagnoses, and guiding intervention with cellular-level precision. This promise has motivated the development of a new field, termed *in vivo* microscopy, the goal of which is to obtain microscopic images from living human patients. Two *in vivo* microscopy technologies, confocal microscopy and optical coherence tomography, are currently available and in clinical use. Upcoming developments, such as whole organ microscopy, swallowable microscopy capsules, molecular imaging, and very high-resolution microscopic imaging devices are in the pipeline and will likely transform how disease is diagnosed and medicine is practiced in the future.

Biography: **Guillermo (Gary) Tearney** MD, PhD, is the Remondi Family Foundation Endowed Massachusetts General Hospital (MGH) Research Institute Chair and Professor of Pathology at Harvard Medical School. Professor Tearney received his MD magna cum laude from Harvard Medical School and his PhD in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology.

Professor Tearney's lab at the Wellman Center for Photomedicine at MGH is focused on the development and clinical validation of *in vivo* microscopy methods for human disease diagnosis. Prof. Tearney has co-authored over 250 peer-reviewed publications, including papers featured on the covers of Science and Nature Medicine. Professor Tearney also has over 100 granted US patents, resulting in several commercial medical devices. Additionally, he was recently named one of the nation's Top Translational Researchers by Nature Biotechnology and his capsule microscopy device was highlighted as one of MIT Technology Review's 10 Breakthrough Technologies in 2019.

Hot Topics III

Thursday 2 April 2020 • 9:00 AM - 10:35 AM

Location: Schweitzer Auditorium, Niveau/Level 0

9.00 to 9.05

INTRODUCTION

Thierry Georges

Oxxius, France

2019 Symposium Chair

9.05 to 9.50

ULTRAFAST SOLID-STATE LASERS: A SUCCESS STORY FOR THE LAST 30 YEARS WITH NO END IN SIGHT



Ursula Keller

ETH Zurich, Switzerland

Ultrafast – or ultra-short pulsed – lasers are dramatically impacting many areas of photonics, from basic science to industrial manufacturing and biomedicine. The design and performance of the lasers behind these applications is critical for new discoveries, creating new applications and opening new market opportunities. For example novel pulse generation techniques allowed for the generation of stable pulses from diode-pumped solid-state lasers for the first time, and enabled the performance of such lasers to improve by several orders of magnitude with regards to pulse duration, pulse energy, pulse repetition rates and noise. This new performance frontier enabled new discoveries in nonlinear optics such as high harmonic generation that reduced the pulse duration from femtoseconds to attoseconds and expanded the spectral regime into to hard X-rays. We reached the limit of short pulse generation with one optical cycle where the exact position of the electric field underneath the pulse envelope has become important. It was clear for us that passive modelocking does not stabilize the electric field position and solving this problem resulted in the frequency comb revolution. In this talk I will review a personal selection of topics showing the amazing progress in average power scaling, ultrashort pulse generation, and frequency comb generation. I will point out the key inventions during the last 30 years with a short “before and after” perspective. At the end I will give a short outlook even though I never would have predicted the current achievements 30 years ago.

Biography: **Ursula Keller** has been a tenured professor of physics at ETH Zurich since 1993 (www.ulp.ethz.ch), and serves as a director of the Swiss research program NCCR MUST in ultrafast science since 2010 (www.nccr-must.ch). She received a „Diplom“ at ETH Zurich in 1984, a Ph.D. at Stanford University USA in 1989, was a Member of Technical Staff at Bell Labs USA 1989 to 1993. She was a “Visiting Miller Professor” at UC Berkeley in 2006 and a visiting professor at the Lund Institute of Technologies in 2001. From 2014-2018 she was a member of the research council of the Swiss National Science Foundation. She has been a co-founder and board member for Time-Bandwidth Products (acquired by JDSU in 2014) and for GigaTera (acquired by Time-Bandwidth in 2003).

Her research interests are exploring and pushing the frontiers in ultrafast science and technology. Awards include the IEEE Edison Medal (2019), European Inventor Award for lifetime achievement (2018), IEEE Photonics Award (2018), OSA Charles H. Townes Award (2015), LIA Arthur L. Schawlow Award (2013), ERC advanced grant (2012 and 2018), EPS Senior Prize (2011), OSA Fraunhofer/Burley Prize (2008), Leibinger Innovation Prize (2004), and Zeiss Research Award (1998). She supervised and graduated 79 Ph.D. students, published more than 450 peer-reviewed journal publications.

9:50 to 10:35

FROM INVERSE DESIGN TO IMPLEMENTATION OF PRACTICAL QUANTUM PHOTONICS



Jelena Vuckovic

Stanford Univ., United States

At the core of most quantum technologies, including quantum networks and quantum simulators, is the development of homogeneous, long lived qubits with excellent optical interfaces, and the development of high efficiency and robust optical interconnects for such qubits. To achieve this goal, we have been studying color centers in diamond and silicon carbide, in combination with novel fabrication techniques, and relying on the powerful and fast photonics inverse design approach that we have developed.

Biography: **Jelena Vuckovic** is a Jensen Huang Professor in Global Leadership in the Stanford School of Engineering and a Professor of Applied Physics, by courtesy. She leads the Nanoscale and Quantum Photonics Lab, and is also a director of QFARM - the Stanford-SLAC Quantum Initiative. Vuckovic has won numerous awards including the Distinguished Scholarship from the Max Planck Institute for Quantum Optics, Humboldt Prize, and the Presidential Early Career Award for Scientists and Engineers. She is a Fellow of APS, OSA, and IEEE.

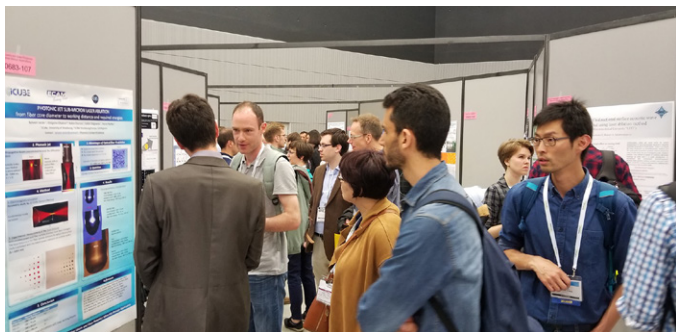
TECHNICAL EVENTS

Light Shaping Focus Session

Monday 30 March 2020 • 11:00 - 18:00

Location: Niveau/Level 0, Salon 1

This Session will provide an overview of various methods of spatial light shaping, covering refractive freeform surfaces, diffractive beam splitters, diffusers, and multichannel array-type components including lens arrays. Light shaping techniques are classified and the strengths and weaknesses of the different methods are discussed with respect to different applications and light sources. The usage and limitations of ray and physical optics for the modeling and design of light shaping systems is considered. Fabrication techniques for light shaping components will be addressed.



Poster Sessions and Receptions

Tuesday 31 March 2020 • 18:00 - 20:00

Wednesday 1 April 2020 • 18:00 - 20:00

Location: Galerie Erasme, Niveau/Level 0

Conference attendees are invited to attend the Photonics Europe poster sessions on Tuesday and Wednesday. Each day will feature posters from selected conferences. Posters will be on display after 10.00 on Tuesday, and Wednesday morning in the Conference Centre. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field.

Poster Setup: Sunday 10:00 AM – 5:00 PM

POSTER SET-UP INSTRUCTIONS

- Set up your poster during the setup hours listed for your poster session.
- Paper numbers will be placed on the poster boards in numerical order; please find your paper number and put up your poster in the designated space.
- Presenters who have not placed their poster(s) on their assigned board by 60 minutes prior to the session on the day of their presentation will be considered a “no show” and their manuscript will not be published.

POSTER SESSION INSTRUCTIONS

- A poster author is required to stand by the poster during the scheduled poster session to answer questions from attendees.

POSTER TEARDOWN INSTRUCTIONS

- Presenters must remove their posters immediately after the poster session. SPIE assumes no responsibility for posters and will not save abandoned posters.

POSTER GUIDELINES

<http://spie.org/PWPosterGuidelines>

6th Sino-French Photonics and Optoelectronics PHOTONET International Research Network Workshop

Thursday 2 April 2020 • 11:00 AM - 17:30

Location: Salon 6, Niveau/Level 0

The PHOTONET International Research Network (IRN) has been created in 2015 by the French National Centre for Scientific Research (CNRS) in order to support and develop over the long-term existing collaborations, as well as new partnerships, between French and Chinese groups, laboratories, and universities in the fields of optoelectronics, photonics and biomedical optics.

This PHOTONET workshop aims at bringing together a large community of scientists and engineers working in the fundamental concepts and technology as well as methodological developments of innovative solutions covering three key research axes in photonics: (i) integrated optics and optical communications, (ii) emerging materials and concepts in photonics and (iii) biomedical optics and biophotonics.

Photonics and Plasmonics at the Mesoscale Workshop

Thursday 2 April 2020 • 11:00 - 17:30

Location: Salon 9, Niveau/Level 0

This workshop is devoted to mesoscale structures and devices with building blocks which are large enough to support internal resonances (such as whispering gallery modes in microspheres or localized surface plasmon resonances in metallic nanoparticles), but at the same time small enough, so that geometrical optics cannot be applied for studying their properties (typically Mie parameter around 10). In the last two decades, the research in photonics rapidly moved from macro to nanoscale optics rendering the structures with the wavelength-scale dimensions (mesoscale) somewhat less studied, although recently it was an explosion of research aimed at novel optical properties of such structures such as photonic nanojets and hooks, photonic-plasmonic near-field coupling effects enabling ultrasensitive sensors and tweezers, super-resolution imaging properties, etc. The focus of this workshop is on structural design, numerical modeling, demonstration of new concepts and functionalities, application of the proposed principles in devices such as sensors and microscopes, new materials and novel fabrication approaches used for building mesoscale structures and devices.



SPIE Photonics Europe Industry Program

These sessions provide valuable information and networking for anyone — from engineers to CEOs — looking for the latest on industry insights.

Executive Seminar: Imaging and Sensing Marketplace Forum

Monday 30 March 2020

Separate registration required. Registration fee €400 (\$445).

Join this new industry event for senior level executives, investors, and other industry stakeholders seeking an in-depth understanding of the global marketplace for imaging and sensing. This Executive Seminar delivers a review of current applications, markets, and emerging opportunities based on the unique combination of TEMATYS' photonics markets expertise and the extensive industry connections of SPIE.

Agenda coming soon. Learn more and register at: spie.org/ExecSeminar

DEVELOPED IN
PARTNERSHIP WITH
SPIE.



EU Funding Opportunities

Tuesday 31 March 2020 • 10:30 - 14:30

Location: Hall Rhin, Niveau/Level 0

The funding landscape in Europe is complex and potentially overwhelming with a multitude of pan-European and national funding mechanisms available. This session explores some of the options available by the European Union and Research Council as well as presenting more detail on Research Funding in the UK around BREXIT.

SPEAKERS:



10:30 to 11:00

SPIE GLOBAL INDUSTRY UPDATE

Stephen G. Anderson

Director, Industry Development, SPIE (United States)



11:00 to 11:30

HORIZON 2020 AND HORIZON EUROPE FUNDING ACTIVITIES FOR PHOTONICS

Anna Pelagotti

European Research Council Executive Agency, Belgium and Istituto di Fisica Applicata "Nello Carrara" (Italy)



11:30 to 12:00

MARIE SKŁODOWSKA-CURIE ACTIONS: FUNDING OPPORTUNITIES

Renat Bilyalov

European Research Council Executive Agency (Belgium)

12:00 to 13:00

LUNCH BREAK



13:00 to 13:30

THE FUNDING OPPORTUNITIES OF THE EUROPEAN RESEARCH COUNCIL

Anna G. Mignani

European Research Council Executive Agency, Belgium and Istituto di Fisica Applicata "Nello Carrara" (Italy)

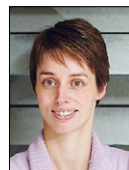


13:30 to 14:00

ACTPHAST 4R + 4.0 INNOVATION SUPPORT HUBS FOR RESEARCHERS AND COMPANIES I

Hugo Thienpont

Vrije Univ. Brussel (Belgium)



14:00 to 14:30

ACTPHAST 4R + 4.0 INNOVATION SUPPORT HUBS FOR RESEARCHERS AND COMPANIES II

Nathalie Vermeulen

Vrije Univ. Brussel (Belgium)

Biophotonics and Quantum Technologies

Wednesday 1 April 2020 • 10:30 - 14:30

Location: Hall Rhin, Niveau/Level 0

Join us for these two sessions:

10:30 am to noon

BIOPHOTONICS

1:00 to 2:30 pm

QUANTUM TECHNOLOGIES

Innovation Village Awards Ceremony

Wednesday 1 April 2020 • 3:00 PM - 4:00 PM

Location: Hall Rhin, Niveau/Level 0

15:00 - 16:00

CET The Innovation Village competition aims to find the best innovation by an individual researcher and the best innovation by a multilateral project, organization, or company. Join us to celebrate the 2020 winners!

EXHIBITION



See top companies at the free Exhibition

140 COMPANIES • CONNECTING RESEARCH AND INDUSTRY

The SPIE Photonics Europe Exhibition is a prime opportunity for researchers and engineers to connect with leading companies throughout Europe.

FIND ADVANCED TECHNOLOGIES

- Chemical and biological sensing
- Ion-beam, x-ray, EUV, electron-beam
- Clinical, chemical, and biological instrumentation
- Lasers and other light sources, laser systems and accessories
- Cameras and CCD components
- Metrology, inspection, process control
- Infrared sources, detectors, and systems
- Optical components, detectors, fibres, materials, substrates
- Displays, communications
- Optical test and measurement equipment
- Electronic imaging components, equipment, and systems
- Finished optics, filters and coatings, optical fabrication equipment
- Electronics and signal analysis equipment
- Optics manufacturing
- Software
- Photonics equipment manufacturing
- Fibre optic components, equipment, and systems
- Resist technology and processing
- High-speed imaging and sensing
- Optical test and measurement equipment
- Electronic imaging components, equipment, and systems
- Finished optics, filters and coatings, optical fabrication equipment
- Signal analysis equipment
- Optics manufacturing
- Software for simulation and design
- Photonics equipment manufacturing

Tuesday 31 March 10.00 to 17.00
Wednesday 1 April 10.00 to 16.00



Connect with European Projects/ Networks

See projects and related prototypes in a special section of the exhibition. Meet network representatives and discover more about links among groups across Europe in the field of optics and photonics.



The Photonics Innovation Village

The Photonics Innovation Village showcases research and innovative products from universities, nonprofits, and research centres. Organizations receive free exposure in the exhibition hall and take part in a competition for prizes by sharing their latest findings to industry innovators and other photonics visionaries.

2020 PHOTONICS INNOVATION VILLAGE PARTICIPANTS

Ben-Gurion University, Israel

LiqSys

Spectro-polarimetric imaging system for early-stage skin cancer based on compact liquid crystal devices

Aalto University, Finland

A-Photonics Project

A compact sub-picosecond LASER with tuneable wavelength and controlled pulse rate

Vrije Universiteit Brussel, Belgium

CAPS CMOS sensor

A NIR-range fast camera allowing sub-nanosecond exposure time with picosecond timing control

Institut Pasteur, France

LCY2.0

An open-access and easy-access software for the analysis of biological images (microscopy, tracking, ...)

TU Wien, Austria

ILLabs

A NEMS-based detector with a high-sensitivity over a wide infrared range

KAUST, Saudi Arabia

LiFi

A high-speed data communication transceiver based on a semiconductor laser

Inspier, Brazil

PBMT

A low-level-light-therapy system to treat extensive wounds

StealthTransit Team

Stealth Transit system

A system mountable on classical telescopes in order to make invisible the transit of satellites

MEMBERSHIP



What Do These People Share?

They share ideas, possibilities, and passion that lead to personal success, technological advancements, and better lives for all. They share curiosity, knowledge, and expertise that impact science, engineering, medicine, and industry. And they share a connection with SPIE.

These people connect with SPIE around our common mission to advance light-based research and technologies for the betterment of the human condition. They are part of a global community that includes researchers, engineers, educators, students, investors, entrepreneurs, and policy-makers.

People all over the world and across disciplines have gained competitive advantage thanks to their SPIE Membership.

Join them, and share your passion and expertise with SPIE.

SPIE.

spie.org/membership

help@spie.org • +1 360 676 3290

Professional Development

Spend some time focusing on your career development, these sessions will help you hone valuable skills.



Take part in the SPIE Career Summit, our professional development programming at Photonics Europe 2020. Workshops and sessions will cover a range of topics, from strategies for a successful job search to transforming technical writing and presentations. Hone your career skills and learn valuable insights into preparing to work in optics and photonics.

Networking, Workshops, and Presentations

TIME	EVENT	PAGE
Sunday 29 March 2020		
13:30-16:30	Networking for Researchers Workshop	p. 14
20:00-21:30	SPIE Career Lab Meetup	p. 18
Monday 30 March 2020		
8:00-9:00	Career Summit Networking Breakfast	p. 18
9:00-12:00	Structuring and Delivering Research Talks	p. 14
9:00-12:00	Essential Skills for a Career in Industry	p. 15
13:30-16:30	Creating Effective Presentation Slides	p. 15
13:30-16:30	Designing Your Own Career Path	p. 15
17:00-18:00	LinkedIn Editathon	p. 16
Tuesday 31 March 2020		
9:00-12:00	Writing Effective Research Abstracts	p. 16
9:00-12:00	Telling Better Stories with the Same Facts	p. 16
13:30-16:30	Conveying Messages with Graphs	p. 17
13:30-16:30	Reporting on Your Work Persuasively and Efficiently	p. 17
17:00-18:30	Career Summit Networking Social	p. 17

Networking for Researchers

Sunday 29 March 2020 • 13:30 - 16:30

Location: Etoile A, Niveau/Level 1

Open to those with a paid registration badge.

No advance registration is required. However, seating is limited and will be granted on a first-come, first-served basis.

A success factor for any career, networking can be daunting for shy people. Still, both the introverted and the extraverted can benefit from a more systematic approach to professional networking. This workshop explores the very concept of a network, then discusses approaches to effective networking, both face to face and online, each time offering concrete, readily applicable tips.

LEARNING OUTCOMES: This workshop will enable you to:

- understand the many facets of networking
- approach people and start conversations respectfully
- make the most of networking opportunities at conferences

INTENDED AUDIENCE: This workshop is intended for anyone who wishes to start networking more systematically or to become better at it.



INSTRUCTOR: **Jean-luc Doumont** runs lectures and workshops in research communication, critical thinking, and related topics for engineers, scientists, and other rational minds. He is an engineer from the University of Louvain and a doctor in applied physics from Stanford University. Articulate, entertaining, and thought-provoking, he is a popular invited speaker at top-notch universities and research centers worldwide.

Structuring and Delivering Research Talks

Monday 30 March 2020 • 9:00 - 12:00

Location: Salon 12, Niveau/Level 1

Open to those with a paid registration badge.

No advance registration is required. However, seating is limited and will be granted on a first-come, first-served basis.

Oral presentations are about having something to say and being able to say it—instead of just “explaining slides” to the audience. This workshop offers a no-nonsense approach to structuring and delivering research talks. It also offers tips on how to manage the nervousness associated with speaking in public. Creating Effective Presentation Slides is the companion workshop held in the afternoon.

LEARNING OUTCOMES: This workshop will enable you to:

- understand the basic principles of effective communication
- organize your research story into a meaningful sequence
- deliver your presentation effectively, both verbally and nonverbally

INTENDED AUDIENCE: This workshop is intended for anyone who must prepare and deliver research presentations. Both novice and experienced speakers can expect to gain a lot from it.



INSTRUCTOR: **Jean-luc Doumont** runs lectures and workshops in research communication, critical thinking, and related topics for engineers, scientists, and other rational minds. He is an engineer from the University of Louvain and a doctor in applied physics from Stanford University. Articulate, entertaining, and thought-provoking, he is a popular invited speaker at top-notch universities and research centers worldwide.



Essential Skills for a Career in Industry

Monday 30 March 2020 • 9:00 - 12:00

Location: Salon 13, Niveau/Level 1

Open to those with a paid registration badge.

No advance registration is required. However, seating is limited and will be granted on a first-come, first-served basis.

Working in industry is very different than academia. An advanced degree in science and engineering gives you many technical skills that are valuable in the private sector, but there are a lot of important aspects of working in a company that aren't taught in school. This workshop gives you the industry primer you need.

The workshop will start with an overview of the five most important ways that working in industry is different than the academic research environment STEM graduate students are trained in. Next, we will cover five habits that scientists and engineers who are successful in industry learn quickly. We will also cover some basics of company finance, how projects are managed in industry, and some tricks for keeping your projects on schedule.

LEARNING OUTCOMES: After completing this workshop, attendees will be able to

- describe five ways that technical work in industry is different than academic research
- list the five habits that scientists and engineers who are successful in industry learn quickly
- explain a corporate financial statement and point out where engineering/R&D fits into the profit model
- describe why making decisions quickly is so important in industry, and explain a new technique for making a decision when the 'right' answer is not clear
- list the key elements of a typical industry development project, and describe tactics for keeping it on schedule

INTENDED AUDIENCE: This workshop is intended for graduate students in science and engineering programs who are looking to pursue careers in industry. Scientists and engineers who are already working in industry and want to accelerate their career progress will also find this workshop very helpful.



INSTRUCTOR: David M. Giltner is the author of the book *Turning Science into Things People Need*, and is an internationally recognized speaker and mentor for early career scientists and engineers seeking careers in industry. He has spent the last 20 years commercializing photonics technologies in a variety of roles for several companies including JDS Uniphase and Ball Aerospace. Through his time in the private sector, David learned how to function well in both highly technical and business circles, and has often functioned as an interpreter to help these two worlds communicate more productively. David has a BS and PhD in physics and holds six patents in the fields of laser spectroscopy and optical communications.

Creating Effective Presentation Slides

Monday 30 March 2020 • 13:30 - 16:30

Location: Salon 12, Niveau/Level 1

Open to those with a paid registration badge.

No advance registration is required. However, seating is limited and will be granted on a first-come, first-served basis.

Most slides out there are ineffective, detracting from what presenters are saying instead of enhancing their presentations. This workshop discusses how to design and construct more effective slides for research presentations, and how to handle them well. As such, it complements the morning workshop on Structuring and Delivering Research Talks. Attend both and fully transform your next presentation.

LEARNING OUTCOMES: This workshop will enable you to:

- design slides that get the message across
- construct slides that do not distract from the talk
- handle slides optimally during the presentation

INTENDED AUDIENCE: This workshop is intended for anyone who must prepare and deliver research presentations. Both novice and experienced speakers can expect to gain a lot from it.

INSTRUCTOR: Jean-luc Doumont runs lectures and workshops in research communication, critical thinking, and related topics for engineers, scientists, and other rational minds. He is an engineer from the University of Louvain and a doctor in applied physics from Stanford University. Articulate, entertaining, and thought-provoking, he is a popular invited speaker at top-notch universities and research centers worldwide.

Designing Your Own Career Path

Monday 30 March 2020 • 13:30 - 16:30 PM

Location: Salon 13, Niveau/Level 1

Open to those with a paid registration badge.

No advance registration is required. However, seating is limited and will be granted on a first-come, first-served basis.

Many students pursue STEM degrees because they excel in the subject matter, but often have little idea exactly what career paths they may ultimately pursue. Engineers typically imagine becoming a design engineer at a large and well-known engineering company, and scientists often imagine becoming a research professor. Relatively few of these "traditional" career options are available, however, and few graduates have the tools or the training to design a career path to any other destination. This workshop will give participants five clear steps to design a career path that will be both rewarding and exciting.

The workshop will start with an overview of the five most important ways that working in industry is different than the academic research environment STEM graduate students are trained in. Next, we will cover five habits that scientists and engineers who are successful in industry learn quickly. We will also cover some basics of company finance, how projects are managed in industry, and some tricks for keeping your projects on schedule.

LEARNING OUTCOMES: After completing this workshop, attendees will be able to

- list the five key steps to designing their own rewarding career path in the private sector
- evaluate their own strengths in terms of their skills, their knowledge, and most importantly, their attributes
- explain a corporate financial statement and point out where engineering/R&D fits into the profit model
- follow three steps to defining their career target and utilize several new ways to research this target
- understand how to navigate the hidden job market to find that opportunity that fits them well

INTENDED AUDIENCE; This workshop is intended for graduate and undergraduate students in science and engineering programs who are planning to pursue careers in the private sector. Scientists and engineers who are already working in industry but find themselves unsure where to take the next step in their careers will also find this workshop very helpful.

PROFESSIONAL DEVELOPMENT



INSTRUCTOR: David M. Giltner is the author of the book *Turning Science into Things People Need*, and is an internationally recognized speaker and mentor for early career scientists and engineers seeking careers in industry. He has spent the last 20 years commercializing photonics technologies in a variety of roles for several companies including JDS Uniphase and Ball Aerospace. Through his time in the private sector, David learned how to function well in both highly technical and business circles, and has often functioned as an interpreter to help these two worlds communicate more productively. David has a BS and PhD in physics and holds six patents in the fields of laser spectroscopy and optical communications.

LinkedIn Editathon

Monday 30 March 2020 • 17:00 - 18:00

Location: Niveau/Level 1, Salon 13

Open to those with a paid registration badge.

No advance registration is required. However, seating is limited and will be granted on a first-come, first-served basis.

LinkedIn is a great tool, but it is just that – a tool. Like any tool, it only works for you if you know how to use it. Most early career scientists and engineers realize they need a good LinkedIn profile, but many don't know what makes a good profile. This Editathon will provide participants an opportunity to revise their profiles with an experienced industry hiring manager to provide input on best practices and what a hiring manager is likely to notice and find relevant.

LEARNING OUTCOMES: Participants attending the Editathon will have one hour to work on their LinkedIn profile. The instructor will briefly outline a few best practices and a summary of what industry hiring managers may be looking for.

INTENDED AUDIENCE: This workshop is intended primarily for early career scientists and engineers who want to improve their LinkedIn profiles and make them more attractive to potential private sector employers. However, scientists and engineers who are further into their careers but have little experience with LinkedIn may also find it valuable.



INSTRUCTOR: David M. Giltner is the author of the book *Turning Science into Things People Need*, and is an internationally recognized speaker and mentor for early career scientists and engineers seeking careers in industry. He has spent the last 20 years commercializing photonics technologies in a variety of roles for several companies including JDS Uniphase and Ball Aerospace. Through his time in the private sector, David learned how to function well in both highly technical and business circles, and has often functioned as an interpreter to help these two worlds communicate more productively. David has a BS and PhD in physics and holds six patents in the fields of laser spectroscopy and optical communications.

Writing Effective Research Abstracts

Tuesday 31 March 2020 • 9:00 - 12:00

Location: Salon 12, Niveau/Level 1

Open to those with a paid registration badge.

No advance registration is required. However, seating is limited and will be granted on a first-come, first-served basis.

Telling a convincing research story in about 200 words to a potentially diverse audience is by far the most challenging writing task for researchers. This workshop discusses how to structure and write effective abstracts for papers, dissertations, or research reports, in order to make the audience care and to get the message across.

LEARNING OUTCOMES: This workshop will enable you to:

- select what to include in an abstract—and what to leave out
- organize your research story into a meaningful sequence
- express your ideas clearly, accurately, and concisely

INTENDED AUDIENCE: This workshop is intended for anyone who must write research abstracts or any other summary of work done. Both novice and experienced authors can expect to gain a lot from it.



INSTRUCTOR: Jean-luc Doumont runs lectures and workshops in research communication, critical thinking, and related topics for engineers, scientists, and other rational minds. He is an engineer from the University of Louvain and a doctor in applied physics from Stanford University. Articulate, entertaining, and thought-provoking, he is a popular invited speaker at top-notch universities and research centers worldwide.

Telling Better Stories with the Same Facts

Tuesday 31 March 2020 • 9:00 - 12:00

Location: Salon 13, Niveau/Level 1

Open to those with a paid registration badge.

No advance registration is required. However, seating is limited and will be granted on a first-come, first-served basis.

Many early career scientists and engineers are good at describing their accomplishments to someone in an academic setting who understands their research. Making their dissertation research sound appealing to someone who doesn't have a similar background, such as an industry hiring manager, is much more challenging. This can be a particular problem in a job interview. If the candidate launches into a description of their work the way they would at an academic conference, the interviewer is likely to not understand how the candidate's experience is applicable to the company.

This workshop is primarily aimed at helping the participants perform better in a job interview, but it will also help their career in a much broader sense, improving their communication with anyone who is not an expert in their specific discipline or work area.

LEARNING OUTCOMES: After completing this workshop, attendees will be able to

- describe their dissertation research in a way that makes them sound less like an academic and more like someone who can contribute to an industry team
- relay why telling stories is so much better for interviewing than simply listing skills and experience
- list five story elements that will make their experience much more relatable to an industry hiring manager
- answer the common question "So, what do you do" in a way that creates career opportunities rather than just small talk
- outline a simple way to ensure that their career stories are interesting, rather than boring or confusing

INTENDED AUDIENCE: This workshop is intended for PhD level scientists and engineers who are unsure how to make their dissertation research sound relevant to a hiring manager at a company that is not involved in the same area of research.



INSTRUCTOR: David M. Giltner is the author of the book *Turning Science into Things People Need*, and is an internationally recognized speaker and mentor for early career scientists and engineers seeking careers in industry. He has spent the last 20 years commercializing photonics technologies in a variety of roles for several companies including JDS Uniphase and Ball Aerospace. Through his time in the private sector, David learned how to function well in both highly technical and business circles, and has often functioned as an interpreter to help these two worlds communicate more productively. David has a BS and PhD in physics and holds six patents in the fields of laser spectroscopy and optical communications.

Conveying Messages with Graphs

Tuesday 31 March 2020 • 13:30 - 14:30

Location: Salon 12, Niveau/Level 1

Open to those with a paid registration badge.
No advance registration is required. However, seating is limited and will be granted on a first-come, first-served basis.

Widely used in research and development to analyze and communicate data, graphical displays are still poorly mastered by researchers (and popular software does not help). This workshop discusses how to create more effective graphs—graphs that are truly visual, are truthful to the data, and get the message across.

LEARNING OUTCOMES: This workshop will enable you to:

- select the right graph for a given data set and a given research question
- optimize this graph to make it intuitive and to reveal the data
- phrase a caption that gets the message across

INTENDED AUDIENCE: This workshop is intended for anyone who must create graphs for papers, presentations, or posters. Both novice and experienced authors/speakers can expect to gain a lot from it.



INSTRUCTOR: **Jean-luc Doumont** runs lectures and workshops in research communication, critical thinking, and related topics for engineers, scientists, and other rational minds. He is an engineer from the University of Louvain and a doctor in applied physics from Stanford University. Articulate, entertaining, and thought-provoking, he is a popular invited speaker at top-notch universities and research centers worldwide.

Reporting on Your Work Persuasively and Efficiently

Tuesday 31 March 2020 • 13:30 - 14:30

Location: Salon 13, Niveau/Level 1

Open to those with a paid registration badge.
No advance registration is required. However, seating is limited and will be granted on a first-come, first-served basis.

This workshop will help applied scientists and engineers cut down the time they spend reporting on the solutions they've proposed, designed, implemented, or evaluated, while making their reports – whether written or oral – more convincing and readable.

LEARNING OUTCOMES: This workshop will enable you to:

- create a clear technical argument using a simple formula
- tailor your report to the audience in question
- speed up the writing process by outlining and getting feedback before you start

INTENDED AUDIENCE: This workshop should help any engineer, applied scientist, or consultant or other researcher who needs to communicate the pros and cons of solutions to a technical problem. It is particularly helpful for students and young professionals who have projects and theses on the horizon, and for mid-career professionals looking to move up to positions where they have to pitch and report for their company or team.



INSTRUCTOR: **Sunny Bains** is a scientist, journalist, and Principal Teaching Fellow at University College London, where she teaches research, analysis, and communication to students across the physical sciences and engineering. She is author of *Explaining the Future: How to Research, Analyze, and Report on Emerging Technologies* (Oxford University Press, 2019) and won the UCL Provost's Teaching Award in 2016. She has degrees in physics, journalism, and physical computation in artificial intelligence and is currently researching a book on neuromorphic engineering.

Career Summit Networking Social

Date: Tuesday 31 March 2020 • 17:00 - 18:30

Location: Etoile B, Niveau/Level 1

Open to participants of the SPIE Career Development Summit.
Participants will receive a ribbon during workshops at the Summit.
Please wear this ribbon for entry into the networking social.

Come grab a drink and meet others from the SPIE Career Development Summit in a relaxed atmosphere. Upon entry, you will be asked to identify your special interest area on a sticker and will be given a networking card with a unique question on it. Your job is to ask this question to someone you haven't met before. Every five minutes, a tone will sound and you will switch cards with the person with whom you are speaking and move on to find a new contact and begin a new discussion with your new question. At 6 pm, the speed-networking segment will end and you are invited to continue discussions with the people you found most interesting. Prepare your business cards and elevator pitch!

Student events

These events are tailored to student needs; learn what other young researchers are doing to get involved and build a career.

Student Chapter Leadership Workshop

Sunday 29 March 2020 • 8:00 - 12:00

Location: Etoile C, Niveau/Level 1

Open to those with a paid student registration badge.

Join SPIE student chapter leaders from around the world for this half-day leadership workshop. The workshop will start with breakfast, followed by a morning session on mindful leadership and chapter management.

Please email students@spie.org to register by Friday, 17 March.

Social Networking Events

Join your colleagues at networking events, including the Welcome Reception.

Wikipedia Edit-a-thon

Sunday 29 March 2020 • 17:00 PM - 19:00 PM

Location: Salon 13, Niveau/Level 1

Open to the public.

Bring your laptop and join us in editing Wikipedia pages about inspiring women, ethnic, or racial minority scientists.

Wikipedia is the fifth most popular website in the world, with more than 32 million views a day. Unfortunately fewer than 18% of the English-language biographies are about women. The stats for ethnic and racial minorities are no better.

During the event, a dedicated diversity activist will teach you how to edit Wikipedia pages. You will then have an opportunity to work together to research and write the biographies of scientists from under-represented groups who inspire you. No previous experience is needed!

Create a Wikipedia account before you arrive to make the most out of your time with us! Tips on how to do so are may be found here: [wikihow.com/Create-a-Wikipedia-Account](https://www.wikihow.com/Create-a-Wikipedia-Account)

Do you have suggestions for pages to create? Let us know! You can find us on Twitter @WomeninOptics.

SPIE Career Lab Meetup

Sunday 29 March 2020 • 8:00 PM - 9:30 PM

Open to SPIE Career Lab members who have a paid registration badge. No advance registration is required. However, seating is limited and will be granted on a first-come, first-served basis.

The SPIE Career Lab is a community for people connected to optics & photonics to help each other with professional advice, questions, and opportunities. Members of this community are invited to this special onsite meetup to network face-to-face and prepare for an exciting week at the conference.

Career Summit Networking Breakfast

Monday 30 March 2020 • 8:00 - 9:00

Location: Etoile B, Niveau/Level 1

Open to those with a paid registration badge.

No advance registration is required. However, seating is limited and will be granted on a first-come, first-served basis.

Start your conference day off with a tasty breakfast and an informal networking opportunity. This is a chance to get to know your peers as well as connect with volunteer leadership of SPIE while discussing table topics on areas that interest you. Table topics and discussion leaders will be listed at the door.

Early Career Professionals and students are encouraged to attend!

Women's Networking Luncheon

Monday 30 March 2020 • 12:00 - 13:30

Location: Etoile B, Niveau/Level 1

Open to those with a paid registration badge.

No advance registration is required. However, seating is limited and will be granted on a first-come, first-served basis.

Description TBD

Welcome Reception

Monday 30 March 2020 • 19:00 - 20:00

Location: Etoile B, Niveau/Level 1

All attendees are invited to the Welcome Reception. Relax, socialize, and enjoy the refreshments. Please remember to wear your registration badge. Dress is casual.

SCIENCE IS FOR EVERYONE

EQUITY

Is access to opportunities, fair treatment, and advancement for all people; it's about eliminating barriers that prevent full participation.

DIVERSITY

Includes all the ways in which people differ—identity markers such as race, ethnicity, gender, ability, sexual orientation, and more.

INCLUSION

Goes beyond diversity: it's the act of creating an environment where everyone feels welcomed, respected, supported, and valued.



spie.org/inclusion

 **SPIE.** EQUITY
DIVERSITY
INCLUSION

SPIE Fellow Member & Student Luncheon

Tuesday 31 March 2020 • 12:30 - 14:00

Location: Etoile B, Niveau/Level 1

Student conference attendees and SPIE Fellow Members are invited to this engaging networking lunch. This event gives students an opportunity to network with SPIE Fellows who will share their insights into career paths in optics and photonics.

Lunch is complimentary. Fellow Members will receive a personal invitation, student seating is available on a first-come, first-served basis.

LGBTQ+ Social

Tuesday 31 March 2020 • 19:00 - 20:00

Open to those with a paid registration badge.

Come socialize and network with other LGBTQ and allies in the optics and photonics community.

Equity, Diversity, and Inclusion Presentation and Reception

Wednesday 1 April 2020 • 17:00 - 18:30

Location: Etoile B, Niveau/Level 1

Open to those with a paid registration badge.

Join us for a thought-provoking presentation and stay after to discuss topics with your colleagues during the reception.

Talk and speaker TBD

Light Works

Art-Science Photonics Exhibition

Monday 30 March • 10:00 to Wednesday 1 April

17:00 hrs.

Following the success of "Light Culture" at SPIE Photonics Europe in 2018, taking a look back at holography and the history of 3D imaging, the new exhibition, "Light Work/s" will move forwards to explore the frontier between art and science in the field of light, imaging and photonics.

Two French artists:

Silvi Simon (Strasbourg)

Mustapha Azeroual (Paris)

have been commissioned to present their work in this field, including new works of art developed in collaboration with researchers from the different teams at the ICube Laboratory in Strasbourg and financed by the sponsors of the conference. In parallel, there will be information boards associated with the different works of art discussing the related scientific aspects.

At the intersection of photography and cinema, Silvi Simon's works of art explore the frontiers between light and matter, and film and digital photography. Through immersive installations, the artist questions the experimental process itself, as well as the weaknesses of the imaging systems used to take the pictures.

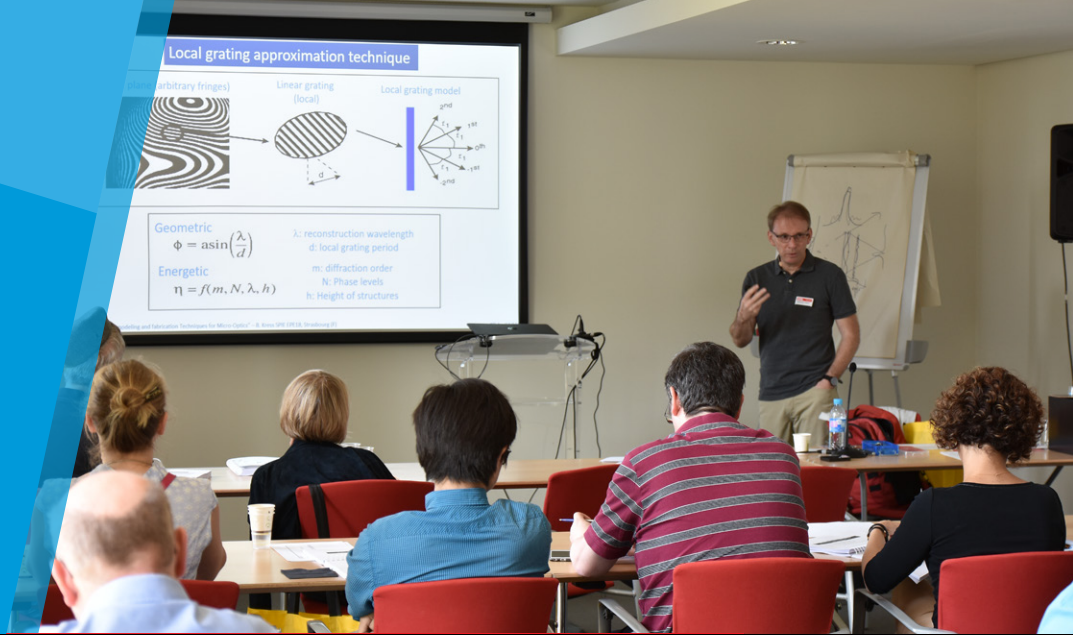
Confronting historical imaging and printing techniques with contemporary photography, Mustapha Azeroual uses an experimental approach to question the very process and conditions involved in image formation using light.

Research, experimental approaches, exploration of light, works of art... "Light work/s" reveals the different possibilities of working with these raw materials central to SPIE Photonics Europe that Silvi Simon and Mustapha Azeroual seize with both hands in an attempt to bring out the poetry hidden in experimental research.

To open the exhibition, there will be an official "vernissage" during the conference reception on the Monday evening, with local and international speakers. The exhibition will be on show throughout the Strasbourg Convention Centre.

The exhibition is overseen by Emeline Dufrennoy, an independent curator who regularly collaborates with the University of Strasbourg.

PHOTONICS EUROPE COURSES



REGISTER EARLY

Courses and workshops have limited seating and can sell out prior to the conference. To get the training you need, early registration is recommended.

There will not be a wait list for sold out courses.

Registering for a course or workshop gains you FREE admission to the exhibition.

For the most up-to-date information on courses and workshops including pricing and scheduling, please refer to our website:

www.spie.org/pwprogram

Continuing Education Units



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

Build skills and knowledge

Make the most of your time and register for half-day courses taught by experts in industry and academia. Take advantage of this opportunity and get high quality, efficient training to keep you up-to-date on the latest technology and applications.

4 courses.

Money-back guarantee.

INSTRUCTOR SPOTLIGHT:



Bernard Kress

Over the past two decades Bernard Kress has made significant scientific contributions as an engineer, researcher, associate professor, consultant, instructor, and author. He has been instrumental in developing numerous optical sub-systems for consumer electronics and industrial products, generating IP, teaching and transferring technological solutions to industry.

WHAT ATTENDEES HAVE SAID ABOUT HIS COURSES:

"The instructor is very knowledgeable in AR/VR and presented an extremely interesting course."

"Excellent course. Bernard has a lot of energy and enthusiasm!!"

"Excellent presentation. Very thorough and generous at answering questions."

MONEY-BACK GUARANTEE

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

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

BIOPHOTONICS

Towards In-vivo Labelfree Optical Spectroscopy: Basics to Applications *New*

SC1304 • Course Level: Intermediate • CEU: 0.4
 \$330 Members • \$186 Student Members • \$390 Non-Members USD
 Wednesday 1:30 pm to 5:30 pm

This course aims at introducing the basics of linear and non-linear spectroscopic techniques with emphasis on laser-based methods, in particular Raman spectroscopy, for medical in-vivo diagnosis. The ability to obtain specific chemical information labelfree makes Raman spectroscopy attractive for many clinical investigations of bodily fluids, pathogens, cells, and tissue biopsies. Within this course we will focus on implementing various Raman-approaches, also in combination with CARS, second harmonic generation (SHG) and two-photon excited autofluorescence (TPEF) for multimodal imaging approaches. Special attention is also given to sampling approaches. The course participants will gain a general understanding of how linear and non-linear spectroscopic approaches can complement established medical diagnostic tools and learn how these modern approaches can be used to apply these techniques to fight the major concurrent health challenges like cancer.

LEARNING OUTCOMES

This course will enable you to:

- discuss the basic principle of linear and non-linear Raman spectroscopic techniques for tissue- and cell diagnostics.
- explain how the Raman spectral signatures of cells and tissue can be translated into diagnostic markers by means of statistical data evaluation procedures (chemometrics) or advanced image processing algorithms;
- recognize some unmet medical needs which can be addressed by Raman-spectroscopic diagnostics. Examples in oncology and pathology will be provided
- examine the advantages and limitations of the various Raman-based approaches for medical diagnosis.
- discuss the great potential of medical Raman spectroscopy to complement established clinical diagnostic tools.

INTENDED AUDIENCE

Physicists, engineers, biomedical scientists and clinicians who are interested in Raman-spectroscopic techniques will benefit from this course.

INSTRUCTOR

Jürgen Popp holds a chair for Physical Chemistry at the Friedrich-Schiller University Jena and is the Scientific Director of the Leibniz Institute of Photonic Technology, Jena. His research interests are mainly concerned with biophotonics. In particular his expertise in the development and application of innovative Raman techniques for biomedical diagnosis should be emphasized. He has published more than 800 journal papers and has been named as an inventor on 12 patents. He is Editor-in-Chief of the *Journal of Biophotonics*. In 2012, he received an honorary doctoral degree from Babes-Bolyai University in Cluj-Napoca, Romania. Professor Jürgen Popp is the recipient of the 2013 Robert Kellner Lecture Award and the prestigious 2016 Pittsburgh Spectroscopy Award. In 2016 he was elected to the American Institute for Medical and Biological Engineering (AIMBE) College of Fellows. 2018 Juergen Popp was awarded the renowned Ioannes Marcus Marci Medal of the Czechoslovak Spectroscopy Society, he won the third prize of the Berthold Leibinger Innovationspreis and received the Kaiser-Friedrich-Forschungspreis. In 2019 he was awarded the Ralf-Dahrendorf-Preis für den Europäischen Forschungsraum.

Quantitative Phase Imaging (QPI): Principles and Applications *New*

SC1300 • Course Level: Introductory • CEU: 0.4
 \$330 Members • \$186 Student Members • \$390 Non-Members USD
 Sunday 1:30 pm to 5:30 pm

This course aims to help researchers join the exciting and quickly emerging field of biomedical QPI. Quantifying cell-induced shifts in the optical path-lengths permits nanometer scale measurements of structures and motions in a non-contact, non-invasive manner. We will explain the basic principles and applications of QPI.

In the first part of the course: Methods - we will cover the main approaches to QPI, including phase-shifting, off-axis, common-path, and white-light methods, together with their figures of merit. A practical guide to designing and implementing instrumentation for QPI, along with image processing techniques will be presented.

In the second part of the course: Applications – we will review recent advances in biomedical applications of QPI. We will cover basic applications published in the recent literature on cell structure, dynamics and light scattering, as well as clinical applications such as blood testing and tissue diagnosis.

LEARNING OUTCOMES

This course will enable you to:

- identify and describe the pros and cons of various QPI experimental geometries
- write down the interference and phase retrieval equations for phase shifting and off-axis methods
- discriminate between the spatial and temporal phase noise in QPI
- explain the relationship between QPI and angular light scattering
- compute tomographic reconstructions under the Born approximation using QPI data
- summarize the applications of quantitative phase imaging to biomedicine
- estimate cell dry mass, red blood cell volume, angular scattering map, etc., from QPI data

INTENDED AUDIENCE

Scientists and engineers who wish to broaden their research portfolio by exploring the possibilities in the field of quantitative phase imaging. Undergraduate training in optics or equivalent is assumed.

INSTRUCTOR

Gabriel Popescu is a Professor in Electrical and Computer Engineering, University of Illinois at Urbana-Champaign. He received his Ph.D. in Optics in 2002 from the School of Optics/ CREOL (now the College of Optics and Photonics), University of Central Florida. He continued his training with Michael Feld at M.I.T., working as a postdoctoral associate. He joined Illinois in August 2007 where he directs the Quantitative Light Imaging Laboratory (QLI Lab) at the Beckman Institute for Advanced Science and Technology. Dr. Popescu served as Associate Editor of Optics Express and Biomedical Optics Express, Editorial Board Member for Journal of Biomedical Optics and Scientific Reports. He authored 170 journal publications, 220 conference presentations, 32 patents, gave 220 lecture/plenary/invited talks (<http://light.ece.illinois.edu/>). He founded Phi Optics, Inc., a start-up company that commercializes quantitative phase imaging technology. He is an OSA, SPIE, and AIMBE Fellow and IEEE Senior Member. He authored three books, parts of which will be used for this course:

1. Popescu, G. (2011). Quantitative phase imaging of cells and tissues. New York, McGraw-Hill.
2. Popescu, G. (2018). Principles of Biophotonics, Volume 1 - "Linear systems and the Fourier transform in optics", IOP Publishing.
3. Popescu, G. (2019). Principles of Biophotonics, Volume 2 - "Light emission, detection, and statistics", IOP Publishing.

OPTICAL IMAGING AND SENSING

Design, Modeling and Fabrication Techniques for Micro-Optics: Applications to Display, Imaging, Sensing and Metrology

SC1217 • Course Level: Intermediate • CEU: 0.4
\$330 Members • \$186 Student Members *
\$390 Non-Members USD
Sunday 8:30 am to 12:30 pm

This course provides an overview of the various design and fabrication techniques available to the optical engineer for micro / nano optics, diffractive optics and holographic optics. Emphasis is put on DFM (Design For Manufacturing) for wafer scale fabrication, Diamond Turning Machining (DTM) and holographic exposure. The course shows how design techniques can be tailored to address specific fabrication techniques' requirements and production equipment constraints. The course will also address various current application fields such as display, imaging, sensing and metrology.

The course is built around 4 points: (1) design, (2) modeling, (3) fabrication/mass production and (4) application fields.

We will also review in details the basic micro-optics building blocks and the overall architecture of the iPhone X IR human face sensor.

- 1) The course will review various design techniques used in standard optical CAD tools such as Zemax and CodeV to design Diffractive Optical Elements (DOEs), Micro-Lens Arrays (MLAs), hybrid optics and refractive micro-optics, Holographic Optical Element (HOE), as well as the various numerical design techniques for Computer Generated Holograms (CGHs).
- 2) Modeling single micro optics or complex micro-optical systems including MLAs, DOEs, HOEs, CGHs, and other hybrid elements can be a difficult or nearly impossible task when using classical ray tracing algorithms. We will review techniques using physical optics propagation to model not only multiple diffraction effects and their interferences, but also systematic and random fabrication errors, multi-order propagation and other effects which cannot be modeled accurately through ray tracing.
- 3) Following the design (1) and modeling tasks (2), the optical engineer usually needs to perform a DFM process so that his/her design can be fabricated by the target manufacturing partner/vendor on specific equipment. We will review such DFM for wafer fab via optical lithography (tape-out process), single point diamond turning (SPDT), or holographic optics recording specification. The course also reviews fracturing techniques to produce GDSII layout files for specific lithographic fabrication techniques and manufacturing equipment.
- 4) In order to point out the potential of such micro-optics for consumer products, this section reviews current application fields for which such elements are providing an especially good match, impossible to implement with traditional optics, such as depth mapping sensing (structured illumination based sensor) and augmented reality display (waveguide grating combiner optics). We will also review applications in high resolution incremental/absolute optical encoders. Design and modeling techniques will be described for such applications fields, and optical hardware sub-system implementations and micro-optics elements will be shown and detailed.

LEARNING OUTCOMES

This course will enable you to:

- review the various micro-optics / diffractive optics design techniques used today in popular optical design software such as Zemax and CodeV
- decide which design software would be best suited for a particular micro-optics design task
- evaluate the various constraints linked to either ray tracing or physical optics propagation techniques, and develop custom numerical propagation algorithms
- model systematic and random fabrication errors, especially for lithographic fabrication
- compare the various constraints linked to mask layout generation for lithographic fabrication (GDSII)
- review the different GDSII fabrication layout file architectures, and how to adapt them to various lithographic fabrication techniques such as the ones described in SC454
- discuss current application fields and products using such optics,

as in Augmented and Mixed Reality headsets, and high resolution hybrid incremental/absolute diffractive optical encoders.

INTENDED AUDIENCE

Scientists, engineers, technicians, or managers who wish to learn more about how to design, model, fabricate and test micro-optics, diffractive optics and hybrid micro-optics, and how such optics can be integrated effectively in consumer products. Basic knowledge in optics is assumed.

INSTRUCTOR

Bernard Kress Over the past two decades, Bernard Kress has made significant scientific contributions as an engineer, researcher, associate professor, consultant, instructor, and author. He has been instrumental in developing numerous optical sub-systems for consumer and industrial products, generating IP, teaching and transferring technological solutions to industry. Application sectors include laser materials processing, optical anti-counterfeiting, biotech sensors, optical telecom devices, optical data storage, optical computing, optical motion sensors, digital displays systems, and eventually HUD and HMD displays (smart glasses, AR/MR/VR). Bernard has been specifically involved in the field of micro-optics, wafer scale optics, holography and nano-photonics. He has published half a dozen books and has more than 35 patents granted. He is a short course instructor for the SPIE and has been chair of various SPIE conferences. He is an SPIE fellow since 2013 and has been elected to the board of Directors of SPIE (2017-19). Bernard has joined Google [X] Labs. in 2011 as the Principal Optical Architect on the Google Glass project, and is since 2015 the Partner Optical Architect at Microsoft Corp. on the HoloLens project.

Optical Technologies and Architectures for Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR) Head-Mounted Displays (HMDs)

SC1218 • Course Level: Intermediate • CEU: 0.4
\$330 Members • \$186 Student Members •
\$390 Non-Members USD
Sunday 1:30 pm to 5:30 pm

The course provides an extensive overview of the current product offerings as well as the various optical architectures, as in:

- Smart Glasses and Digital Eyewear
- Augmented Reality (AR) and Mixed Reality (MR) headsets
- Virtual Reality (VR) and Merged Reality headsets

The course describes the optical backbone of existing systems, as well as the various optical building blocks, as in:

- Display engines including microdisplay panel architectures, scanner based light engines and phase panels
- Optical combiners integrated either in free space or waveguide platforms
- Depth mapping sensors either through structured illumination or time of flight
- Head tracking, gaze tracking and gesture sensors

Emphasis is set on the design and fabrication techniques to provide the best display immersion and comfort:

- Wearable comfort (size/ weight, CG)
- Visual comfort (eye box size and IPD coverage, angular resolution, FOV, distortion, dynamic range, contrast,...)
- Passive and active foveated rendering and peripheral displays
- VAC (Vergence Accommodation Conflict) mitigation through varifocal, multifocal, spatial and temporal light fields and per pixel depth holographic displays.

The features and limitations of current optical technologies addressing such specifications are reviewed. In order to design next generation head worn systems, one needs to fully understand the specifics and limitations of the human visual system, and design the optics and the optical architecture around such. Challenges for next generation systems are reviewed, where immersion and comfort need to be addressed along with consumer level costs requirements.

Finally, the course reviews market analysts' expectations, projected over the next 5 to 10 years, and lists the main actors (major product design companies, start-ups and optical building block vendors, and current investment rounds in such). Demonstration of some of the state of the art AR, MR and VR headsets will be offered to attendees at the end of the course.

LEARNING OUTCOMES

This course will enable you to:

- identify the various consumer and enterprise head worn systems available in industry today, defined as smart glasses, digital eyewear, AR, MR and VR HMDs, and understand their fundamental differences and specifics
- explain the current optical technologies and sub-systems, their advantages and limitations.
- describe the relations and implications between FOV, resolution, MTF, eyebox size, effective IPD coverage, screen door effects, pupil swim, vergence/accommodation disparity, foveated rendering, peripheral displays,
- examine the human visual system, its specifics and limitations.
- identify the limitations of current optical architectures and how some can be overcome by designing the optics around the human visual system.
- describe the feature and functionality requirement for next generation systems, and review the key enabling technologies.
- examine the current AR/VR market status as well as the upcoming market expectations for each field (smart glasses, AR and VR)

INTENDED AUDIENCE

Optical, mechanical and electrical engineers involved in the design and development of Enterprise and Consumer HMDs in all their declinations. Product and project managers involved in defining current and next generation HMD products, technology product roadmaps and next generation optical sub-systems.

INSTRUCTOR

Bernard Kress Over the past two decades, Bernard Kress has made significant scientific contributions as an engineer, researcher, associate professor, consultant, instructor, and author. He has been instrumental in developing numerous optical sub-systems for consumer and industrial products, generating IP, teaching and transferring technological solutions to industry. Application sectors include laser materials processing, optical anti-counterfeiting, biotech sensors, optical telecom devices, optical data storage, optical computing, optical motion sensors, digital displays systems, and eventually HUD and HMD displays (smart glasses, AR/MR/VR). Bernard has been specifically involved in the field of micro-optics, wafer scale optics, holography and nano-photonics. He has published half a dozen books and has more than 35 patents granted. He is a short course instructor for the SPIE and has been chair of various SPIE conferences. He is an SPIE fellow since 2013 and has been elected to the board of Directors of SPIE (2017-19). Bernard has joined Google [X] Labs. in 2011 as the Principal Optical Architect on the Google Glass project, and is since 2015 the Partner Optical Architect at Microsoft Corp. on the HoloLens project.

COMMUNITY SUPPORT

Helping You Create The Future

In 2019, SPIE provided over \$5 million in community support including scholarships and awards, outreach and advocacy programs, travel grants, public policy, and educational resources.

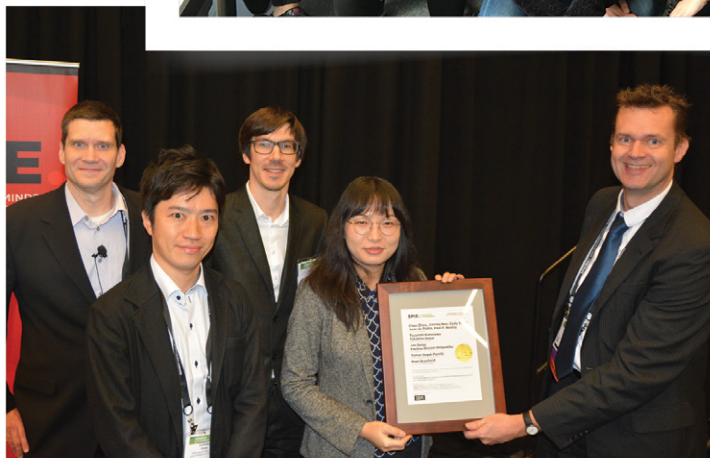
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DAILY CONFERENCE SCHEDULE

SUNDAY 29 March	MONDAY 30 March	TUESDAY 31 March	WEDNESDAY 1 April	THURSDAY 2 April
Nano- and Quantum Sciences , Track Chair: David L. Andrews , Univ. of East Anglia (United Kingdom)				
	11344 Metamaterials (McDonald, Staude, Zayats), p. 27			
11345 Nanophotonics (Andrews, Bain, Kauranen, Nunzi), p. 31				
	11346 Advances in Ultrafast Condensed Phase Physics (Haacke, Sharma Yakovlev), p. 36			
	11347 Quantum Technologies (Diamanti, Ducci, Treps, Whitlock), p. 38			
	11348 Terahertz Photonics ^{NEW} (Jarrahi, Preu, Turchinovich), p. 41			
Optical Imaging and Sensing , Track Chair: Francis Berghmans , Vrije Univ. Brussel (Belgium)				
	11349 3D Printed Optics and Additive Photonic Manufacturing (Herkommer, Flury, Freyman), p. 44			
	11350 Digital Optics for Immersive Displays (DOID20) (Kress, Peroz), p. 46			
11351 Unconventional Optical Imaging (Fournier, Georges, Popescu), p. 47				
	11352 Optics and Photonics for Advanced Dimensional Metrology (de Groot, Leach, Picart), p. 51			
	11353 Optics, Photonics and Digital Technologies for Imaging Applications (Schelkens, Kozacki), p. 54			
11354 Optical Sensing and Detection (Berghmans, Mignani), p. 57				
Lasers and Nonlinear Optics , Track Chair: Kyriacos Kalli , Cyprus Univ. of Technology (Cyprus)				
	11355 Micro-Structured and Specialty Optical Fibres (Kalli, Peterka, Bunge), p. 62			
	11356 Semiconductor Lasers and Laser Dynamics (Sciamanna, Michalzik, Panajotov, Höfling), p.65			
	11357 Fiber Lasers and Glass Photonics: Materials through Applications (Ferraro, Mackenzie, Taccheo), p.68			
	11358 Nonlinear Optics and its Applications (Broderick, Dudley, Peacock), p. 73			
Biophotonics , Track Chairs: Jürgen Popp , Leibniz-Institut für Photonische Technologien e.V. (Germany); Valery V. Tuchin , N.G. Chernyshevsky Saratov State Univ. (Russian Federation); Sylvain Gioux , Univ. de Strasbourg (France)				
	11359 Biomedical Spectroscopy, Microscopy, and Imaging ^{NEW} (Popp, Gergely), p. 77			
	11360 Neurophotonics ^{NEW} (Pavone, Cognet, Kuner), p. 81			
	11361 Biophotonics in Point-of-Care ^{NEW} (Canva, Giannetti, Altug, Moreau), p. 83		11362 Clinical Biophotonics ^{NEW} (Elson, Gioux, Pogue), p. 86	
	11363 Tissue Optics and Photonics ^{NEW} (Tuchin, Blondel, Zalevsky), p. 89			
Application of Photonic Technology , Track Chairs: Laurent Vivien , Ctr. de Nanosciences et de Nanotechnologies (France); John T. Sheridan , Univ. College Dublin (Ireland)				
	11364 Integrated Photonics Platforms: Fundamental Research, Manufacturing and Applications (Baets, O'Brien, Vivien) p. 94			
	11365 Organic Electronics and Photonics: Fundamentals and Devices (Reineke, Vandeval, Maes), p. 98			
	11366 Photonics for Solar Energy Systems (Sprafke, Goldschmidt, Pandraud), p. 100			
	11367 Photosensitive Materials and their Applications ^{NEW} (McLeod, Pascual, Tomita, Sheridan), p. 102			
Emerging Topics				
	FS100 Light Shaping Focus Session (Wyrowski, Meuret, Sheridan), p. 106			11368 Photonics and Plasmonics at the Mesoscale ^{NEW} (Lecler, Astratov, Minin), p. 105
				WS200 6th annual Sino-French "Photonics and Optoelectronics" PHOTONET International Research Network Workshop ^{NEW} (Blondel, Gralak, Peucheret, Zhang, Gao, Bai), p. 107

HARASSMENT

Harassment consists of unwanted, unwelcomed, and uninvited behavior that demeans, threatens, or offends another.

SPIE is committed to providing a harassment- and discrimination-free experience for everyone at our events, an experience that embraces the richness of diversity where participants may exchange ideas, learn, network, and socialize in the company of colleagues in an environment of mutual respect.

It is SPIE policy that all employees, volunteers, and participants are entitled to respectful treatment. Any form of bullying, discrimination, harassment, sexual or otherwise, is unacceptable and will not be tolerated.

To report harassment you have witnessed or experienced at an event or meeting contact any SPIE staff member or use the SPIE Reporting Hotline: 1-888-818-6898 or spie.ethicspoint.com

The **SPIE Anti-Harassment Policy** may be found at spie.org/harassment

The **SPIE Code of Conduct** may be found at spie.org/conduct

SPIE.

CONFERENCE 11344

Monday–Thursday 30 March–2 April 2020 • Proceedings of SPIE Vol. 11344

Metamaterials XII

Conference Chairs: **Kevin F. MacDonald**, Univ. of Southampton (United Kingdom); **Isabelle Staude**, Friedrich-Schiller-Univ. Jena (Germany); **Anatoly V. Zayats**, King's College London (United Kingdom)

Programme Committee: **Hatice Altug**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Sergey I. Bozhevolnyi**, Univ. of Southern Denmark (Denmark); **Andrea Di Falco**, Univ. of St. Andrews (United Kingdom); **Tal Ellenbogen**, Tel Aviv Univ. (Israel); **Jonathan A. Fan**, Stanford Univ. (United States); **Anthony Grbic**, Univ. of Michigan (United States); **Sébastien Guenneau**, CNRS-Imperial Unite Mixte Internationale (United Kingdom); **Maria Kafesaki**, Foundation for Research and Technology-Hellas (Greece); **Arseniy I. Kuznetsov**, A*STAR - Institute of Materials Research and Engineering (Singapore); **Tao Li**, Nanjing Univ. (China); **Stefan Linden**, Rheinische Friedrich-Wilhelms-Univ. Bonn (Germany); **Ferran Martín**, Univ. Autònoma de Barcelona (Spain); **Alejandro Martínez**, Univ. Politècnica de València (Spain); **Martin W. McCall**, Imperial College London (United Kingdom); **Dorota A. Pawlak**, Institute of Electronic Materials Technology (Poland); **Carsten Rockstuhl**, Karlsruher Institut für Technologie (Germany); **Mario Silveirinha**; **Philippe Tassin**, Chalmers Univ. of Technology (Sweden); **Sergei Tretyakov**, Aalto Univ. School of Science and Technology (Finland); **Din Ping Tsai**, Research Ctr. for Applied Sciences - Academia Sinica (Taiwan); **Jonathan A. Fan**, Stanford Univ. (United States); **Jason G. Valentine**, Vanderbilt Univ. (United States)

The 2020 conference will be held in honor of Professor Allan Boardman



An SPIE Fellow, great supporter of SPIE, and chairman of SPIE Metamaterials conference, Allan Boardman passed away on 23 November 2018. Professor Boardman was one of the earliest scientists to delve into the area of surface plasmons and is recognized for his outstanding service to the optics community through his dedication to optics and photonics and encouragement of young scientists throughout his life.

MONDAY 30 MARCH

HOT TOPICS I MON 9:00 TO 11:00

Photonics Europe 2020: Hot Topics Session I

- 9:00 - 9:20 **SPIE Welcome and Award Presentation**
John E. Greivenkamp, Univ of Arizona, United States
SPIE President
- Welcome**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- City of Strasbourg Welcome**
- 9:25 - 9:30 **Introduction to Hot Topics**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- 9:30 - 10:15 **Naturally fast and low power electro-optic polymer optical devices are ideally positioned for the next-generation Internet photonics roadmap**
Michael Lebby, CEO Lightwave Logic, United Kingdom
- 10:15 - 11:00 **3D printed micro-optics: state of the art and future challenges**
Harald Giessen, University of Stuttgart, Germany

For additional details see pages 6-7

SESSION 1 MON 11:15 TO 12:45

Wavefront Engineering

- Dielectric metasurfaces for simultaneous spectral and spatial modulation in color printing and holography (Invited Paper)**,
Thomas Zentgraf, Basudeb Sain, Univ. Paderborn (Germany); Qunshuo Wei, Yongtian Wang, Beijing Institute of Technology (China); Bernhard Reineke, Univ. Paderborn (Germany); Xiaowei Li, Lingling Huang, Beijing Institute of Technology (China) [11344-1]
- Metareflectors for focused beams**, Jade Martínez-Llinàs, Clément Henry, Daniel Andrén, Ruggero Verre, Mikael Käll, Philippe Tassin, Chalmers Univ. of Technology (Sweden) [11344-2]
- All-polarization generation and manipulation using dielectric metasurfaces**, Fei Ding, Univ. of Southern Denmark (Denmark); Bingdong Chang, Technical Univ. of Denmark (Denmark); Qunshuo Wei, Lingling Huang, Beijing Institute of Technology (China); Xiaowei Guan, Technical Univ. of Denmark (Denmark); Sergey I. Bozhevolnyi, Univ. of Southern Denmark (Denmark) [11344-3]
- Shaping complex vector beams with metamaterials (Invited Paper)**,
Diane J. Roth, Luke H. Nicholls, Emma Perry, Mazhar E. Nasir, Alexey V. Krasavin, Nikita A. Shevchenko, Anatoly V. Zayats, King's College London (United Kingdom) [11344-4]
- Lunch Break Mon 12:45 to 13:40

CONFERENCE 11344

SESSION 2..... MON 13:40 TO 15:40

Allan Boardman Memorial Session

The 'trapped rainbow' and ultraslow waves on the nanoscale (*Invited Paper*), Ortwin Hess, Imperial College London (United Kingdom) . . . [11344-5]

Far-field deep subwavelength imaging and metrology: bringing artificial intelligence to nanophotonics (*Invited Paper*), Nikolay I. Zheludev, Univ. of Southampton (United Kingdom) and Nanyang Technological Univ. (Singapore); Guang Hui Yuan, Nanyang Technological Univ. (Singapore); Tanchao Pu, Univ. of Southampton (United Kingdom) and Univ. of the Chinese Academy of Sciences (China); Vassili Savinov, Nikitas Papisimakis, Univ. of Southampton (United Kingdom) . . . [11344-6]

Volumetric metamaterials and nanoplasmonic materials enabled by crystal growth (*Invited Paper*), Dorota A. Pawlak, Institute of Electronic Materials Technology (Poland); Mariusz Tomczyk, Lodz Univ. of Technology (Poland); Piotr Paszke, Rafal Nowaczynski, Univ. of Warsaw (Poland); Przemyslaw Piotrowski, Warsaw Univ. of Technology (Poland); Katarzyna Sadecka, Institute of Electronic Materials Technology (Poland); Alessandro Belardini, Sapienza Univ. di Roma (Italy); Johann Toudert, Consejo Superior de Investigaciones Cientificas (Spain); Concita Sibilia, Sapienza Univ. di Roma (Italy) . . . [11344-7]

A consistent macroscopic Maxwell theory without D and H (*Invited Paper*), Martin W. McCall, Imperial College London (United Kingdom) . . . [11344-8]

SESSION 3..... MON 16:10 TO 17:40

Sensing

All-dielectric metasurfaces for sensing (*Invited Paper*), Hatice Altug, Ecole Polytechnique Fédérale de Lausanne (Switzerland) . . . [11344-9]

Asymmetric hole array: tuning the optical circular dichroism for chiral molecules sensing, Alessandro Belardini, Emilija Petronijevic, Grigore Leahu, Sapienza Univ. di Roma (Italy); Tiziana Cesca, Carlo Scian, Univ. degli Studi di Padova (Italy); Fabiana Pandolfi, Sapienza Univ. di Roma (Italy); Giovanni Mattei, Univ. degli Studi di Padova (Italy); Leonardo Mattiello, Concita Sibilia, Sapienza Univ. di Roma (Italy) . . . [11344-10]

Helicity-preserving optical cavity modes for enhanced sensing of chiral molecules (*Invited Paper*), Ivan Fernandez-Corbaton, Joshua Feis, Julian Koepfler, Dominik Beutel, Xavier Garcia-Santiago, Carsten Rockstuhl, Martin Wegener, Karlsruhe Institut für Technologie (Germany) . . . [11344-11]

Metamaterial platform for hydrogen sensing, Mazhar E. Nasir, Diane J. Roth, Haibin Ni, Yunlu Jiang, Anatoly V. Zayats, King's College London (United Kingdom) . . . [11344-12]

TUESDAY 31 MARCH

SESSION 4..... TUE 8:30 TO 10:30

Metamaterials Fabrication

Towards self-assembled metasurfaces (*Invited Paper*), Rajam Elanchelyian, Romain Dezert, Philippe Richetti, Alexandre Baron, Philippe Barois, Olivier Mondain-Monval, Virginie Ponsinet, Univ. de Bordeaux (France) and CNRS (France) . . . [11344-13]

Flat lenses on optical multimode fibers using metallic metasurfaces, Matthias Zeisberger, Henrik Schneidewind, Uwe Hübner, Torsten Wieduwilt, Markus A. Schmidt, Leibniz-Institut für Photonische Technologien e.V. (Germany) . . . [11344-14]

Flexible holographic metasurfaces (*Invited Paper*), Andrea Di Falco, Univ. of St. Andrews (United Kingdom) . . . [11344-15]

Controllable fabrication of self-assembled core-shell metamaterials for plasmonic photocatalysis, Anastasiia Zaleska, King's College London (United Kingdom); William P. Wardley, INL - International Iberian Nanotechnology Lab. (Portugal); Francesco Lotti, Anatoly V. Zayats, Wayne Dickson, King's College London (United Kingdom) . . . [11344-16]

Strong light-matter interaction in lithography-free metamaterial perfect absorbers: energy conversion, color filtering, and sensing applications (*Invited Paper*), Ekmel Özbay, Amir Ghobadi, Deniz Umut Yıldırım, Mahmut Can Soydan, Hodjat Hajian, Bayram Bütün, Bilkent Univ. (Turkey) . . . [11344-17]

SESSION 5..... TUE 11:00 TO 12:45

Nonlinear Materials

Enhancing and switching harmonic generation in plasmonic and dielectric nanoantennas (*Invited Paper*), Lavinia Ghirardini, Politecnico di Milano (Italy); Eva Aurelia Arianna Pogna, Politecnico di Milano (Italy) and Ctr. Nazionale delle Ricerche (Italy); Attilio Zilli, Paolo Biagioni, Lamberto Duò, Giovanni Pellegrini, Francesco Rusconi, Politecnico di Milano (Italy); Andrea Locatelli, Univ. degli Studi di Brescia (Italy); Luca Carletti, Univ. degli Studi di Brescia (Italy) and Univ. di Padova (Italy); Davide Rocco, Univ. degli Studi di Brescia (Italy); Carlo Gigli, Giuseppe Marino, Univ. Paris Diderot (France); Aristide Lemaître, Ctr. de Nanosciences et de Nanotechnologies (France); Andrea Mazzanti, Giuseppe Della Valle, Politecnico di Milano (Italy); Xiaofei Wu, Bert Hecht, Julius-Maximilians-Univ. Würzburg (Germany); Giulio Cerullo, Politecnico di Milano (Italy); Giuseppe Leo, Univ. Paris Diderot (France); Costantino De Angelis, Univ. degli Studi di Brescia (Italy); Marco Finazzi, Michele Celebrano, Politecnico di Milano (Italy) . . . [11344-18]

Nonlinear diffraction in metasurfaces with high order antenna modes, Sylvain D. Gennaro, Sandia National Labs. (United States); Yi Li, Ludwig-Maximilians-Univ. München (Germany); Stefan A. Maier, Ludwig-Maximilians-Univ. München (Germany); Rupert F. Oulton, Imperial College London (United Kingdom) . . . [11344-19]

Analysing the polarisation of femtosecond pulses in hyperbolic metamaterials, Luke H. Nicholls, Francisco J. Rodríguez-Fortuño, Mazhar E. Nasir, King's College London (United Kingdom); Tomasz Stefaniuk, Univ. of Warsaw (Poland); Gregory A. Wurtz, Univ. of North Florida (United States); Anatoly V. Zayats, King's College London (United Kingdom) [11344-20]

Nonlinear optics of photonic hypercrystals: optical limiting and hypercomputing, Igor I. Smolyaninov, Univ. of Maryland, College Park (United States) . . . [11344-21]

Geometric phase and nonlinear photonic metasurfaces (*Invited Paper*), Guixin Li, Southern Univ. of Science and Technology of China (China) . . . [11344-22]

Lunch/Exhibition Break . . . Tue 12:45 to 13:45

SESSION 6..... TUE 13:45 TO 16:00

Novel Effects and Extreme Parameters

Shaping wavefronts of single photons with metasurfaces (*Invited Paper*), Sergey I. Bozhevolnyi, Univ. of Southern Denmark (Denmark) . . . [11344-23]

Chirality in evanescent fields: conditions, limits and guidelines, T. V. Raziman, Rasmus H. Godiksen, Moos A. Müller, Alberto G. Curto, Technische Univ. Eindhoven (Netherlands) . . . [11344-24]

Parity-time (PT) symmetry in chiral metamaterials (*Invited Paper*), Maria Kafesaki, Ioannis Katsantonis, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece); Sotiris Droulias, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece); Costas M. Soukoulis, Foundation for Research and Technology-Hellas (Greece) and Iowa State Univ. of Science and Technology (United States); Eleftherios N. Economou, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece) . . . [11344-25]

Manipulating type-I and type-II Dirac polaritons in cavity-embedded honeycomb metasurfaces, Guillaume Weick, Univ. de Strasbourg (France) and CNRS (France) . . . [11344-26]

Faraday cage of interlaced wire metamaterial becomes transparent (*Invited Paper*), Ildar Yusupov, Dmitry Dobrykh, Denis Sakhno, ITMO Univ. (Russian Federation); Dmitry Filonov, Moscow Institute of Physics and Technology (Russian Federation); Ivan I. Iorsh, Pavel A. Below, ITMO Univ. (Russian Federation) . . . [11344-27]

Non-hermitian topological phase transition in tunable Si metasurfaces, Ki Young Lee, Kwang-Wook Yoo, Min Jeong Kim, Young Sun Choi, Seok Ho Song, Hanyang Univ. (Korea, Republic of) . . . [11344-28]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair

16.35 to 17:20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States

17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8!

WEDNESDAY 1 APRIL

SESSION 7 WED 8:30 TO 10:15

Active Metamaterials

Time-modulated metasurfaces as new devices for extreme electromagnetic wave control (*Invited Paper*), Xuchen Wang, Ana Díaz-Rubio, Viktor Asadchy, Grigori Ptitsyn, Mohammad Mirmoosa, Sergei Tretyakov, Aalto Univ. (Finland) [11344-29]

Spintronic materials for magnetic field controlled metamaterials and metasurfaces in the IR, Alfonso Cebollada, Raquel Alvaro, Lorena Torné, María Ujué González, Gaspar Armelles, Instituto de Micro y Nanotecnología, Consejo Superior de Investigaciones Científicas (Spain) [11344-30]

Optically tunable epsilon-near-zero metamaterials, Humeyra Caglayan, Alireza Rahimi Rashed, Tampere Univ. (Finland) [11344-31]

Nano-opto-mechanical asymmetric transmission, Jinxiang Li, Kevin F. MacDonald, Univ. of Southampton (United Kingdom); Nikolay I. Zheludev, Univ. of Southampton (United Kingdom) and Nanyang Technological Univ. (Singapore) [11344-32]

Active and tunable dielectric nanoantennas (*Invited Paper*), Arseniy I. Kuznetsov, A*STAR - Institute of Materials Research and Engineering (Singapore) [11344-33]

SESSION 8 WED 10:45 TO 12:45

Dielectric Metamaterials

Metaoptics based on multilayer metasurfaces (*Invited Paper*), Jason G. Valentine, Vanderbilt Univ. (United States) [11344-34]

Light control and manipulation with tunable dielectric metasurface spatial light modulators, Shiqiang Li, Xuewu Xu, Rasna M. Veetil, Xinan Liang, Vytautas Valuckas, Parikshit Moitra, Shampy Mansha, Tobias W. W. Mass, Ramón J. Paniagua-Domínguez, Arseniy I. Kuznetsov, Institute of Materials Research and Engineering (Singapore) [11344-35]

Chiral bilayer dielectric metasurfaces, Katsuya Tanaka, Dennis Arslan, Stefan Fasold, Michael Steinert, Manuel Decker, Friedrich-Schiller-Univ. Jena (Germany); Thomas Pertsch, Friedrich-Schiller-Univ. Jena (Germany) and Fraunhofer-Institut für Angewandte Optik und Feinmechanik IOF (Germany); Isabelle Staude, Friedrich-Schiller-Univ. Jena (Germany) [11344-36]

Extreme lasing with exotic all-dielectric metasurface feedback (*Invited Paper*), Alexander V. Kildishev, Purdue Univ. (United States) [11344-37]

AlGaIn metasurface to increase the light-extraction efficiency of deep ultraviolet light-emitting diodes by perfect transmittance before critical angle, Joosun Yun, Hideki Hirayama, RIKEN (Japan) [11344-38]

Focusing and ultrahigh resolution by integrated metalens, Juntao Li, Haowen Liang, Sun Yat-Sen Univ. (China) [11344-39]

Lunch/Exhibition Break Wed 12:45 to 13:45

SESSION 9 WED 13:45 TO 15:45

Nanophotonics and Metamaterials

Session Chair: **Anatoly V. Zayats**, King's College London (United Kingdom)

Joint Session between Metamaterials Conference (11344) and Nanophotonics Conference (11345)

Metaphotonics with Mie-resonant nanostructures (*Invited Paper*), Yuri S. Kivshar, The Australian National Univ. (Australia) [11344-40]

Plasmonic nanoparticles in biological cells (*Invited Paper*), Lene Broeng Oddershede, Novo Nordisk Foundation (Denmark) [11345-52]

Quadratic nanomaterials for nonlinear active metasurfaces (*Invited Paper*), Rachel Grange, ETH Zurich (Switzerland) [11344-41]

Advances in THz generation by nonlinear metasurfaces (*Invited Paper*), Tal Ellenbogen, Tel Aviv Univ. (Israel) [11344-42]

SESSION 10 WED 16:10 TO 18:10

Metamaterials Multiphysics

Drag optical force due to a drift-current bias of graphene (*Invited Paper*), Muzzamal Shaukat, Mário G. Silveirinha, Instituto de Telecomunicações (Portugal) [11344-43]

High-frequency nanomotion imaging of artificial nanostructures, Tongjun Liu, Jun Yu Ou, Kevin F. MacDonald, Univ. of Southampton (United Kingdom); Nikolay I. Zheludev, Univ. of Southampton (United Kingdom) and Nanyang Technological Univ. (Singapore) [11344-44]

Observation of plasmon-phonons in a metamaterial superconductor using inelastic neutron scattering, Vera N. Smolyaninova, Towson Univ. (United States); Jeffrey W. Lynn, Nicholas P. Butch, Heather Chen-Mayer, National Institute of Standards and Technology (United States); Joseph C. Prestigiacomo, Mike Osofsky, U.S. Naval Research Lab. (United States); Igor I. Smolyaninov, Univ. of Maryland, College Park (United States) [11344-45]

Control of surface waves in photonics and geophysics (*Invited Paper*), Sebastien Guenneau, CNRS (United Kingdom) [11344-46]

Photoacoustics: probing hot carrier, heat dissipation and absorption dynamics of materials and nanoparticles through sound waves, Mónica Mota, Andrea Jacassi, Chunqi Zheng, Meri Tan, Imperial College London (United Kingdom); Sylvain D. Gennaro, Sandia National Labs. (United States); Rupert F. Oulton, Imperial College London (United Kingdom) [11344-47]

Field enhancement in acousto-optic crystals with metamaterial inclusions, Nikolai I. Petrov, Scientific and Technological Ctr. of Unique Instrumentation (Russian Federation); Vladislav I. Pustovoi, Scientific and Technological Ctr. of Unique Instrumentation (Russian Federation) . [11344-48]

POSTERS-WEDNESDAY WED 18:00 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Wednesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

Optimization by a genetic algorithm of pyramidal structures made of one, two or three stacks of metal/dielectric layers for a quasi-perfect broadband absorption of UV to near-infrared radiations, Alexandre Mayer, Univ. de Namur (Belgium); Sarah Griesse-Nascimento, Hai Bi, Eric Mazur, Harvard Univ. (United States); Michaël Lobet, Ctr. Spatial de Liège (Belgium) [11344-55]

Surface plasmon polaritons on CuS meta-films, Amaresh Shukla, Anton Bykov, Mark Green, Anatoly V. Zayats, King's College London (United Kingdom) [11344-56]

Highly efficient metamirror with circular dichroism and wavefront engineering, Hafiz Saad Khaliq, Muhammad Qasim Mehmood, Kashif Riaz, Information Technology Univ. of the Punjab (Pakistan) [11344-57]

Canons of the creation of metamaterials, Amritdin Salakhitdinov, Khotam Mirzokulov, Tashkent Univ. of Information Technologies (Uzbekistan) [11344-58]

Active beam shaping with tunable gap plasmon metasurface, Chao Meng, Sergey I. Bozhevolnyi, Univ. of Southern Denmark (Denmark) [11344-59]

Expressing Mie coefficients for absorbing isotropic particles in a generic fashion, Aso Rahimzadegan, Carsten Rockstuhl, Karlsruher Institut für Technologie (Germany); Rasoul Alaee, Univ. of Ottawa (Canada) . . . [11344-60]

Plasmon excitation: from waveguiding to electron tunneling, Pan Wang, Zhejiang Univ. (China) [11344-61]

Light diffraction in photonic hypercrystals studied by finite-difference frequency-domain method, Vladimir B. Novikov, Tatiana V. Murzina, M.V. Lomonosov Moscow State Univ. (Russian Federation) [11344-62]

Electron-tunnelling-based nanoscale light sources, Yunlu Jiang, Alexey V. Krasavin, Pan Wang, Anatoly V. Zayats, King's College London (United Kingdom) [11344-63]

Infrared emission in metamaterial composed of poly(ethylene terephthalate) polymeric matrix and carbon nanotubes., Maria Cristina Larciprete, Roberto Li Voti, Marco Centini, Sapienza Univ. di Roma (Italy); Merle Orth, Institut für Textiltechnik, RWTH Aachen Univ. (Germany); Stefano Paoloni, Univ. degli Studi di Roma "Tor Vergata" (Italy); Concita Sibilia, Sapienza Univ. di Roma (Italy) [11344-64]

Experimental detection of toroidal and anapole dipoles: introducing anapole spectroscopy, Vassili Savinov, Univ. of Southampton (United Kingdom); Wei-Yi Tsai, Univ. of Southampton (United Kingdom) and National Taiwan Univ. (Taiwan); Jun-Yu Ou, Univ. of Southampton (United Kingdom); Din Ping Tsai, Research Ctr. for Applied Sciences - Academia Sinica (Taiwan) and National Taiwan Univ. (Taiwan); Nikolay I. Zheludev, Univ. of Southampton (United Kingdom) and Nanyang Technological Univ. (Singapore) . . . [11344-65]

Lead halide perovskite-based active hyperbolic metamaterials in the visible region, Supratim Basak, Tel Aviv Univ. (Israel) . . . [11344-66]

Hot electron generation via surface internal photo-effect in structures with quantum well, Fedor Shuklin, Univ. of Southern Denmark (Denmark) and National Nuclear Research Univ. MEPhI (Russian Federation) and P. N. Lebedev Physical Institute (Russian Federation); Igor V. Smetanin, Igor E. Protsenko, P. N. Lebedev Physical Institute (Russian Federation); Jacob Khurgin, Johns Hopkins Univ. (United States); Alexander V. Uskov, P. N. Lebedev Physical Institute (Russian Federation) . . . [11344-67]

Silicon-on-insulator based high-index contrast gratings for resonant enhancement of second harmonic generation from two-dimensional material, Jayanta Deka, Medha Dandu, Lal Krishna A. S., Sruti Menon, Jyothisna K. M., Kausik Majumdar, Varun Raghunathan, Indian Institute of Science, Bengaluru (India) . . . [11344-68]

An optimization of the design of metal-insulator-metal-based broadband metamaterial absorber based on TiN compounds for maximum absorption of the solar spectrum in solar energy devices, Gleb D. Demin, National Research Univ. of Electronic Technology (Russian Federation) . . . [11344-69]

Design of silicon waveguides with all-dielectric metamaterial cladding by employing numerical simulations, Andraz Debevc, Janez Krc, Marko Topic, Univ. of Ljubljana (Slovenia) . . . [11344-70]

Turbulence reduction through local PT symmetry, Salim Benadouda Ivars, Muriel Botey, Ramon Herrero, Univ. Politècnica de Catalunya (Spain); Kestutis Staliunas, Univ. Politècnica de Catalunya (Spain) and Institutió Catalana de Recerca i Estudis Avançats (Spain) . . . [11344-71]

Transformation of refractive index spectra for titanium rough surfaces, Anna V. Tcibulnikova, Vasily A. Slezhkin, Iliia G. Samusev, Maxim V. Demin, Dmitry A. Artamonov, Valery V. Bryukhanov, Immanuel Kant Baltic Federal Univ. (Russian Federation) . . . [11344-72]

Circular dichroism and extraordinary transmission in elliptical nanohole arrays, Hanan Ali, Central China Normal Univ. (China); Lucio Claudio Andreani, Univ. degli Studi di Pavia (Italy); Emiliija Petronijevic, Concita Sibilia, Sapienza Univ. di Roma (Italy) . . . [11344-73]

Design and analysis of the polycrystalline silicon based metamaterial in the terahertz band, Xia Zhang, Communication Univ. of China (China); Dacheng Zhang, Institute of Micro-Nano Electronics, Peking Univ. (China) . . . [11344-74]

Tailoring metasurface reflection and absorption by interaction with a layered substrate, Yunus Denizhan Sirmaci, Institute of Applied Physics, Friedrich-Schiller-Univ. Jena (Germany) . . . [11344-75]

An analytical model for a chiral metasurface with gammadion-based unit cell in THz frequency range, Maxim S. Masyukov, Anna V. Vozianova, Kseniia V. Gubaidullina, Mikhail Urakov, Alexander Grebenchukov, Mikhail K. Khodzitsky, ITMO Univ. (Russian Federation) . . . [11344-76]

An optimization of numerical calculation of chiral metasurfaces using finite difference time domain method, Kseniia V. Gubaidullina, Anna V. Vozianova, Maxim S. Masyukov, Mikhail K. Khodzitsky, ITMO Univ. (Russian Federation) . . . [11344-77]

Design of optical metamaterials and metasurfaces using global optimization methods, Philipp-Immanuel Schneider, Martin Hammerschmidt, JCMwave GmbH (Germany); Phillip Manley, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany) and Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Christiane Becker, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Felix Binkowski, Remi Colom, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany); Sven Burger, Konrad-Zuse-Zentrum für Informationstechnik Berlin (Germany) and JCMwave GmbH (Germany) . . . [11344-78]

Enhanced second-harmonic generation from plasmon-plasmon coupling in bilayer nanoparticle films, Nathan Spear, Kent Hallman, Amanda Wistuba, Wenze Tan, Richard F. Haglund, Janet Macdonald, Vanderbilt Univ. (United States) . . . [11344-79]

HOT TOPICS III THU 9:00 TO 10:35

Photonics Europe 2020: Hot Topics Session III

- 9.00 - 9.05 **Introduction**
Thierry Georges, Oxxius, France
2019 Symposium Chair
- 9.05 - 9.50 **Ultrafast solid-state lasers: a success story for the last 30 years with no end in sight**
Ursula Keller, ETH Zurich, Switzerland
- 9:50 - 10:35 **From inverse design to implementation of practical quantum photonics**
Jelena Vuckovic, Stanford Univ., United States

For additional details see page 9

SESSION 11 THU 11:00 TO 13:00

2D Materials and Metamaterials

- Unusual optical response in graphene: anomalous optical saturation and nonperturbative nature (Invited Paper)**, Philippe Tassin, Chalmers Univ. of Technology (Sweden); Behrooz Semnani, Univ. of Waterloo (Canada) . . . [11344-49]
- Topological valley plasmon transport in graphene bi-layer metasurfaces: applications to sensing nanodevices**, Yupei Wang, Jian Wei You, Nicolae C. Panoiu, Univ. College London (United Kingdom) . . . [11344-50]
- Manipulating chiral valley photons via integrated metasurfaces (Invited Paper)**, Cheng-Wei Qiu, National Univ. of Singapore (Singapore) . . . [11344-51]
- Van der Waals hyperbolic-medium antennas and nanostructures**, Fatih F. Ince, Viktoriia E. Babicheva, The Univ. of New Mexico (United States) . . . [11344-52]
- Nonlinear polaritons in monolayer MoSe₂ coupled to optical bound states in the continuum**, Vasily Kravtsov, Ekaterina Khestanova, Fedor A. Benimetskiy, Anton K. Samusev, ITMO Univ. (Russian Federation); Maurice S. Skolnick, Dmitry N. Krizhanovskii, The Univ. of Sheffield (United Kingdom); Ivan I. Iorsh, ITMO Univ. (Russian Federation) . . . [11344-53]
- VO₂-hBN hyperbolic heterostructures for thermally tunable mid-infrared waveguiding, optical isolation and light trapping**, Hodjat Hajian, Amir Ghobadi, Bilkent Univ. (Turkey); Andriy Serebryannikov, Adam Mickiewicz Univ. (Poland); Bayram Bütün, Bilkent Univ. (Turkey); Guy Vandenbosch, KU Leuven (Belgium); Ekmel Özbay, Bilkent Univ. (Turkey) . . . [11344-54]

CONFERENCE 11345

Sunday–Thursday 29 March–2 April 2020 • Proceedings of SPIE Vol. 11345

Nanophotonics VIII

Conference Chairs: **David L. Andrews**, Univ. of East Anglia (United Kingdom); **Angus J. Bain**, Univ. College London (United Kingdom); **Martti Kauranen**, Tampere Univ. of Technology (Finland); **Jean-Michel Nunzi**, Queen's Univ. (Canada)

Programme Committee: **Antonio Ambrosio**, Harvard Univ. (United States); **Sophie Brasselet**, Institut Fresnel (France); **Michele Celebrano**, Politecnico di Milano (Italy); **Crina M. Cojocaru**, Univ. Politècnica de Catalunya (Spain); **Céline Fiorini-Debuisschert**, Commissariat à l'Énergie Atomique (France); **Vincent Ginis**, Vrije Univ. Brussel (Belgium); **Arseniy I. Kuznetsov**, A*STAR - Institute of Materials Research and Engineering (Singapore); **Christoph Lienau**, Carl von Ossietzky Univ. Oldenburg (Germany); **Raúl J. Martín-Palma**, Univ. Autónoma de Madrid (Spain); **Jesper Mork**, Technical Univ. of Denmark (Denmark); **Jean-Luc Pelouard**, Ctr. de Nanosciences et de Nanotechnologies (France); **Mohsen Rahmani**, The Australian National Univ. (Australia); **Monika Ritsch-Marte**, Medizinische Univ. Innsbruck (Austria); **Kalaichelvi Saravanamuttu**, McMaster Univ. (Canada); **Haim Suchowski**, 3DOptix (Israel); **Jun Wang**, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences (China); **Anatoly V. Zayats**, King's College London (United Kingdom)

SUNDAY 29 MARCH

SESSION 1..... SUN 13:00 TO 13:30

Welcome and Opening Presentation

Session Chair: **Angus J. Bain**, Univ. College London (United Kingdom)

Matrix Fourier optics and compact full-Stokes polarization imaging with metasurfaces (*Invited Paper*), Noah A. Rubin, Harvard John A. Paulson School of Engineering and Applied Sciences (United States); Gabriele D'Aversa, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Paul Chevalier, Harvard John A. Paulson School of Engineering and Applied Sciences (United States); Zhujun Shi, Harvard Univ. (United States); Wei Ting Chen, Federico Capasso, Harvard John A. Paulson School of Engineering and Applied Sciences (United States) [11345-1]

SESSION 2..... SUN 13:30 TO 15:30

Structured Light and Applications

Session Chair: **David L. Andrews**, Univ. of East Anglia (United Kingdom)

Generation of structured laser beams (*Invited Paper*), Andrew Forbes, Univ. of the Witwatersrand, Johannesburg (South Africa) [11345-2]

Customized optical singularity dynamics in tailored three-dimensional light fields, Ramon Runde, Eileen Otte, Eric Asché, Cornelia Denz, Westfälische Wilhelms-Univ. Münster (Germany) [11345-3]

Applications of semiconductor-based metasurfaces (*Invited Paper*), Patrice Genevet, Ctr. de recherche sur l'hétéroépitaxie et ses applications (France) [11345-4]

Polychromatic twisting operator, C. T. Samlan, Yoko Miyamoto, The Univ. of Electro-Communications (Japan); Etienne Brasselet, Univ. de Bordeaux (France) and CNRS (France) [11345-5]

Probing the backscattering of TiO₂ particles with vortex beams, Xavier Zambrana-Puyalto, Istituto Italiano di Tecnologia (Italy) [11345-6]

SESSION 3..... SUN 16:00 TO 18:20

Nanophotonics Structures

Session Chair: **Martti Kauranen**, Tampere Univ. (Finland)

Control of light at the atomic scale: fundamentals and applications (*Invited Paper*), F. Javier García de Abajo, ICFO - Institut de Ciències Fotòniques (Spain) [11345-7]

Dual periodic structures as photonic harmonic oscillators, Alagappan Gandhi, Ching Png Eng, Agency for Science, Technology and Research (A*STAR) (Singapore) [11345-8]

Simple and robust design of photonic crystal cavities and applications, Inès Ghorbel, Gabriel Marty, Thales Research & Technology (France) and Ctr. de Nanosciences et de Nanotechnologies (France); Sylvain Combré, Thales Research & Technology (France); Rémy Braive, Fabrice Raineri, Ctr. de Nanosciences et de Nanotechnologies (France) and Univ. Paris Diderot (France); Alfredo De Rossi, Thales Research & Technology (France) [11345-9]

Scattering engineering: form nature to applications (*Invited Paper*), Silvia Vignolini, Univ. of Cambridge (United Kingdom) [11345-10]

Photonic crystal optical switch using topological interface mode, Kwang-Wook Yoo, Ki Young Lee, Seok Ho Song, Hanyang Univ. (Korea, Republic of) [11345-11]

Self-assembled nanostructures for enhanced photocurrent generation, surface passivation and carrier transport in hole-selective solar cells, Mohammad Jobayer Hossain, CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States); Gregory Doerk, Ctr. for Functional Nanomaterials, Brookhaven National Lab. (United States); Kristopher O. Davis, CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States) [11345-12]

MONDAY 30 MARCH

HOT TOPICS I..... MON 9:00 TO 11:00

Photonics Europe 2020: Hot Topics Session I

9:00 - 9:20 **SPIE Welcome and Award Presentation**
John E. Greivenkamp, Univ. of Arizona, United States
SPIE President

Welcome

Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair

City of Strasbourg Welcome

9:25 - 9:30 **Introduction to Hot Topics**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair

9:30 - 10:15 **Naturally fast and low power electro-optic polymer optical devices are ideally positioned for the next-generation internet photonics roadmap**
Michael Lebby, CEO Lightwave Logic, United Kingdom

10:15 - 11:00 **3D printed micro-optics: state of the art and future challenges**
Harald Giessen, University of Stuttgart, Germany

For additional details see pages 6-7

SESSION 4..... MON 11:30 TO 12:30

Optical Manipulation

Session Chair: **David L. Andrews**, Univ. of East Anglia (United Kingdom)

Levitating particles with a plane wave above a plasmonic surface, Jack J. Kingsley-Smith, Michela F. Picardi, Francisco J. Rodriguez-Fortuño, King's College London (United Kingdom) [11345-13]

Subfemtonewton force fields measured with ergodic Brownian ensembles, Minghao Li, Oussama Sentissi, Azzini Stefano, Gabriel Schnoering, Institut de Science et d'Ingénierie Supramoléculaires (France); Antoine Canaguier-Durand, Lab. Kastler Brossel (France); Cyriaque Genet, Institut de Science et d'Ingénierie Supramoléculaires (France) [11345-14]

Laser detuning as a tool for optical catalysis, Kayn A. Forbes, David L. Andrews, Univ. of East Anglia (United Kingdom) [11345-15]

Lunch Break Mon 12:30 to 13:40

SESSION 5..... MON 13:40 TO 15:10

Topological Fields

Session Chair: **Andrew Forbes**, Univ. of the Witwatersrand, Johannesburg (South Africa)

Nano-optical Skyrmions: a new texture of light (*Invited Paper*), Guy Bartal, Technion-Israel Institute of Technology (Israel) [11345-16]

Dynamics and assembly of silica microspheres by tailored optical trapping potentials, Valeriia Bobkova, Jan Stegemann, Dominic Kampmann, Ramon Runde, Cornelia Denz, Westfälische Wilhelms-Univ. Münster (Germany) [11345-17]

Topological phases of polaritons in a cavity waveguide, Guillaume Weick, Univ. de Strasbourg (France) and CNRS (France) [11345-18]

Uncovering optical near-field spin angular momentum and spin-orbit interaction with an inherent spin-polarization relationship, Peng Shi, Aiping Yang, Fanfei Meng, Luping Du, Xiao-Cong Yuan, Shenzhen Univ. (China) [11345-19]

CONFERENCE 11345

SESSION 6..... MON 15:40 TO 18:00

Plasmonics I

Session Chair: **Benjamin J. Eggleton**, The Univ. of Sydney (Australia)

Tuning plasmon-induced reflectance and transmission with hybrid metasurfaces (*Invited Paper*), Humeysra Caglayan, Mohsin Habib, Tampere Univ. (Finland) [11345-20]

Plasmon mediated remote Raman scattering with advanced gold-based nanowires, Jean-Luc Duvaill, Institut des Matériaux Jean Rouxel, Univ. de Nantes (France) and CNRS (France); Daniel Funes-Hernando, Institut des Matériaux Jean Rouxel (France); Dominik Winterauer, Renishaw plc (United Kingdom); Mario Pelaez-Fernandez, Raul Arenal, Lab. de Microscopías Avanzadas, Instituto Universitario de Investigación en Nanociencia de Aragón (Spain); Bernard Humbert, Maxime Bayle, Jean-Yves Mevellec, Institut des Matériaux Jean Rouxel (France); Tim Batten, Renishaw plc (United Kingdom)..... [11345-21]

Engineering the emission statistics of plasmonic lasers, Dasuni N. Lelwala Gamacharige, Malin Premaratne, Monash Univ. (Australia) [11345-22]

Ultrafast nonlinear plasmonics (*Invited Paper*), Natalia Del Fatti, Univ. Claude Bernard Lyon 1 (France) [11345-23]

Metals and dielectrics for UV plasmonics, Fernando Moreno, Yael Gutiérrez, Francisco González, José M. Saiz, Rodrigo Alcaraz de la Osa, Pablo Albella, Dolores Ortiz, Univ. de Cantabria (Spain); Henry O. Everitt, U.S. Army Aviation and Missile Command (United States) [11345-24]

Surface plasmon polariton generation in a carbon nanotube on dielectric substrate, Aleksei Kadochkin, Sergey Moiseev, Ulyanovsk State Univ. (Russian Federation); Yuliya Dadoenkova, Ulyanovsk State Univ. (Russian Federation) and Lab. des Sciences et Techniques de l'Information, de la Communication et de la Connaissance, CNRS (France) and Ecole Nationale d'Ingénieurs de Brest (France); Igor Zolotovskii, Ulyanovsk State Univ. (Russian Federation)..... [11345-25]

TUESDAY 31 MARCH

SESSION 7..... TUE 8:30 TO 10:20

Plasmonics II

Session Chair: **Vincent Ginis**, Harvard Univ. (United States)

Plasmonics for solar fuels: fundamentals and devices (*Invited Paper*), Giulia Tagliabue, Ecole Polytechnique Fédérale de Lausanne (Switzerland)..... [11345-26]

Plasmonic resonances and spasing in metastructures and nanoantennas, Viktoriia E. Babicheva, The Univ. of New Mexico (United States)..... [11345-27]

Phase-resolved surface plasmon scattering probed by cathodoluminescence holography, Albert Polman, Nick Schilder, Harshal Agrawal, Erik Garnett, AMOLF (Netherlands) [11345-28]

Plasmon-assisted chemical changes in poly(methyl methacrylate), Kamonpan Chumpol, Niall McEvoy, Xia Zhang, Richard Hobbs, Ctr. for Research on Adaptive Nanostructures and Nanodevices, Trinity College Dublin (Ireland) [11345-29]

High-order surface plasmon resonance refractive index sensor based on photonic crystal fiber, Zhenkai Fan, Hebei Univ. of Science and Technology (China)..... [11345-30]

SESSION 8..... TUE 10:50 TO 12:40

Plasmonics and Nanoantennas

Session Chair: **Martti Kauranen**, Tampere Univ. (Finland)

Single molecule super-resolved microscopy for LDOS mapping: beyond the plasmonic mirage effect (*Invited Paper*), Valentina Krachmalnicoff, Guillaume Blanquer, Bart Van Dam, Institut Langevin Ondes et Images (France); Angelo Gulinatti, Giulia Acconcia, Politecnico di Milano (Italy); Yannick De Wilde, Ignacio Izeddin, Institut Langevin Ondes et Images (France) [11345-31]

One source to route them all, Michela F. Picardi, Anatoly V. Zayats, Francisco J. Rodríguez-Fortuño, King's College London (United Kingdom)..... [11345-32]

Hybrid Yagi-Uda nanoantennas for directional and narrow band infrared thermal radiation, Marco Centini, Maria Cristina Larciprete, Roberto Li Voti, Mario Bertolotti, Concita Sibilia, Sapienza Univ. di Roma (Italy); Mauro Antezza, Lab. Charles Coulomb, Univ. de Montpellier (France) and Institut Univ. de France (France) and CNRS (France) [11345-33]

Evanescence and propagating fields of a strongly focused beam in the near-field and far-field regions, Nikolai I. Petrov, Scientific and Technological Ctr. of Unique Instrumentation (Russian Federation) [11345-34]

Study of absorption and emission dipoles of upconverting nanoparticles optically trapped at the absorption resonance, Amrendra Kumar, Bhavesh Kharbada, Gunaseelan M., Basudev Roy, Indian Institute of Technology Madras (India) [11345-35]

Lunch/Exhibition Break Tue 12:40 to 13:50

SESSION 9..... TUE 13:50 TO 15:50

Novel Synthetic Methods

Session Chair: **Jean-Michel Nunzi**, Queen's Univ. (Canada)

Bacterially synthesized tellurium nanostructures for broadband ultrafast nonlinear optical applications, Jun Wang, Shanghai Institute of Optics and Fine Mechanics (China) [11345-36]

Novel supra-molecular arrangements with plasmonic functionalities for Fipronil pesticide detection, Massimo Rippha, Riccardo Castagna, Istituto di Scienze Applicate e Sistemi Intelligenti "Eduardo Caianiello", Consiglio Nazionale delle Ricerche (Italy); Radoslaw Kolkowski, Ctr. for Nanophotonics, AMOLF (Netherlands); Joseph Zyss, Institut d'Alembert, École normale supérieure Paris-Saclay (France); Jun Zhou, Institute of Photonics, Ningbo Univ. (China); Lucia Petti, Istituto di Scienze Applicate e Sistemi Intelligenti "Eduardo Caianiello", Consiglio Nazionale delle Ricerche (Italy) [11345-37]

Gallium polymorphs: from atmospheric to high pressure, Yael Gutiérrez, Univ. de Cantabria (Spain); Maria Losurdo, Istituto di Nanotecnologia, Consiglio Nazionale delle Ricerche (Italy); Pablo García-Fernández, Francisco González, Univ. de Cantabria (Spain); April S. Brown, Duke Univ. (United States); Henry O. Everitt, U.S. Army Aviation and Missile Command (United States); Javier Junquera, Fernando Moreno, Univ. de Cantabria (Spain) [11345-38]

Core-shell magneto-luminescent nanocomposites, Anna A. Matiushkina, Aliaksei Dubavik, Anna O. Orlova, ITMO Univ. (Russian Federation) [11345-39]

Revealing the modal structure of gold-silicon hybrid nanopillars with cathodoluminescence imaging spectroscopy, Cillian McPolin, King's College London (United Kingdom); Yago N. Vila, King's College London (United Kingdom) and Univ. Politècnica de Catalunya (Spain); Alexey V. Krasavin, King's College London (United Kingdom); Jordi Llorca, Univ. Politècnica de Catalunya (Spain); Anatoly V. Zayats, King's College London (United Kingdom) [11345-40]

Room-temperature lasing action from all-dielectric metasurface near bound states in the continuum, Shaimaa I. Azzam, Vladimir M. Shalaev, Alexandra Boltasseva, Alexander V. Kildishev, Krishnakali Chaudhuri, Alexei Lagutchev, Young Kim, Purdue Univ. (United States) [11345-41]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair

16:35 to 17:20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States

17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

WEDNESDAY 1 APRIL

SESSION 10 WED 8:30 TO 10:20

Sensing

Session Chair: **Arseniy I. Kuznetsov**,
A*STAR - Data Storage Institute (Singapore)

- A renaissance in Brillouin scattering** (*Invited Paper*), Benjamin J. Eggleton, The Univ. of Sydney (Australia) [11345-42]
- Semiconductor-based nanostructures for spectral filtering**, Clément Maës, ONERA (France) and Univ. de Montpellier (France) . [11345-43]
- Observation of photonic skyrmion in a confined electromagnetic field with orbital angular momentum**, Aiping Yang, Peng Shi, Fanfei Meng, Luping Du, Xiao-Cong Yuan, Shenzhen Univ. (China) [11345-44]
- Hybrid-plasmonic waveguides for SERS in remote mode**, Nebras Al-Attar, Univ. College Dublin (Ireland)..... [11345-45]
- Upmost efficiency, few-micron thick infrared HgCdTe photodetectors**, Mark Auslender, Roy Avrahamy, Ben-Gurion Univ. of the Negev (Israel); Moshe Zohar, Sami Shamoon College of Engineering (Israel); Benjamin Milgrom, Jerusalem College of Technology (Israel); Shlomo Hava, Raphael Shikler, Ben-Gurion Univ. of the Negev (Israel) [11345-46]

SESSION 11 WED 10:50 TO 12:30

Photoinduced Effects

Session Chair: **Raúl J. J. Martín-Palma**,
Univ. Autónoma de Madrid (Spain)

- Exciton energy propagation between self-assembled nanoplatelets**, Jiawen Liu, Sorbonne Univ. (France); Lilian Guillemeney, Ecole Normale Supérieure de Lyon (France); Arnaud Choux, Agnès Maître, Sorbonne Univ. (France); Benjamin Abécassis, Ecole Normale Supérieure de Lyon (France); Laurent Coolen, Sorbonne Univ. (France)..... [11345-47]
- Analysis of Förster resonance energy transfer (FRET) in the vicinity of a charged metallic nanosphere via nonlocal optical response method**, Champi Asoka Abeywickrama, Malin Premaratne, Monash Univ. (Australia); David L. Andrews, Univ. of East Anglia (United Kingdom) [11345-48]
- Spontaneous emission of an atomic dipole near a mirror-coated dielectric medium**, Benjamin Dawson, Nicholas Furtak-Wells, Thomas Mann, Gin Jose, Almut Beige, Univ. of Leeds (United Kingdom)..... [11345-49]
- Long-range coupling of individual quantum dots with plasmonic nanoparticles in a thin-film hybrid material**, Daria Dyagileva, Victor A. Krivenkov, Pavel S. Samokhvalov, National Research Nuclear Univ. MEPhI (Russian Federation); Igor Nabiev, National Research Nuclear Univ. MEPhI (Russian Federation) and Lab. de Recherche en Nanosciences, Univ. de Reims Champagne-Ardenne (France); Yury Rakovich, National Research Nuclear Univ. MEPhI (Russian Federation) and Ctr. de Fisica de Materiales, Univ. del País Vasco, Consejo Superior de Investigaciones Científicas (Spain) and IKERBASQUE, Basque Foundation for Science (Spain)..... [11345-50]
- Photoinduced change in SPIONS/CdSe/ZnS nanocomposites optical properties**, Ivan A. Reznik, Anna A. Matiushkina, Yulia Timkina, Aliaksei Dubavik, Anna O. Orlova, ITMO Univ. (Russian Federation)..... [11345-51]
- Lunch/Exhibition Break Wed 12:30 to 13:45

SESSION 12 WED 13:45 TO 15:45

Nanophotonics and Metamaterials

Session Chair: **Anatoly V. Zayats**,
King's College London (United Kingdom)

Joint Session between Metamaterials Conference (11344) and Nanophotonics Conference (11345)

- Metaphotonics with Mie-resonant nanostructures** (*Invited Paper*), Yuri S. Kivshar, The Australian National Univ. (Australia) [11344-40]
- Plasmonic nanoparticles in biological cells** (*Invited Paper*), Lene Broeng Oddershede, Novo Nordisk Foundation (Denmark) [11345-52]
- Quadratic nanomaterials for nonlinear active metasurfaces** (*Invited Paper*), Rachel Grange, ETH Zurich (Switzerland) [11344-41]
- Advances in THz generation by nonlinear metasurfaces** (*Invited Paper*), Tal Ellenbogen, Tel Aviv Univ. (Israel)..... [11344-42]

SESSION 13 WED 16:10 TO 17:40

Photonic Sources

Session Chair: **Rachel Grange**, ETH Zurich (Switzerland)

- Robust perovskite-based nanolasers and white LEDs** (*Invited Paper*), Juan Du, Yuxin Leng, Shanghai Institute of Optics and Fine Mechanics (China)..... [11345-53]
- Random lasing action from solution-processed organometal halide perovskites with plasmonic nanoparticles**, Tsung Sheng Kao, National Chiao Tung Univ. (Taiwan) [11345-54]
- Nanowire single-photon sources: mechanics matters**, Saptarshi Kotal, Alberto Artioli, CEA-Grenoble (France); Niels Gregersen, Technical Univ. of Denmark (Denmark); Pierre Verlot, The Univ. of Nottingham (United Kingdom); Jean-Michel Gérard, Julien Claudon, CEA-Grenoble (France)..... [11345-55]
- Mid-infrared radiation source for spectroscopic applications based on multiwalled carbon nanotubes on top of silicon**, Ahmed Saeed, Electronics Research Institute (Egypt); Yasser M. Sabry, Ain Shams Univ. (Egypt) and Si-Ware Systems (Egypt); Ahmed A. Elsayed, Ain Shams Univ. (Egypt); Frédéric Marty, Elyes Nefzaoui, Tarik Bourouina, ESIEE Paris (France); Heba A. Shawkey, Electronics Research Institute (Egypt); Diaa Khalil, Ain Shams Univ. (Egypt) and Si-Ware Systems (Egypt) [11345-56]

POSTERS-WEDNESDAY WED 18:00 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Wednesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

- SERS spectroscopy and quantum-chemical calculations of stilbene amino derivatives in conditions of adsorption on silver nanoparticles**, Aleksei Smirnov, Olga V. Odintsova, Elena V. Solovyeva, Saint Petersburg State Univ. (Russian Federation) [11345-70]
- Enhanced spontaneous emission in Anderson localized cavities**, Belkis Gökbulut, Naci Inci, Bogaziçi Univ. (Turkey)..... [11345-71]
- Generalized Brewster effect in aluminum-doped ZnO nanopillars**, Sharmistha Chatterjee, Univ. della Calabria (Italy); Osamu Takayama, Andrei V. Lavrinenko, Technical Univ. of Denmark (Denmark); Michael Hinczewski, Giuseppe Strangi, Case Western Reserve Univ. (United States)..... [11345-72]
- Numerical study on the symmetry breaking for the stimulated Brillouin scattering in a rutile nanowire**, Xiao-Xing Su, Beijing Jiaotong Univ. (China)..... [11345-73]
- Fano phase and its realization through geometric phase of polarized light in a plasmonic crystal**, Ankit Kumar Singh, Subir Ray, Shubham Chandel, Nirmalya Ghosh, Partha Mitra, Indian Institute of Science Education and Research Kolkata (India)..... [11345-74]
- Diamond gratings for dielectric laser acceleration**, Pontus Forsberg, Mikael Karlsson, Mathias Hamberg, Uppsala Univ. (Sweden) [11345-75]
- Targeted genome editing in potato protoplast via optical delivery of CRISPR/Cas9 ribonucleoproteins**, Anke Londenberger, Frederik-Matti Bartels, Laser Zentrum Hannover e.V. (Germany); Joseph Kkakpo Quaye, Jens Boch, Institut für Pflanzengenetik, Leibniz Univ. Hannover (Germany); Tammo Ripken, Dag Heinemann, Laser Zentrum Hannover e.V. (Germany)..... [11345-76]
- Flat band transitions in PT symmetric photonic lattices**, Gun Pyo Kim, Min Jeong Kim, Youngsun Choi, Seok-Ho Song, Hanyang Univ. (Korea, Republic of) [11345-77]
- Near-infrared optical sensor based on silicon on insulator subwavelength grating structure**, Mohamed M. Badr, Aya F. Amer, Mohamed A. Swillam, The American Univ. in Cairo (Egypt) [11345-78]
- Plasmon-mediated interactions between fluorescent emitters: from weak to strong coupling regime**, Camilo R. Pérez, Institut Langevin Ondes et Images (France); Joël Bellessa, Clementine Symonds, Institut Lumière Matière (France); Dorian Bouchet, Utrecht Univ. (Netherlands); Rémi Carminati, Yannick De Wilde, Valentina Krachmalnicoff, Institut Langevin Ondes et Images (France) [11345-79]
- Electromagnetism at finite temperature: a density operator approach**, Daigo Oue, Imperial College London (United Kingdom)..... [11345-80]
- Performance comparison of tin-based group IV SQWIP and MQWIP in dark conditions**, Prakash Pareek, Vaagdevi Engineering College (India); Ravi Ranjan, Darbhanga College of Engineering (India); Saurabh Kumar Pandey, Indian Institute of Technology Patna (India); Jitendra Kumar Mishra, Indian Institute of Information Technology, Ranchi (India); Ajay Kumar Kushwaha, Government Engineering College, Raipur (India)..... [11345-81]

CONFERENCE 11345

Optical parameters of coupled vertical cylindrical quantum dots with double modified Pöschl-Teller potential in terahertz range, Mher Mkrtchyan, David Hayrapetyan, Russian-Armenian Univ. (Armenia); Hayk Sarkisyan, Russian-Armenian Univ. (Armenia) and Yerevan State Univ. (Armenia) [11345-82]

Sensing solutions for SERS applications using gold nanoparticle modified quartz surfaces, Karina Matveeva, Iliia Samusev, Immanuel Kant Baltic Federal Univ. (Russian Federation) [11345-83]

Numerical analysis of radiation coupling of leaky mode, Min Jeong Kim, Gun Pyo Kim, Ki Young Lee, Seok Ho Song, Hanyang Univ. (Korea, Republic of) [11345-84]

Experimentally tunable nanoparticle facet for a highly efficient plasmonic nanocavity device, Vasanthan Devaraj, Jong-Min Lee, Pusan National Univ. (Korea, Republic of); Samir Adhikari, Chungnam National Univ. (Korea, Republic of); Won-Geun Kim, Pusan National Univ. (Korea, Republic of); Minjun Kim, Donghan Lee, Chungnam National Univ. (Korea, Republic of); Jin-Woo Oh, Pusan National Univ. (Korea, Republic of) [11345-85]

Multifunctional, flexible and free-standing SERS-active AgNW filter foils, Özge Demirtas, Middle East Technical Univ. (Turkey); Ozan Akdemir, Univ. of Twente (Netherlands); Sahin Coskun, Eskisehir Osmangazi Univ. (Turkey); Hüsnü Emrah Ünalın, Alpan Bek, Middle East Technical Univ. (Turkey) [11345-86]

Plasmonic-assisted photo-catalysis: nothing more than a classical thermal effect, Ieng-Wai Un, Yonatan Dubi, Yonatan Sivan, Ben-Gurion Univ. of the Negev (Israel) [11345-87]

Impact of built-in polarization field on the structural design of AlGaIn deep-ultraviolet light-emitting diodes, Yen-Kuang Kuo, Jih-Yuan Chang, National Changhua Univ. of Education (Taiwan) [11345-88]

New method of SERS-active gold surfaces fabrication for bacterial cells Raman analysis, Andrey Y. Zyubin, Igor Kon, Dmitry Kalinnikov, Iliia Samusev, Karina Matveeva, Immanuel Kant Baltic Federal Univ. (Russian Federation) [11345-89]

Dielectric nanocavity for the emission control of a single-photon source, Vitaly Yaroshenko, Olga Sergaeva, Ilya Volkov, Dmitry Zuev, Roman Savelev, ITMO Univ. (Russian Federation) [11345-90]

Investigation of GeSn/SiGeSn nanostructured layer for sensors in midinfrared application, Ravi Ranjan, Darbhanga College of Engineering (India); Prakash Pareek, Vaagdevi Engineering College (India); Jitendra Kumar Mishra, Indian Institute of Information Technology, Ranchi (India); Sanjay Kumar, Darbhanga College of Engineering (India) [11345-91]

FTDT numerical calculations of local plasmonic fields for multilayer gold nanoparticles-agents for theranostics, Andrey Y. Zyubin, Igor Kon, Karina Matveeva, Iliia Samusev, Immanuel Kant Baltic Federal Univ. (Russian Federation) [11345-92]

Photoluminescence properties of carbon dots explained by partially hybridized atomic domains, Nikita V. Tepliakov, ITMO Univ. (Russian Federation) and Ecole Polytechnique Fédérale de Lausanne (Switzerland); Evgeny V. Kundelev, Pavel D. Khavlyuk, ITMO Univ. (Russian Federation); Yuan Xiong, City Univ. of Hong Kong (Hong Kong, China); Mikhail Yu. Leonov, ITMO Univ. (Russian Federation); Weiren Zhu, Shanghai Jiao Tong Univ. (China); Alexander V. Baranov, Anatoly V. Fedorov, ITMO Univ. (Russian Federation); Andrey L. Rogach, City Univ. of Hong Kong (Hong Kong, China); Ivan D. Rukhlenko, The Univ. of Sydney (Australia) [11345-93]

Polarization-independent SERS substrates for trace detection of chemical and biological molecules, Yashna Sharma, Delhi Technological Univ. (India); Anuj Dhawan, Indian Institute of Technology Delhi (India) [11345-94]

Photocatalytic titanium dioxide nanostructures based on thermal annealed precursor layers, Anastasiia Lazareva, Anna O. Orlova, Ekaterina Kolesova, ITMO Univ. (Russian Federation) [11345-95]

Optical properties of hybrid film depending on overlap of the nanoparticle plasmon resonance and J-aggregate band of cyanine dye, Rezida Nabiullina, Anton Starovoytov, Igor Gladskikh, ITMO Univ. (Russian Federation) [11345-96]

Laser fabrication of hybrid nanostructures with nonlinear response, Ekaterina Grachkova, Vitaly Yaroshenko, Artem Larin, Eduard Ageev, Dmitry Zuev, ITMO Univ. (Russian Federation) [11345-97]

Nature as an inspiration for sustainable white materials, Gianni Jacucci, Lukas Schertel, Silvia Vignolini, Univ. of Cambridge (United Kingdom) [11345-98]

Improved optical fiber tweezers using 3D printed Fresnel lenses, Asa Asadollahbaik, Simon Thiele, Ksenia Weber, Univ. Stuttgart (Germany); Aashutosh Kumar, Institut NÉEL (France); Johannes Drozella, Florian Sterl, Alois A. Herkommer, Harald Giessen, Univ. Stuttgart (Germany); Jochen Fick, Institut NÉEL (France) [11345-99]

Photoluminescence enhancement of YAG:Ce coatings coupled to arrays of colloidal Ag nanocubes, Mohammad Khaywah, Antoine Moreau, Audrey Potdevin, François Reveret, Rachid Mahiou, Genevieve Chadeyron, Emmanuel Centeno, Univ. Clermont Auvergne (France); Youcef Ouerdane, Univ. Jean Monnet Saint-Etienne (France) [11345-100]

Directional control of quantum emission by a novel plasmonic metasurface, Zeinab Eftekhari, Hodjat Hajian, Neval Yilmaz, Ekmel Ozbay, Bilkent Univ. (Turkey) [11345-101]

Ultracompact polarization splitter in the visible range, Mohamed M. Badr, Mohamed M. El-Rayany, Mohamed A. Swillam, The American Univ. in Cairo (Egypt) [11345-102]

High-efficiency optical limiter in the near-infrared based on a phase-changing metasurface, Austin Howes, Zhihua Zhu, Richard F. Haglund, Jason Valentine, Vanderbilt Univ. (United States) [11345-103]

Direction and polarization resolved spectroscopic investigation of optically trapped europium-doped nanorods, Aashutosh Kumar, Institut NÉEL, Univ. Grenoble Alpes (France) and CNRS (France); Jeongmo Kim, Univ. Paris-Saclay (France) and Lab. de physique de la matière condensée, Ecole Polytechnique, CNRS (France); Sile Nic Chormaic, Okinawa Institute of Science and Technology Graduate Univ. (Japan) and Institut NÉEL, Univ. Grenoble Alpes (France) and CNRS (France); Jongwook Kim, Thierry Gacoin, Univ. Paris-Saclay (France); Jochen Fick, Univ. Grenoble Alpes (France) [11345-104]

Investigation of InAs quantum dots grown on the Ge substrate without migration enhanced epitaxy layer, Ravinder Kumar, Debi Prasad Panda, Jhuma Saha, Suryansh Dongre, Sanowar A. Gazi, Subhananda Chakrabarti, Indian Institute of Technology Bombay (India) [11345-105]

Influence of InGaAs matrix thickness on the optical properties and strain distribution in self-assembled sub-monolayer InAs quantum dot heterostructures, Saranya Ramasamy, Ravindra Kumar, Sanowar A. Gazi, Jhuma Saha, Debi Prasad Panda, Arjun Mandal, Subhananda Chakrabarti, Indian Institute of Technology Bombay (India) [11345-106]

Study on optical properties and strain distribution of InAs/InGaAs sub-monolayer quantum dot heterostructure with multiple stacking layers, Saranya Ramasamy, Ravindra Kumar, Sanowar A. Gazi, Jhuma Saha, Debi Prasad Panda, Arjun Mandal, Subhananda Chakrabarti, Indian Institute of Technology Bombay (India) [11345-107]

Effect of varying facet angle on the strain and energy band profile of InAs QD heterostructures, Ravindra Kumar, Jhuma Saha, Subhananda Chakrabarti, Indian Institute of Technology Bombay (India) [11345-108]

A comparative analysis of analog and digital alloy technique of In_xGa_{1-x}As capping material on InAs quantum dot heterostructures, Ravindra Kumar, Jhuma Saha, Subhananda Chakrabarti, Indian Institute of Technology Bombay (India) [11345-109]

Comparison of ZnO nanoparticles with different dopants as an electron-transport layer in quantum dot light-emitting diodes, Mariya A. Zvaigzne, National Research Nuclear Univ. MEPhI (Russian Federation); Alexei E. Aleksandrov, Dmitriy A. Lypenko, A. N. Frumkin Institute of Physical Chemistry and Electrochemistry (Russian Federation); Igor Nabiev, Univ. de Reims Champagne-Ardenne (France); Pavel S. Samokhvalov, National Research Nuclear Univ. MEPhI (Russian Federation) [11345-110]

THURSDAY 2 APRIL

HOT TOPICS III THU 9:00 TO 10:35

Photonics Europe 2020: Hot Topics Session III

- | | |
|--------------|---|
| 9.00 - 9.05 | Introduction
Thierry Georges , Oxxius, France
2019 Symposium Chair |
| 9.05 - 9.50 | Ultrafast solid-state lasers: a success story for the last 30 years with no end in sight
Ursula Keller , ETH Zurich, Switzerland |
| 9:50 - 10:35 | From inverse design to implementation of practical quantum photonics
Jelena Vuckovic , Stanford Univ., United States |

For additional details see page 9

SESSION 14..... THU 11:00 TO 12:30

Guided Modes and Cavities

Session Chair: **Christoph Lienau**,
Carl von Ossietzky Univ. Oldenburg (Germany)

Microcavity-enhanced surface nonlinear optics (*Invited Paper*), Yun-Feng Xiao, Peking Univ. (China) [11345-57]

Silicon nitride based guided-mode resonance structures for enhancement of nonlinear optical effects, Sruti Menon, Asish Prosad, Rabindra Biswas, Varun Raghunathan, Indian Institute of Science, Bengaluru (India). [11345-58]

Four-port integrated waveguide coupler exploiting bidirectional propagation of two single-mode waveguides, Mathias J. Weisen, James C. Gates, Corin B. E. Gawith, Peter G. R. Smith, Peter Horak, Optoelectronics Research Ctr. (United Kingdom). [11345-59]

Analysis of multipolar contributions to eigenmodes in resonators of various shapes, Sergey Gladyshev, Kristina Frizyuk, Andrey Bogdanov, ITMO Univ. (Russian Federation) [11345-60]

SESSION 15..... THU 13:40 TO 15:10

Time Resolved Dynamics

Session Chair: **Angus J. Bain**, Univ. College London (United Kingdom)

Coherent carrier and exciton transport in organic semiconductors (*Invited Paper*), Irene Burghardt, Goethe-Univ. Frankfurt am Main (Germany) [11345-61]

Polarised two-photon absorption and heterogeneous fluorescence dynamics in biomolecules, Angus J. Bain, Thomas S. Blacker, Michael Duchon, Univ. College London (United Kingdom). [11345-62]

Control and evaluation of the interaction between organic emitters and localized surface plasmon of periodic metallic nanoparticles, Sarah Hamdad, Amadou Thierno Diallo, Mahmoud Chakaroun, Azzedine Boudrioua, Univ. Paris 13 (France) [11345-63]

Synthesis and down-conversion luminescence studies of CaF₂, SrF₂, Ba₄Y₃F₁₇, GdF₃, YF₃, NaYF₄ doped Yb or Pr/Ce/Eu ions as a potential application for silicon solar cells, Sergey Kuznetsov, A. M. Prokhorov General Physics Institute (Russian Federation); Alexey Nizamutdinov, Eduard Madirov, Kazan Federal Univ. (Russian Federation); Vasili Konyushkin, Andrey Nakladov, Vera Proydakova, Maria Mayakova, Valerii Voronov, A. M. Prokhorov General Physics Institute (Russian Federation); Amir Khadiev, Vadim Semashko, Kazan Federal Univ. (Russian Federation); Pavel Fedorov, "A. M. Prokhorov General Physics Institute (Russian Federation) . . . [11345-64]

SESSION 16..... THU 15:40 TO 17:30

Nonlinear Interactions

Session Chair: **Jean-Michel Nunzi**, Queen's Univ. (Canada)

Integrated nonlinear silicon photonics with metallic nanofocusing elements (*Invited Paper*), Nicholas A. Gusken, Imperial College London (United Kingdom); Michael P. Nielsen, The Univ. of New South Wales (Australia); Xingyuan Shi, Paul Dichtl, Imperial College London (United Kingdom); Stefan A. Maier, Ludwig-Maximilians-Univ. München (Germany); Rupert F. Oulton, Imperial College London (United Kingdom) [11345-65]

Second harmonic generation from an ITO nanolayer: experiment versus theory, Laura Rodriguez Sune, Univ. Politècnica de Catalunya (Spain); Michael Scalora, Charles M. Bowden Research Ctr., U.S. Army Combat Capabilities Development Command Aviation & Missile Ctr. (United States); Allan Johnson, ICFO - Institut de Ciències Fotòniques (Spain); Crina Cojocaru, Univ. Politècnica de Catalunya (Spain); Neset Akozbek, Zachary Coppens, The AEGIS Technologies Group, Inc. (United States); Daniel Perez, Simon Wall, ICFO - Institut de Ciències Fotòniques (Spain); Jose Trull, Univ. Politècnica de Catalunya (Spain) [11345-66]

Absolute two-photon absorption cross-sections of single-exciton states in semiconductor nanocrystals, Victor A. Krivenkov, Pavel S. Samokhvalov, Daria V. Dyagileva, National Research Nuclear Univ. MEPhI (Russian Federation); Igor Nabiev, National Research Nuclear Univ. MEPhI (Russian Federation) and Lab. de Recherche en Nanosciences, Univ. de Reims Champagne-Ardenne (France). [11345-67]

Three-dimensional phase-matched nonlinear plasmonic metamaterials, Timo Stolt, Tampere Univ. (Finland); Jeonghyun Kim, Pohang Univ. of Science and Technology (Korea, Republic of); Sébastien Héron, Univ. Côte d'Azur (France); Anna Vesala, Mikko J. Huttunen, Tampere Univ. (Finland); Robert Czaplicki, Nicolaus Copernicus Univ. (Poland); Xiaorun Zang, Martti Kauranen, Tampere Univ. (Finland); Junsuk Rho, Pohang Univ. of Science and Technology (Korea, Republic of); Patrice Genevet, Univ. Côte d'Azur (France) [11345-68]

Thermo-optical nonlinearity of metallic nanoparticle(s), Ieng-Wai Un, Yonatan Sivan, Ben-Gurion Univ. of the Negev (Israel). [11345-69]

Advances in Ultrafast Condensed Phase Physics II

Conference Chairs: **Stefan Haacke**, Institut de physique et chimie des matériaux de Strasbourg (France); **Sangeeta Sharma**, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); **Vladislav Yakovlev**, Max-Planck-Institut für Quantenoptik (Germany)

Programme Committee: **Joachim Burgdörfer**, Vienna Univ. of Technology (Austria); **Giulio N. Cerullo**, Politecnico di Milano (Italy); **F. Javier García de Abajo**, ICFO - Institut de Ciències Fotòniques (Spain); **Peter Hommelhoff**, Friedrich-Alexander-Universität Erlangen-Nürnberg (Germany); **Misha Ivanov**, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); **Maciej Lorenc**, CNRS-Rennes (France); **Hamed Merdji**, CEA-Saclay (France); **Doris E. Reiter**, Westfälische Wilhelms-Universität Münster (Germany); **Martin Schultze**, Technische Universität Graz (Austria); **Nicolas Tancogne-Dejean**, Max Planck Institute for the Structure and Dynamics of Matter (Germany)

TUESDAY 31 MARCH

SESSION 1 TUE 8:30 TO 10:20

Novel Experimental and Theoretical Tools

Session Chair: **Shunsuke A. Sato**, Max-Planck-Institut für Struktur und Dynamik der Materie (Germany)

Transient attosecond soft-X-ray spectroscopy in layered semi-metals (*Invited Paper*), Themistoklis P. H. Sidiropoulos, Nicola Di Palo, Daniel Rivas, ICFO - Institut de Ciències Fotòniques (Spain); Stefano Severino, Univ. degli Studi di Napoli Federico II (Italy); Maurizio Reduzzi, Barbara Buades, ICFO - Institut de Ciències Fotòniques (Spain); Iker Leon, ICFO - Institut de Ciències Fotòniques (Spain); Seth L. Cousin, KMLabs (United States); Michael Hemmer, ICFO - Institut de Ciències Fotòniques (Spain); Craig Cocchi, Humboldt-Universität Berlin (Germany); Eric J. Pellegrin, CELLS - ALBA (Spain); J. Herrero Martin, ALBA Synchrotron (Spain); S. Mañas-Valero, Instituto de Ciencia Molecular (Spain); Eduardo A. Coronado, Univ. Nacional de Córdoba (Argentina); Tessa Danz, Sentech Sensor Technology BV (Netherlands); Claudia Draxl, Humboldt-Universität zu Berlin (Germany); Mitsuharu Uemoto, Kazuhiro Yabana, Univ. of Tsukuba (Japan); Martin Schultze, Technische Universität Graz (Austria); Simon Wall, A. Picon, Jens Biegert, ICFO - Institut de Ciències Fotòniques (Spain)[11346-1]

Stark control of electrons at interfaces (*Invited Paper*), Ignacio Franco, Univ. of Rochester (United States) [11346-2]

Subsystem- and material-resolved view of nonequilibrium states in nanostructured metal/2D semiconductor heterostructures, Tommaso Pincelli, Thomas Vasileiadis, Shuo Dong, Daniela Zahn, Samuel Beaulieu, Hélène Seiler, Maciej Dendzik, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany); Ying-Peng Qi, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany) and East China Normal Univ. (China); Sang-Eun Lee, William Y. Windsor, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany); Patrick R. Xian, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany) and Northwestern Univ. (United States); Julian Maklar, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany); Emerson Coy, NanoBioMedical Ctr., Adam Mickiewicz Univ. (Poland); Niclas S. Müller, Yu Okamura, Stephanie Reich, Freie Universität Berlin (Germany); Martin Wolf, Laurenz Rettig, Ralph Ernster, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany) [11346-3]

Electronic, magnetic and phononic excitations as competing drivers of lattice motion: ultrafast x-ray diffraction experiments, Matias Bargheer, Univ. Potsdam (Germany) [11346-4]

SESSION 2 TUE 10:50 TO 13:00

Magnetism and Phase Transitions

Session Chair: **Christoph Lange**, Univ. Regensburg (Germany)

Ultrafast spintronics (*Invited Paper*), Yves Acremann, Kevin Bühlman, Rafael Gort, Andreas Vaterlaus, ETH Zurich (Switzerland) [11346-5]

Time-resolved magneto-optics across the Verwey transition (*Invited Paper*), Valérie Halté, Jayash Panigrahi, Erwan Terrier, Institut de Physique et de Chimie des Matériaux de Strasbourg (France) [11346-6]

Lightwave-induced manipulation of magnetic momenta, Florian Siegrist, Julia Gessner, Marcus Osslander, Yang Cui, Max-Planck-Institut für Quantenoptik (Germany); Alexander Guggenmos, Ulf Kleineberg, Ludwig-Maximilians-Universität München (Germany); Jakob Walowski, Christian Denker, Ulrike Martens, Markus Münzenberg, Ernst Moritz Arndt Universität Greifswald (Germany); J. Kay Dewhurst, Max-Planck-Institut für Mikrostrukturphysik (Germany); Sangeeta Sharma, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Martin Schultze, Technische Universität Graz (Austria) [11346-7]

Predicting ultrafast spin dynamics with TDDFT, Peter Elliott, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); J. Kay Dewhurst, Max-Planck-Institut für Mikrostrukturphysik (Germany); E.K.U. Gross, Fritz Haber Ctr. for Molecular Dynamics, The Hebrew Univ. of Jerusalem (Israel); Sangeeta Sharma, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [11346-8]

Optically induced spin-transfer probed by energy and spin-resolved transient absorption spectroscopy, Felix Willems, Clemens von Korff Schmising, Christian Strüber, Daniel Schick, W. Dieter Engel, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); J. Kay Dewhurst, Max-Planck-Institut für Mikrostrukturphysik (Germany); Peter Elliott, Sangeeta Sharma, Stefan Eisebitt, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany) [11346-9]
Lunch/Exhibition Break Tue 13:00 to 14:10

SESSION 3 TUE 14:10 TO 16:00

Strongly Correlated Materials

Session Chair: **Valérie Halté**, Institut de Physique et de Chimie des Matériaux de Strasbourg (France)

Photodoping the antiferromagnetic Mott insulator La₂CuO₄ (*Invited Paper*), A. R. Pokharel, Johannes Gutenberg Universität Mainz (Germany); M. Beyer, Manuel Obergfell, Univ. Konstanz (Germany); Steinn Ymir Agustsson, Max-Planck-Institut für Festkörperforschung (Germany); T. Dong, Johannes Gutenberg Universität Mainz (Germany); Gennady Logvenov, Ivan Božovic, Brookhaven National Lab. (United States); Z. Lenar, Jožef Stefan Institute (Slovenia); Peter Prelovsek, Univ. of Ljubljana (Slovenia); Jure Demsar, Johannes Gutenberg Universität Mainz (Germany) [11346-10]

Ultrafast generation and decay of a surface metal (*Invited Paper*), Lukas Gierster, Sessa Vempati, Julia Stähler, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany) [11346-11]

Ultrafast electron dynamics in strontium iridate, Jonathan Caillaux, Lab. de Physique des Solides (France); David Bresteau, Thierry Ruchon, Lab. Interactions, Dynamiques et Lasers (France); Federico Cilento, Fulvio Parmigiani, Elettra-Sincrotrone Trieste S.C.p.A. (Italy); Ismaël Vadillo, Lab. Interactions, Dynamiques et Lasers (France); Carlo Spezzani, Elettra-Sincrotrone Trieste S.C.p.A. (Italy); Olivier Tcherbakoff, Pascal D'Oliveira, Pascal Salières, Lab. Interactions, Dynamiques et Lasers (France); François Polack, David Dennetière, Synchrotron SOLEIL (France); Véronique Brouet, Marino Marsi, Lab. de Physique des Solides (France) [11346-12]

Combined ultrafast spectroscopy techniques discloses the microscopic electron lattice interplay behind charge density waves, Hamoon Hedayat, Arianna Ceraso, Politecnico di Milano (Italy); Charles Sayers, Univ. of Bath (United Kingdom); Stefano Dal Conte, Politecnico di Milano (Italy); Jasper van Wezel, Univ. of Amsterdam (Netherlands); Stephen Clark, Univ. of Bristol (United Kingdom); Enrico Da Como, Univ. of Bath (United Kingdom); Giulio Cerullo, Politecnico di Milano (Italy) and CNR-Istituto di Fotonica e Nanotecnologie (Italy); Claudia Dallera, Ettore Carpena, Politecnico di Milano (Italy) [11346-13]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

- 16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Universiteit Brussel, Belgium
2019 Symposium Chair
- 16:35 to 17:20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States
- 17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

POSTERS-TUESDAY TUE 18:05 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Tuesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

First-principles method based electronic transport properties of two-dimensional SnSe₂(1-x).X₂x alloys, Osama Jalil, Shahzad Ahmad, Asif Bilal, Usman Younis, Information Technology Univ. of the Punjab (Pakistan); Xinke Liu, Chinese Engineering and Research Institute of Microelectronics, Shenzhen Univ. (China); Kah Wee Ang, National Univ. of Singapore (Singapore) [11346-30]

Lightwave valleytronics in graphene, Hamed Koochaki Kelardeh, Georgia State Univ. (United States) and Max-Planck-Institut für Physik komplexer Systeme (Germany) [11346-31]

The dynamic molecular Hall effect, Vasileios Balos, Martin Wolf, Genaro Bierhance, Mohsen Sajadi, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany) [11346-32]

Transient nonthermal state and coherent phonon hardening in prototype Mott compound V₂O₃, Davide Boschetto, Lab. d'Optique Appliquée (France); Niloufar Nilforoushan, Mateusz Weis, Lab. d'Optique Appliquée, ENSTA Paris, Ecole Polytechnique (France) and CNRS (France); Jiuxiang Zhang, Jonathan Caillaux, Lab. de Physique des Solides, Univ. Paris-Sud (France); Mustapha Zaghroui, GREMAN, Univ. de Tours (France); Marino Marsi, Lab. de Physique des Solides, Univ. Paris-Sud (France) [11346-33]

Photocycle and surface charge mobility of fluorescent carbon nanodots in various solvents by means of ultrafast transient absorption spectroscopy, Michela Gazzetto, Univ. Bern (Switzerland) [11346-34]

Femtosecond electronic and vibrational spectroscopy of the excited states in Fe(II)-NHC complexes, Stefan Haacke, Edoardo Domenichini, Institut de Physique et de Chimie des Matériaux de Strasbourg (France); Philippe Gros, Univ. de Lorraine (France) and CNRS (France); Mohamed Darari, Univ. de Lorraine (France); Tiago Buckup, Felix Hainer, Nicolò Alagna, Ruprecht-Karls-Universität Heidelberg (Germany) [11346-35]

Ultrafast dopant-driven dynamics in the photo-induced phase transition of vanadium dioxide, Kannatassen Appavoo, The Univ. of Alabama at Birmingham (United States); Joyeeta Nag, Vanderbilt Univ. (United States); Weidong Luo, San Jose State Univ. (United States); Gerd Duscher, The Univ. of Tennessee Knoxville (United States); Andrew Payzant, Oak Ridge National Lab. (United States); Matthew Sfeir, The City Univ. of New York (United States); Sokrates Pantelides, Vanderbilt Univ. (United States); Bin Wang, The Univ. of Oklahoma (United States); Richard F. Haglund, Vanderbilt Univ. (United States) [11346-36]

WEDNESDAY 1 APRIL

SESSION 4 WED 8:30 TO 10:40

Strong-field Processes I

Session Chair: Koichiro Tanaka, Kyoto Univ. (Japan)

First-principles calculations for attosecond physics in solids (Invited Paper), Shunsuke A. Sato, Univ. of Tsukuba (Japan) [11346-14]

Generation of high harmonics in solids and propagation effects (Invited Paper), Isabella Floss, Christoph Lemell, Technische Univ. Wien (Austria); Kazuhiro Yabana, Univ. of Tsukuba (Japan); Joachim Burgdörfer, Technische Univ. Wien (Austria) [11346-15]

Conduction mechanisms and capacitive effect in ultrafast photoemission from diamond nanotips, Benoit Chalopin, Olivier Torresin, Julien Mauchain, Univ. Toulouse III - Paul Sabatier (France); Mario Borz, Ivan Blum, Angela Vella, Univ. de Rouen Normandie (France) [11346-16]

Enhanced high-harmonic generation from chromium-doped magnesium oxide, Viktoria Nefedova, Sven Fröhlich, Hamed Merdji, CEA-Paris-Saclay (France) [11346-17]

Time-resolved photoluminescence of small GaN/AlN quantum dots, Mathieu Gallart, Maryna Hrytsaienko, Marc Ziegler, Olivier Crégut, Institut de Physique et de Chimie des Matériaux de Strasbourg (France); Sebastian Tamariz, Raphaël Butté, Nicolas Grandjean, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Bernd Hönerlage, Pierre Gilliot, Institut de Physique et de Chimie des Matériaux de Strasbourg (France) [11346-18]

SESSION 5 WED 11:10 TO 13:00

Strong-field Processes II

Session Chair: Vladislav S. Yakovlev,

Max-Planck-Institut für Quantenoptik (Germany)

Coherent subcycle acceleration of electronic charges and spins (Invited Paper), Christoph Lange, Stefan Schlauderer, Christoph P. Schmid, Fabian Langer, Univ. Regensburg (Germany); Stefan W. Koch, Philipps-Univ. Marburg (Germany); Mackillo Kira, Univ. of Michigan (United States); Jennifer Reimann, Jens Gudde, Ulrich Höfer, Philipps-Univ. Marburg (Germany); Sebastian Baierl, T. Ebnet, Univ. Regensburg (Germany); D. C. Valovcin, Univ. of California, Santa Barbara (United States); Konstantin A. Zvezdin, A. M. Prokhorov General Physics Institute (Russian Federation); Alexey V. Kimel, Rostislav V. Mikhaylovskiy, Radboud Univ. Nijmegen (Netherlands); Rupert Huber, Univ. Regensburg (Germany) [11346-19]

Carrier doping effect on high harmonic generation from solids (Invited Paper), Koichiro Tanaka, Kyoto Univ. (Japan) [11346-20]

Towards attosecond electron dynamics in high-order harmonic generation from solids, Sven Fröhlich, Viktoria Nefedova, Shatha Kaassamani, David Gauthier, Willem Boutu, Hamed Merdji, CEA-Paris-Saclay (France) [11346-21]

Orbital-dependent electron thermalization in metals excited by ultrashort laser pulse, Elena Silaeva, Univ. Jean Monnet Saint-Etienne (France) and Univ. de Lyon (France) and Institut d'Optique Graduate School (France); Razvan Stoian, Univ. de Lyon (France) and Univ. Jean Monnet Saint-Etienne (France) and Institut d'Optique Graduate School (France); Jean-Philippe Colombier, Univ. Jean Monnet Saint-Etienne (France) and Univ. de Lyon (France) and Institut d'Optique Graduate School (France) .. [11346-22]

Lunch/Exhibition Break Wed 13:00 to 14:10

SESSION 6 WED 14:10 TO 15:40

Atomically Thin Materials and Topological Materials

Session Chair: Yves Acremann, ETH Zurich (Switzerland)

Light-induced anomalous Hall effect in graphene (Invited Paper), Guido Meier, Univ. Hamburg (Germany) [11346-23]

Ultrafast nonlinear optical properties of gated graphene (Invited Paper), Giancarlo Soavi, Friedrich-Schiller Univ. Jena (Germany) [11346-24]

Ultrafast light-induced Lifshitz transition in topological Weyl semimetal, Samuel Beaulieu, Shuo Dong, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany); Nicolas Tancogne-Dejean, Max-Planck-Institut für Struktur und Dynamik der Materie (Germany); Maciej Dzendzik, Tommaso Pincelli, Julian Maklar, Patrick R. Xian, Martin Wolf, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany); Angel Rubio, Michael A. Sentef, Max-Planck-Institut für Struktur und Dynamik der Materie (Germany); Laurenz Rettig, Ralph Ernstorfer, Fritz-Haber-Institut der Max-Planck-Gesellschaft (Germany) [11346-25]

SESSION 7 WED 16:10 TO 17:45

Molecular Systems in the Condensed Phase

Session Chair: Stefan Haacke, Institut de Physique et de Chimie des Matériaux de Strasbourg (France)

Quantum phenomena in nanomaterials: coherent dynamics in quantum dots arrays (Invited Paper), Elisabetta Collini, Univ. degli Studi di Padova (Italy) [11346-26]

Ultrafast spectroscopy of transparent dye-sensitized solar cells designed for the near-infrared, Stefan Haacke, Institut de Physique et de Chimie des Matériaux de Strasbourg, Univ. de Strasbourg (France) and CNRS (France); Ilias Nikolinos, Univ. de Strasbourg (France) and CNRS (France); Waad Naim, Univ. de Picardie Jules Verne (France) and CNRS (France); Nadia Barbero, Claudio Barolo, Univ. degli Studi di Torino (Italy); Frédérique Sauvage, Univ. de Picardie Jules Verne (France) [11346-27]

Two-dimensional electronic spectroscopy to study the ultrafast photoisomerization of biomimetic molecules, Robin Pierron, Univ. de Strasbourg (France) and CNRS (France); Johanna Brazard, Univ. de Strasbourg (France) and Univ. de Genève (Switzerland) and CNRS (France); Damianos Agathangelou, Univ. de Strasbourg (France) and Univ. of Michigan (United States) and CNRS (France); Olivier Crégut, Univ. de Strasbourg (France) and CNRS (France); Stefan Haacke, Jérémie Léonard, Univ. de Strasbourg (France) and CNRS (France) [11346-28]

Understanding elastically driven cooperativity in molecular photomagnetic materials, Alix Volte, Céline Mariette, Institut de Physique de Rennes (France); Marie-Laure Boillot, Institut de Chimie Moléculaire et des Matériaux d'Orsay, Univ. Paris-Sud (France); Roman Bertoni, Eric Collet, Hervé Cailleau, Maciej Lorenc, Marco Cammarata, Institut de Physique de Rennes (France) [11346-29]

CONFERENCE 11347

Monday–Wednesday 30 March–1 April 2020 • Proceedings of SPIE Vol. 11347

Quantum Technologies 2020

Conference Chairs: **Eleni Diamanti**, CNRS, Sorbonne Univ. (France); **Sara Ducci**, Univ. Paris 7-Diderot (France); **Nicolas Treps**, Lab. Kastler Brossel (France); **Shannon Whitlock**, Univ. Strasbourg ISIS (France)

Programme Committee: **Kai Bongs**, The Univ. of Birmingham (United Kingdom); **Philippe Bouyer**, Lab. Photonique, Numérique et Nanosciences (France); **Félix Bussièrès**, id Quantique SA (Switzerland); **Thomas Gerrits**, National Institute of Standards and Technology (United States); **Hugues de Riedmatten**, ICFO - Institut de Ciències Fotòniques (Spain); **Chiara Macchiavello**, Univ. degli Studi di Pavia (Italy); **Tracy E. Northup**, Univ. Innsbruck (Austria); **Fabio Sciarrino**, Sapienza Univ. di Roma (Italy); **Paolo Villoresi**, Univ. degli Studi di Padova (Italy); **Frank Wilhelm-Mauch**, Univ. des Saarlandes (Germany)

MONDAY 30 MARCH

HOT TOPICS I MON 9:00 TO 11:00

Photonics Europe 2020: Hot Topics Session I

- 9:00 - 9:20 **SPIE Welcome and Award Presentation**
John E. Greivenkamp, Univ. of Arizona, United States
SPIE President
Welcome
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
City of Strasbourg Welcome
- 9:25 - 9:30 **Introduction to Hot Topics**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- 9:30 - 10:15 **Naturally fast and low power electro-optic polymer optical devices are ideally positioned for the next-generation Internet photonics roadmap**
Michael Lebby, CEO Lightwave Logic, United Kingdom
- 10:15 - 11:00 **3D printed micro-optics: state of the art and future challenges**
Harald Giessen, University of Stuttgart, Germany

For additional details see pages 6-7

SESSION 1 MON 11:30 TO 12:40

Quantum Cryptography and Communication I

- Classical computing with quantum resources** (*Invited Paper*),
Stefanie Barz, Univ. Stuttgart (Germany) [11347-1]
- Multipoint for high-dimensional quantum states using structured photons**, Robert Fickler, Markus Hiekkamäki, Tampere Univ. (Finland); Florian Brandt, Frederic Bouchard, Univ. of Ottawa (Canada); Shashi Prabhakar, Tampere Univ. (Finland); Marcus Huber, Institut für Quantenoptik und Quanteninformation ÖAW (Austria) [11347-2]
- Long-range distribution of multiphoton entanglement**, Monika E. Mycroft, Adam Buraczewski, Univ. of Warsaw (Poland); Stefanie Barz, Univ. Stuttgart (Germany); Magdalena Stobinska, Univ. of Warsaw (Poland) [11347-3]
- Lunch Break Mon 12:40 to 14:00

SESSION 2 MON 14:00 TO 15:30

Quantum Simulation and Computing I

- Many-body physics with atoms in arrays** (*Invited Paper*), Antoine Browaeys, Lab. Charles Fabry (France) [11347-4]
- Towards quantum simulations with circular Rydberg atoms**, Clément Sayrin, Rodrigo Cortiñas, Brice Ravon, Paul Méhaignerie, Maxime Favier, Jean-Michel Raimond, Yohann Machu, Michel Brune, Lab. Kastler Brossel, Collège de France, CNRS (France) and Ecole Normale Supérieure, Univ. PSL (France) and Sorbonne Univ. (France) [11347-5]
- Large arrays of atomic ensembles for quantum simulation and computation**, Yibo Wang, Sayali Shevate, Univ. de Strasbourg (France); Tobias Wintermantel, Ruprecht-Karls-Universität Heidelberg (Germany) and Univ. de Strasbourg (France); Shannon Whitlock, Univ. de Strasbourg (France) [11347-6]
- Linear optical quantum computing with feedforward using ultrafast optical switches**, Guilherme Luiz Zanin, Univ. Federal de Santa Catarina (Brazil) and Univ. Wien (Austria); Maxime Jacquet, Irati Alonso Calafell, Robert Peterson, Lee Rozema, Philip Walther, Univ. Wien (Austria) [11347-7]

SESSION 3 MON 16:00 TO 17:30

Quantum Simulation and Computing II

- TBA2** (*Invited Paper*), Eleni Diamanti, CNRS, Sorbonne Univ. (France) [11347-8]
- Machine learning for characterization of quantum states and processes**, Aleksey Fedorov, Russian Quantum Ctr. (Russian Federation) [11347-9]
- Continuous variables error correction with integrated biphoton frequency combs**, Nicolas Fabre, Lab. Matériaux et Phénomènes Quantiques, Univ. Paris Diderot (France); Giorgio Maltese, Felicien Appas, Simone Felicetti, Lab. Matériaux et Phénomènes Quantiques (France); Andreas Ketterer, Univ. of Freiburg (Germany); Arne Keller, Thomas Coudreau, Florent Baboux, Maria Amanti, Sara Ducci, Perola Milman, Lab. Matériaux et Phénomènes Quantiques (France) [11347-10]
- Quantum walk approach to the GKP encoding**, Shin-Tza Wu, Chai-Yu Lin, Wang-Chang Su, National Chung Cheng Univ. (Taiwan) [11347-11]

TUESDAY 31 MARCH

SESSION 4 TUE 9:00 TO 10:20

Quantum Cryptography and Communication II

- Towards long distance entanglement between a photon and a solid-state multimode quantum memory**, Jelena Rakonjac, Dario Lago-Rivera, Samuele Grandi, Alessandro Seri, Hugues de Riedmatten, ICFO - Institut de Ciències Fotòniques (Spain) [11347-12]
- Dynamic Purcell-enhanced emission from erbium ions coupled to a microcavity**, Chetan Deshmukh, Bernardo Casabone, Hugues de Riedmatten, ICFO - Institut de Ciències Fotòniques (Spain); Diana Serrano, Shuping Liu, Alban Ferrier, Philippe Goldner, École Nationale Supérieure de Chimie de Paris (France); David Hunger, Karlsruhe Institut für Technologie (Germany) [11347-13]
- A cold-atom temporally-multiplexed quantum repeater node with cavity-enhanced noise suppression**, Lukas Heller, Pau Farrera, Georg Heinze, ICFO - Institut de Ciències Fotòniques (Spain); Hugues de Riedmatten, ICFO - Institut de Ciències Fotòniques (Spain) and Institut Català de Recerca i Estudis Avançats (Spain) [11347-14]
- Towards ultrabright photon pair sources for quantum communication**, Rana Sebak, Emma Brambila, Fraunhofer-Institut für Angewandte Optik und Feinmechanik IOF (Germany) and Abbe School of Photonics, Friedrich-Schiller-Universität Jena (Germany); Tobias Gäbler, Fraunhofer-Institut für Angewandte Optik und Feinmechanik IOF (Germany) and Institut für Angewandte Physik, Friedrich-Schiller-Universität Jena (Germany); Daniel Rieländer, Markus Gräfe, Fabian Steinlechner, Fraunhofer-Institut für Angewandte Optik und Feinmechanik IOF (Germany) [11347-15]

SESSION 5 TUE 10:50 TO 12:40

Quantum Sensing, Imaging, and Metrology I

- Scalable ion traps for quantum metrology** (*Invited Paper*), Tanja E. Mehlstäubler, Physikalisch-Technische Bundesanstalt (Germany) [11347-16]
- Ghost displacement**, John Jeffers, Luca Mazzarella, Gioan Tatti, Univ. of Strathclyde (United Kingdom) [11347-17]
- Quantum illumination with simple detection**, Hao Yang, Univ. of Strathclyde (United Kingdom); Wojciech Roga, National Institute of Information and Communications Technology (Japan) and Univ. of Strathclyde (United Kingdom); Jonathan Pritchard, John Jeffers, Univ. of Strathclyde (United Kingdom) [11347-18]
- Sensing electromagnetic fields with the AC-Stark effect in two-photon spectroscopy of cold trapped HD⁺**, Florin Lucian Constantin, Lab. de Physique des Lasers, Atomes et Molécules (France) [11347-19]
- Quantum-enhanced Rb-87 atomic magnetometer based on a 795 nm polarization-squeezed light field**, Junmin Wang, Xin Wen, Lele Bai, Yulin Yang, Jun He, Shanxi Univ. (China) [11347-20]
- Lunch/Exhibition Break Tue 12:40 to 14:00

SESSION 6 TUE 14:00 TO 15:40

Quantum Sensing, Imaging, and Metrology II

Control of edge losses in membrane resonators for quantum optomechanics, Enrico Serra, Michele Bonaldi, Antonio Lorenzo Borrielli, Francesco Marin, Francesco Marino, Consiglio Nazionale delle Ricerche (Italy); Bruno Morana, Technische Univ. Delft (Netherlands); Paolo Vezio, Avishek Chowdhury, LENS - Lab. Europeo di Spettroscopie Non-Lineari (Italy); Lina Sarro, Technische Univ. Delft (Netherlands); Giovanni Andrea Prodi, Univ. degli Studi di Trento (Italy); Antonio Pontin, Univ. College London (United Kingdom) . [11347-21]

Integrated multiarm interferometers for quantum multiphase estimation protocols, Emanuele Polino, Sapienza Univ. di Roma (Italy); Simone Atzeni, Martina Riva, Politecnico di Milano (Italy); Mauro Valeri, Adil Syed Rab, Raffaele Silvestri, Sapienza Univ. di Roma (Italy); Giacomo Corrielli, Andrea Crespi, Politecnico di Milano (Italy); Nicolò Spagnolo, Paolo Mataloni, Sapienza Univ. di Roma (Italy); Roberto Osellame, Politecnico di Milano (Italy); Fabio Sciarino, Sapienza Univ. di Roma (Italy) [11347-22]

Spin squeezing in a metrologically relevant regime, Carlos L. Garrido Alzar, Systèmes de référence temps-espace, CNRS (France); Meng-Zi Huang, Konstantin Ott, Jakob Reichel, Lab. Kastler Brossel (France); Tommaso Mazzoni, Systèmes de référence temps-espace (France) [11347-23]

Precision inertial measurements with cold-atom interferometers, Remi Geiger, Romain Gautier, Matteo Altorio, Leonid A. Sidorenkov, Arnaud Landragin, Observatoire de Paris (France) [11347-24]

Heralded noiseless coherent-state amplification: towards the quantum limit, Ranjith Nair, Varun Narasimhachar, Mile Gu, Nanyang Technological Univ. (Singapore) [11347-25]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

- 16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair
- 16:35 to 17:20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States
- 17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

POSTERS-TUESDAY TUE 18:05 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Tuesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

Computational quantum ghost imaging, Carsten Pitsch, Dominik Walter, Gabriela Paunescu, Peter Lutzmann, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany) [11347-43]

Shot noise-based quantum random number generator, Jakub Niemczuk, Ewa Placzek-Popko, Wroclaw Univ. of Science and Technology (Poland) [11347-44]

Improving photon indistinguishability of single-photon source based on a magic-wavelength single-atom optical tweezer, Junmin Wang, Rui Sun, Xin Wang, Kong Zhang, Jun He, Shanxi Univ. (China) [11347-45]

Photonic implementation of quantum neural network, Amal R. S., Indian Institute of Space Science and Technology (India) [11347-46]

FPGA-based time-to-digital converters, Richard Nock, Aston Univ. (United Kingdom); Xiao Ai, QLM Technology Ltd. (United Kingdom); Yang Lu, Aston Univ. (United Kingdom); Naim Dahmoun, John G. Rarity, Univ. of Bristol (United Kingdom) [11347-47]

Time-bin multiplexed differential phase shift quantum key distribution, Anil Prabhakar, Gautam K. Shaw, Shyam Sridharan, Forum Shingala, Prabha Mandyam, Shashank K. Ranu, Indian Institute of Technology Madras (India) [11347-48]

Reliable estimation of the statistics of photons emitted from an unknown source of light, Mikolaj Lasota, Piotr Leszek Kolenderski, Nicolaus Copernicus Univ. (Poland) [11347-49]

On-chip registration of spin qubits in highly confined optical fields, Hamidreza Siampour Ashkavandi, The Univ. of Sheffield (United Kingdom) [11347-50]

WEDNESDAY 1 APRIL

SESSION 7 WED 9:00 TO 10:30

Novel Quantum Platforms and Hybrid Devices

TBA4 (Invited Paper), Andreas J. Wallraff, ETH Zurich (Switzerland) [11347-26]

Ultrahigh coherent mechanical resonators for quantum circuit optomechanics, Tatiana Antonovna Vovk, Amir Youssefi, Yash Joshi, Nathan Bernier, Tobias Kippenberg, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [11347-27]

High-speed quantum interface with a quantum dot molecule coupled to a superconducting resonator, Yuta Tsuchimoto, ETH Zurich (Switzerland); Zhe Sun, Ecole Polytechnique Fédérale de Lausanne (Switzerland); Emre Togan, Patrick Knüppel, ETH Zurich (Switzerland); Aymeric Delteil, Univ. de Versailles Saint-Quentin en Yvelines (France); Stefan Fält, Martin Kroner, Klaus Ensslin, Andreas Wallraff, Werner Wegscheider, Atac Imamoglu, ETH Zurich (Switzerland) [11347-28]

All-photonic quantum teleportation and entanglement swapping using on-demand solid-state quantum emitters, Francesco Basso Basset, Michele B. Rota, Sapienza Univ. di Roma (Italy); Christian Schimpf, Johannes Kepler Univ. Linz (Austria); Davide Tedeschi, Sapienza Univ. di Roma (Italy); Marcus Reindl, Daniel Huber, Johannes Kepler Univ. Linz (Austria); Katharina D. Zeuner, KTH Royal Institute of Technology (Sweden); Saimon F. Covre da Silva, Huiying Huang, Johannes Kepler Univ. Linz (Austria); Val Zwiller, Klaus D. Jöns, KTH Royal Institute of Technology (Sweden); Armando Rastelli, Johannes Kepler Univ. Linz (Austria); Rinaldo Trotta, Sapienza Univ. di Roma (Italy) [11347-29]

SESSION 8 WED 11:00 TO 12:50

Single- and Two-photon Emitters

TBA5 (Invited Paper), Rinaldo Trotta, Johannes Kepler Univ. Linz (Austria) [11347-30]

Engineering two-photon wavefunction and statistics in a semiconductor chip, Saverio Francesconi, Lab. Matériaux et Phénomènes Quantiques (France); Florent Baboux, Lab. Matériaux et Phénomènes Quantiques, Univ. Paris Diderot (France); Arnault Raymond, Nicolas Fabre, Lab. Matériaux et Phénomènes Quantiques (France); Aristide Lemaître, Ctr. de Nanosciences et de Nanotechnologies, Univ. Paris-Sud, CNRS (France); Perola Milman, Maria Amanti, Sara Ducci, Lab. Matériaux et Phénomènes Quantiques (France) [11347-31]

Towards synchronization of photons from a SPDC source, Janik Wolters, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) and Technische Univ. Berlin (Germany); Gianni Buser, Univ. Basel (Switzerland); Chris Müller, Humboldt-Univ. zu Berlin (Germany); Roberto Mottola, Univ. Basel (Switzerland); Tim Kroh, Oliver Benson, Humboldt-Univ. zu Berlin (Germany); Philipp Treutlein, Univ. Basel (Switzerland) [11347-32]

Generation of entangled photons with tailored correlations for quantum wavefront shaping, Yaron Bromberg, The Hebrew Univ. of Jerusalem (Israel) [11347-33]

Absorption of a heralded single photon by a nitrogen-vacancy center in diamond, Maria Gieysztor, Marta Misiaszek, Joscelyn van der Veen, Nicolaus Copernicus Univ. (Poland); Wojciech Gawlik, Jagiellonian Univ. in Krakow (Poland); Fedor Jelezko, Univ. Ulm (Germany); Piotr Leszek Kolenderski, Nicolaus Copernicus Univ. (Poland) [11347-34]

Lunch/Exhibition Break Wed 12:50 to 14:00

CONFERENCE 11347

SESSION 9..... WED 14:00 TO 15:30

Integrated Quantum Devices

Integrated quantum photonics: advanced architectures using 3D laser writing (*Invited Paper*), Roberto Osellame, CNR-Istituto di Fotonica e Nanotecnologie (Italy)..... [11347-35]

A new platform for quantum technologies using nanophotonics, Christophe Coueteau, Univ. de Technologie Troyes (France)..... [11347-36]

Nanoscale Pr³⁺: Y₂O₃ for optical quantum technologies, Diana Serrano, École Nationale Supérieure de Chimie de Paris (France); Chetan Deshmukh, ICFO - Institut de Ciències Fotòniques (Spain); Shuping Liu, Alexandre Tallaire, Alban Ferrier, École Nationale Supérieure de Chimie de Paris (France); Hugues de Riedmatten, ICFO - Institut de Ciències Fotòniques (Spain); Philippe Goldner, École Nationale Supérieure de Chimie de Paris (France)..... [11347-37]

Single-spin controlled switching using a quantum dot in a nanobeam waveguide, Alisa Javadi, Univ. Basel (Switzerland) and Univ. of Copenhagen (Denmark); D. Ding, Martin Appel, S. Mahmoodian, M. C. Löbl, Univ. of Copenhagen (Denmark); I. Söllner, Univ. Basel (Switzerland); R. Schott, Ruhr-Univ. Bochum (Germany); T. Schröder, C. Papon, L. Midolo, T. Pregnolato, Univ. of Copenhagen (Denmark); A. D. Wieck, A. Ludwig, Ruhr-Univ. Bochum (Germany); P. Lodahl, Univ. of Copenhagen (Denmark); R. J. Warburton, Univ. Basel (Switzerland)..... [11347-38]

SESSION 10..... WED 16:00 TO 17:30

New Devices for Quantum Technologies

TBA6 (*Invited Paper*), Costanza Toninelli, Istituto Nazionale di Ottica (Italy)..... [11347-39]

Electromagnetically induced transparency in a hollow-core light cage, Flavie Davidson-Marquis, AG Nanooptik, Humboldt-Univ. zu Berlin (Germany); Bumjoon Jang, Leibniz-Institut für Photonische Technologien e.V. (Germany); Tim Kroh, Esteban Gomez Lopez, Chris Müller, AG Nanooptik, Humboldt-Univ. zu Berlin (Germany); Julian Gargiulo, Stefan A. Maier, Nano-Institut, Ludwig-Maximilians-Univ. München (Germany); Harald Kübler, Tilman Pfau, 5th Physikalisches Institut, Univ. Stuttgart (Germany); Markus Schmidt, Leibniz-Institut für Photonische Technologien e.V. (Germany); Oliver Benson, AG Nanooptik, Humboldt-Univ. zu Berlin (Germany)..... [11347-40]

New perspectives in correlation plenoptic imaging and microscopy, Francesco Vincenzo Pepe, Univ. degli Studi di Bari Aldo Moro (Italy) and Istituto Nazionale di Fisica Nucleare (Italy); Alessio Scagliola, Univ. degli Studi di Bari Aldo Moro (Italy); Giovanni Scala, Univ. degli Studi di Bari Aldo Moro (Italy) and Istituto Nazionale di Fisica Nucleare (Italy); Francesco Di Lena, Univ. degli Studi di Bari Aldo Moro (Italy); Saverio Pascazio, Augusto Garuccio, Univ. degli Studi di Bari Aldo Moro (Italy) and Istituto Nazionale di Fisica Nucleare (Italy); Giuliano Scarcelli, Univ. of Maryland, College Park (United States); Milena D'Angelo, Univ. degli Studi di Bari Aldo Moro (Italy) and Istituto Nazionale di Fisica Nucleare (Italy)..... [11347-41]

GaN laser diodes for quantum sensors and optical atomic clocks, Stephen P. Najda, TopGaN Ltd. (Poland)..... [11347-42]

CONFERENCE 11348

Wednesday–Thursday 1 March–2 April 2020 • Proceedings of SPIE Vol. 11348

Terahertz Photonics

Conference Chairs: **Mona Jarrahi**, Univ. of California, Los Angeles (United States); **Sascha Preu**, Technische Univ. Darmstadt (Germany); **Dmitry Turchinovich**, Univ. Bielefeld (Germany)

Programme Committee: **Jan C. Balzer**, Univ. of Duisburg-Essen (Germany); **Enrique Castro-Camus**, Centro de Investigaciones en Óptica, A.C. (Mexico); **Jean-François Lampin**, Institute of Electronics, Microelectronics and Nanotechnology (France); **Hiroaki Minamide**, RIKEN (Japan); **Taiichi Otsuji**, Tohoku Univ. (Japan); **Willie J. Padilla**, Duke Univ. (United States); **Romain Peretti**, Institut d'Electronique de Microélectronique et de Nanotechnologie (France); **Emilien Peytavit**, Institut d'Electronique de Microélectronique et de Nanotechnologie (France); **Marco Rahm**, Technische Univ. Kaiserslautern (Germany); **François Simoens**, CEA-LETI (France); **Andreas Stöhr**, Univ. Duisburg-Essen (Germany); **Zach Taylor**, Aalto Univ. (Finland); **Shang Hua Yang**, National Tsing Hua Univ. (Taiwan); **Nezih Tolga Yardimci**, Univ. of California, Los Angeles (United States)

WEDNESDAY 1 APRIL

SESSION 1 WED 8:30 TO 10:30

Terahertz Components and Applications

Session Chairs: **Zachary Taylor**, Aalto Univ. (Finland);

Aydin Babakhani, Univ. of California, Los Angeles (United States)

Water status measurements on plants using THz spectroscopy (*Invited Paper*), Martin Koch, Philipps-Univ. Marburg (Germany). [11348-1]

Towards broadband THz spectroscopy and analysis of subwavelength size biological samples (*Invited Paper*), Romain Peretti, Institut d'Electronique de Microélectronique et de Nanotechnologie (France) [11348-2]

Photonic terahertz technology for layer thickness measurements (*Invited Paper*), Daniel Molter, Jens Klier, Fraunhofer-Institut für Techno- und Wirtschaftsmathematik ITWM (Germany); Stefan Weber, Tobias Pfeiffer, Fraunhofer-Institut für Techno- und Wirtschaftsmathematik ITWM (Germany) and Landesforschungszentrum OPTIMAS, Technische Univ. Kaiserslautern (Germany); Michael Kolano, Oliver Boidol, Fraunhofer-Institut für Techno- und Wirtschaftsmathematik ITWM (Germany); Mirco Kutas, Björn Haase, Fraunhofer-Institut für Techno- und Wirtschaftsmathematik ITWM (Germany) and Landesforschungszentrum OPTIMAS, Technische Univ. Kaiserslautern (Germany); Joachim Jonuscheit, Fraunhofer-Institut für Techno- und Wirtschaftsmathematik ITWM (Germany) and Landesforschungszentrum OPTIMAS, Technische Univ. Kaiserslautern (Germany). [11348-3]

Paraffin diffractive and refractive terahertz lenses, Agnieszka Siemion, Aneta Melaniuk, Warsaw Univ. of Technology (Poland); Przemyslaw Zagrajek, Wojskowa Akademia Techniczna im. Jaroslawa Dabrowskiego (Poland); Mateusz Surma, Warsaw Univ. of Technology (Poland); Michal Walczakowski, Elzbieta Czerwinska, Wojskowa Akademia Techniczna im. Jaroslawa Dabrowskiego (Poland); Izabela Ducin, Pawel Komorowski, Piotr Sobotka, Warsaw Univ. of Technology (Poland). [11348-4]

Technologies of frequency selective surfaces and metasurfaces for spectral discrimination in terahertz band, Sergei A. Kuznetsov, Novosibirsk State Univ. (Russian Federation). [11348-5]

Terahertz Fresnel-zone-plate film lens based on double-layer metamaterial phase shifter, Zhengli Han, Yuma Takida, RIKEN (Japan); Seigo Ohno, Tohoku Univ. (Japan); Hiroaki Minamide, RIKEN (Japan) [11348-6]

SESSION 2 WED 11:00 TO 12:30

Terahertz Photonics

Session Chairs: **Mona Jarrahi**, Univ. of California, Los Angeles (United States); **Romain Peretti**, Institut d'Electronique de Microélectronique et de Nanotechnologie (France)

Fiber-coupled photoconductive THz devices based on iron-doped InGaAs (*Invited Paper*), Björn Globisch, Robert B. Kohlhaas, Steffen Breuer, Simon Nellen, Lars Liebermeister, Martin Schell, Fraunhofer-Institut für Nachrichtentechnik, Heinrich-Hertz-Institut, HHI (Germany). [11348-7]

Compact, high-speed sampling engine for pulsed femtosecond lasers (*Invited Paper*), Milan Oeri, Ole Peters, Martin Wolferstetter, Ronald Holzwarth, Menlo Systems GmbH (Germany). [11348-8]

Room temperature radiometer based on an up conversion process for CubeSats applications (*Invited Paper*), Luis Enrique Garcia Munoz, Gabriel Santamaria Botello, Kerlos Abdalmalak, Michal Wasiak, Univ. Carlos III de Madrid (Spain). [11348-9]

Multifrequency terahertz wave emission and detection with the photomixing approach: theory and experiments, Florin Lucian Constantin, Lab. de Physique des Lasers, Atomes et Molécules (France). [11348-10]

Lunch/Exhibition Break Wed 12:30 to 13:40

SESSION 3 WED 13:40 TO 15:35

THz Source and Detector Concepts I

Session Chairs: **Taiichi Otsuji**, Tohoku Univ. (Japan); **Masayoshi Tonouchi**, Osaka Univ. (Japan)

Ultrafast dynamics of phase locking in resonant tunneling diode terahertz oscillators (*Invited Paper*), Koichiro Tanaka, Takashi Arikawa, Tomoki Hiraoka, Kyoto Univ. (Japan). [11348-11]

RF control of THz quantum cascade laser frequency combs (*Invited Paper*), Giacomo Scalari, Andres Forrer, David Stark, Urban Senica, Tudor Olariu, Philipp Täschler, Matthias Beck, Jerome Faist, ETH Zurich (Switzerland). [11348-12]

Terahertz quantum cascade laser sources based on intracavity frequency mixing with improved outcoupling efficiency (*Invited Paper*), Jae Hyun Kim, Seungyong Jung, The Univ. of Texas at Austin (United States); Wolfhard Oberhausen, Gerhard Böhm, Walter Schottky Institut (Germany); Kazuue Fujita, Masahiro Hitaka, Akio Ito, Tadataka Edamura, Hamamatsu Photonics K.K. (Japan); Mikhail A. Belkin, Walter Schottky Institut (Germany). [11348-13]

Fully electronic silicon-based THz pulse sources and detectors (*Invited Paper*), Aydin Babakhani, Univ. of California, Los Angeles (United States). [11348-14]

Si capacitive modulator integration in a 300mm silicon photonics platform with strained-SiGe to enhance the electro-optic effect, Ismael Charlet, STMicroelectronics S.A. (France). [11348-15]

SESSION 4 WED 16:00 TO 18:00

THz Source and Detector Concepts II

Session Chairs: **Björn Globisch**, Fraunhofer-Institut für Nachrichtentechnik, Heinrich-Hertz-Institut, HHI (Germany); **Sascha Preu**, Technische Univ. Darmstadt (Germany)

Highly sensitive THz parametric detection (*Invited Paper*), Kodo Kawase, Kosuke Murate, Nagoya Univ. (Japan). [11348-16]

High average power ultrafast terahertz sources with MHz repetition rate (*Invited Paper*), Frank Meyer, Negar Hekmat, Tim Vogel, Alan Omar, Samira Mansourzadeh, Felix Fobbe, Martin Saraceno, Yicheng Wang, Clara J. Saraceno, Ruhr-Univ. Bochum (Germany). [11348-17]

Properties and applications of photoconductive metasurfaces for THz detectors (*Invited Paper*), Oleg Mitrofanov, Lucy Hale, Univ. College London (United Kingdom); Polina Vabishchevich, Sandia National Labs. (United States); Thomas Siday, Univ. College London (United Kingdom); Charles Thomas Harris, Ting Shan Luk, John Reno, Igal Brener, Sandia National Labs. (United States). [11348-18]

Two-port bowtie slot antenna with two monolithically integrated MUTC photodiodes for THz power combining, Sebastian Dülme, Peng Lu, Vladyslav Cherniak, Ivane Appigayei, Thomas Haddad, Marcel Grzeslo, Andreas Stöhr, Univ. Duisburg-Essen (Germany). [11348-19]

High-power, broadband terahertz solid-state emitter based on Yb:YAG thin-disk oscillator, Gaia Barbiero, Haochuan Wang, Ludwig-Maximilians-Univ. München (Germany) and Max-Planck-Institut für Quantenoptik (Germany); Jonathan Brons, TRUMPF Laser GmbH (Germany); Bo-Han Chen, Volodymyr Pervak, Ludwig-Maximilians-Univ. München (Germany); Hanieh Fattahi, Max-Planck-Institut für Quantenoptik (Germany). [11348-20]

Nonlinear THz photonics at terahertz user facility TELBE: current status and developments, Sergey Kovalev, Min Chen, Mohammed Bawatna, Nilesh Awari, Jan Deinert, Igor Ilyakov, Helmholtz-Zentrum Dresden-Rossendorf e. V. (Germany); Thales de Oliveira, Helmholtz-Zentrum Dresden-Rossendorf (Germany) and TU Dresden (Germany); Michael Gensch, Technische Univ. Berlin (Germany) and Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany). [11348-21]

CONFERENCE 11348

SESSION 5 WED 16:00 TO 17:10

Terahertz Imaging I

Session Chair: **Marc P. Georges**, Liège Univ. (Belgium)

Joint Session between Conferences Terahertz Photonics (11348) and Unconventional Optical Imaging (11351)

Note: this session runs concurrently with Session 4 in Terahertz Photonics Conference (11348) and with Session 10 in Unconventional Optical Imaging Conference (11351).

Digital image reconstruction for single-pixel terahertz imaging (*Invited Paper*), Xinke Wang, Yan Zhang, Capital Normal Univ. (China) [11351-42]

Continuous-wave terahertz common-path self-referencing digital holographic imaging based on Fresnel bimirror, Yaya Zhang, Dayong Wang, Lu Rong, Duoxuan Ma, Yunxin Wang, Jie Zhao, Beijing Univ. of Technology (China) [11351-43]

Terahertz reflective ptychography, Marc P. Georges, Liège Univ. (Belgium); Chao Tang, Beijing Univ. of Technology (China); Yuchen Zhao, Liège Univ. (Belgium); Lu Rong, Dayong Wang, Fangrui Tan, Beijing Univ. of Technology (China) [11351-44]

POSTERS-WEDNESDAY WED 18:00 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Wednesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

Design and simulation of graphene-based Archimedeana spiral antenna coupled microbolometer as terahertz detector, Neelima Kolhare, Government College of Engineering, Aurangabad (India) [11348-38]

Efficiency enhancement of terahertz photoconductive antenna by using plasmonic nanograting, Gye Jung Lee, Byeongwoo Son, Yeongha Ko, Do-Kyeong Ko, Jae-Hyung Jang, Gwangju Institute of Science and Technology (Korea, Republic of) [11348-39]

Design and simulation of spoof surface plasmon polariton delay lines at 1 THz, Muhammed Abdullah Unutmaz, Ankara Yildirim Beyazit Univ. (Turkey); Mehmet Unlu, TOBB ETÜ (Turkey) [11348-40]

Optical parameters estimation of a sunflower leaf using THz time domain spectroscopy, Yannick Abautret, Institut Fresnel (France); Dominique Coquillat, Lab. Charles Coulomb (France); Myriam Zerrad, Institut Fresnel (France); Ryad Bendoula, Institut National de Recherche en Sciences et Technologies Pour l'Environnement et l'Agriculture (France); Gabriel Soriano, Institut Fresnel (France); Daphné Héran, Institut National de Recherche en Sciences et Technologies Pour l'Environnement et l'Agriculture (France); Bruno Grèzes-Besset, Innolea (France); Frédéric Chazallet, SHAKTI (France); Claude Amra, Institut Fresnel (France) [11348-41]

Terahertz optical properties of 1% Nd-doped KGW, Alexander Mamrashev, Nazar Nikolaev, Valery Antsygin, Institute of Automation and Electrometry of the SB RAS (Russian Federation) [11348-42]

Terahertz dielectric spectroscopy of nanoporous Al₂O₃ and SiO₂: novel prospective materials of terahertz optics, Vladislav E. Ulitko, Institute of Solid State Physics (Russian Federation); Arseny A. Gavdush, A. M. Prokhorov General Physics Institute (Russian Federation) and Bauman Moscow State Technical Univ. (Russian Federation); Arsen K. Zotov, Vladimir M. Masalov, Institute of Solid State Physics (Russian Federation); Anatoly N. Khodan, A. N. Frumkin Institute of Physical Chemistry and Electrochemistry (Russian Federation); Gennady A. Komandin, A. M. Prokhorov General Physics Institute of the RAS (Russian Federation); Vladimir N. Kurlov, Institute of Solid State Physics (Russian Federation); Kirill I. Zaytsev, A. M. Prokhorov General Physics Institute (Russian Federation) and Bauman Moscow State Technical Univ. (Russian Federation) [11348-43]

Measurement and modeling of adipose tissue and its components with temperature changes in the terahertz range, Irina Yu Y. Yanina, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation); Viktor Nikolaev, Olga A. Zakharova, Alexey Borisov, National Research Tomsk State Univ. (Russian Federation); Konstantin N. Dvoretzki, Saratov State Medical Univ. (Russian Federation); Kirill V. Berezin, Saratov State Univ. (Russian Federation); Vyacheslav I. Kochubey, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation); Yuri V. Kistenev, National Research Tomsk State Univ. (Russian Federation); Valery V. Tuchin, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation) [11348-44]

Properties of BIBO crystal in the terahertz regime, Nazar Nikolaev, State Key Lab. of Infrared Physics, The Shanghai Institute of Technical Physics (China) and Key Lab. of Space Active Opto-electronics Technology, The Shanghai Institute of Technical Physics (China) and Institute of Automation and Electrometry of the SB RAS (Russian Federation) [11348-45]

Intense terahertz generation from transparent solid dielectric medium, Sonal Saxena, Suman Bagchi, M. Tayyab, J. A. Chakera, Raja Ramanna Ctr. for Advanced Technology (India) [11348-46]

Optically pumped terahertz modulator based on few layers of VS₂ on silicon, Alka Jakhar, Indian Institute of Technology Delhi (India); Prabhat Kumar, Institute of Physics of the CAS, v.v.i. (Czech Republic); Samaresh Das, Indian Institute of Technology Delhi (India) [11348-47]

High-efficiency polarization beam splitter based on all-dielectric metasurface, Mengyu Yang, Chunyan Qin, Xiaoju Huang, Zhongquna Wen, Yinhe Liu, Chongqing Univ. (China) [11348-48]

Modified theory of terahertz time domain magneto-optical ellipsometry of magnetic mediums, Anna V. Kuzikova, Mikhail G. Novoselov, Anna V. Vozianova, Mikhail K. Khodzitsky, ITMO Univ. (Russian Federation) [11348-49]

THURSDAY 2 APRIL

HOT TOPICS III THU 9:00 TO 10:35

Photonics Europe 2020: Hot Topics Session III

- 9.00 - 9.05 **Introduction**
Thierry Georges, Oxxius, France
2019 Symposium Chair
- 9.05 - 9.50 **Ultrafast solid-state lasers: a success story for the last 30 years with no end in sight**
Ursula Keller, ETH Zurich, Switzerland
- 9:50 - 10:35 **From inverse design to implementation of practical quantum photonics**
Jelena Vuckovic, Stanford Univ., United States

For additional details see page 9

SESSION 6 THU 11:00 TO 12:20

Terahertz Imaging II

Joint Session between Conferences Unconventional Optical Imaging (11351) and Terahertz Photonics (11348)

Note: this session runs concurrently with Session 7 in Terahertz Photonics Conference (11348) and with Session 15 in Unconventional Optical Imaging Conference (11351).

Practical aid of LTEM for semiconductor R&D (*Invited Paper*), Masayoshi Tonouchi, Osaka Univ. (Japan) [11348-26]

THz imaging-assisted alignment of submillimeter wave spectroscopic system for quantification of corneal water content (*Invited Paper*), Mariangela Baggio, Aalto Univ. (Finland); Yong Hu, Univ. of California, Los Angeles (United States); Alekski Tamminen, Irina Nefedova, Juha Ala-Laurinaho, Zachary Taylor, Aalto Univ. (Finland) [11348-27]

A novel approach for lensless high-resolution terahertz imaging, Dilyan Damyanov, Benedikt Friederich, Kevin Kolpatzke, Xuan Liu, Andreas Czyliwlik, Thorsten Schultze, Ingolf Willms, Jan C. Balzer, Univ. Duisburg-Essen (Germany) [11348-28]

Terahertz LASSO compressed sensing tomography system, Khine Thin Zar Htun, Yangon Technological Univ. (Myanmar) and National Tsing Hua Univ. (Taiwan); Bo-Yi Wu, Feng-Lien Wang, Yi-Chun Hung, Shang-Hua Yang, National Tsing Hua Univ. (Taiwan) [11348-29]

SESSION 7..... THU 10:50 TO 12:30

Condensed Matter at Terahertz Frequencies I

Session Chairs: **Sarah Houver**,
Lab. de Physique de l'ens de Lyon (France); **Lyubov V. Titova**,
Worcester Polytechnic Institute (United States)

Terahertz gain and amplification in current-driven metasurfaces of graphene Dirac plasmons (*Invited Paper*), Taiichi Otsuji, Tohoku Univ. (Japan) [11348-22]

Nonlinear terahertz optics of graphene (*Invited Paper*), Hassan A. Hafez Eid, Dmitry Turchinovich, Univ. Bielefeld (Germany). [11348-23]

Ultralow carrier recombination processes close to Dirac point in graphene/hBN heterostructures (*Invited Paper*), Juliette Mangeney, Lab. de Physique de l'ENS, CNRS (France); Panhui Huang, Simon Messelot, Holger Graef, Jerome Tignon, Lab. de Physique de l'ENS (France); Takashi Taniguchi, National Institute for Materials Science (Japan); Sukhdeep Dhillon, Bernard Plaçais, Robson Ferreira, Lab. de Physique de l'ENS (France) [11348-24]

Terahertz high harmonic generation in Dirac materials: techniques and applications (*Invited Paper*), Michael Gensch, Technische Univ. Berlin (Germany) and Institut für Optische Sensorsysteme, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) [11348-25]

Lunch Break Thu 12:30 to 13:40

SESSION 8..... THU 13:40 TO 15:30

Condensed Matter at Terahertz Frequencies II

Session Chairs: **Dmitry Turchinovich**, Univ. Bielefeld (Germany);
Michael Ruggiero, The Univ. of Vermont (United States)

Imaging ultrafast phenomena on the nanoscale (*Keynote Presentation*), Frank A. Hegmann, Univ. of Alberta (Canada) [11348-30]

2D THz spectroscopic investigation of ballistic conduction-band electron dynamics in InSb (*Invited Paper*), Sarah Houver, Lucas Huber, Matteo Savoini, Elsa Abreu, Steven Johnson, ETH Zurich (Switzerland). [11348-31]

Polaron coherence in hybrid metal halide perovskites measured by time-resolved THz spectroscopy (*Invited Paper*), David G. Cooke, Yang Lan, Benjamin Dringoli, McGill Univ. (Canada); David Valverde-Chavez, Georgia Institute of Technology (United States); Xixi Tao, Xianghua Kong, McGill Univ. (Canada); Yihui He, Northwestern Univ. (United States); Carlito Ponceca Jr., Linköping Univ. (Sweden); Xiaohong Zheng, Univ. of Science and Technology of China (China); Mark Sutton, Hong Guo, McGill Univ. (Canada); Mercuri Kanatzidis, Northwestern Univ. (United States). [11348-32]

Study of ultrafast magnetism by THz emission spectroscopy, Wentao Zhang, Univ. Bielefeld (Germany); Pablo Maldonado, Uppsala Univ. (Sweden); Zuanming Jin, Shanghai Univ. (China); Jacek Arabski, Institut de physique et chimie des matériaux de Strasbourg (France); Guy Schmerber, Institut de Physique et de Chimie des Matériaux de Strasbourg (France); Eric Beaurepaire, Institut de physique et chimie des matériaux de Strasbourg (France); Mischa Bonn, Max-Planck-Institut für Polymerforschung (Germany); Tobias Kampfrath, Freie Univ. Berlin (Germany); Peter Oppeneer, Uppsala Univ. (Sweden); Dmitry Turchinovich, Univ. Bielefeld (Germany) [11348-33]

SESSION 9..... THU 16:00 TO 17:40

Condensed Matter at Terahertz Frequencies III

Session Chairs: **Hassan A. Hafez Eid**, Univ. Bielefeld (Germany);
Juliette Mangeney, Lab. de Physique Statistique de l'ENS (France)

Giant optical nonlinearity interferences in quantum structures (*Invited Paper*), Sukhdeep Dhillon, Lab. de Physique de l'ENS (France); Sarah Houver, Lab. de Physique de l'ens de Lyon (France); Jerome Tignon, Juliette Mangeney, Robson Ferreira, Lab. de Physique de l'ENS (France). . . [11348-34]

THz spectroscopy of MXenes: promise for applications ranging from electromagnetic interference shielding to conductive electrodes (*Invited Paper*), Lyubov V. Titova, Guangjiang Li, Teng Shi, Worcester Polytechnic Institute (United States); Varun Natu, Drexel Univ. (United States); Naaman Amer, Univ. of Alberta (Canada); Shuohan Huang, Missouri Univ. of Science and Technology (United States); Hassan A. Hafez Eid, Univ. Bielefeld (Germany); Frank A. Hegmann, Univ. of Alberta (Canada); Dmitry Turchinovich, Univ. Bielefeld (Germany); Vadym Mochalin, Missouri Univ. of Science and Technology (United States); Michel Barsoum, Drexel Univ. (United States). [11348-35]

Subcycle dynamics in strong terahertz nearfields (*Invited Paper*), Georg Herink, Univ. Bayreuth (Germany) [11348-36]

Terahertz vibrational motions dictate and drive the properties of advanced materials (*Invited Paper*), Michael Ruggiero, The Univ. of Vermont (United States) [11348-37]

CONFERENCE 11349

Monday–Tuesday 30 March–31 March 2020 • Proceedings of SPIE Vol. 11349

3D Printed Optics and Additive Photonic Manufacturing II

Conference Chairs: **Alois M. Herkommer**, Univ. Stuttgart (Germany); **Georg von Freymann**, Technische Univ. Kaiserslautern (Germany); **Manuel Flury**, Institut National des Sciences Appliquées de Strasbourg (France)

Programme Committee: **Klaus Bade**, Karlsruher Institut für Technologie (Germany); **Muriel Carin**, Univ. de Bretagne-Sud (France); **Thierry Engel**, IREPA LASER (France); **Harald Giessen**, Univ. Stuttgart (Germany); **Kevin J. Heggarty**, Télécom Bretagne (France); **Andreas Heinrich**, Hochschule Aalen - Technik und Wirtschaft (Germany); **Hans Peter Herzig**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Christian Koos**, Karlsruher Institut für Technologie (Germany); **David Pietroy**, Univ. Jean Monnet Saint-Etienne (France); **Michael Thiel**, Nanoscribe GmbH (Germany); **Michael Totzeck**, Carl Zeiss SMT GmbH (Germany); **Reinhard Voelkel**, SUSS MicroOptics SA (Switzerland)

MONDAY 30 MARCH

HOT TOPICS I MON 9:00 TO 11:00

Photonics Europe 2020: Hot Topics Session I

- 9:00 - 9:20 **SPIE Welcome and Award Presentation**
John E. Greivenkamp, Univ of Arizona, United States
SPIE President
Welcome
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
City of Strasbourg Welcome
- 9:25 - 9:30 **Introduction to Hot Topics**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- 9:30 - 10:15 **Naturally fast and low power electro-optic polymer optical devices are ideally positioned for the next-generation Internet photonics roadmap**
Michael Lebby, CEO Lightwave Logic, United Kingdom
- 10:15 - 11:00 **3D printed micro-optics: state of the art and future challenges**
Harald Giessen, University of Stuttgart, Germany

For additional details see pages 6-7

SESSION 1 MON 11:30 TO 12:40

Advanced Printing Technology

- Two-photon grayscale lithography** (*Invited Paper*), Michael Thiel, Nanoscribe GmbH (Germany) [11349-1]
- Towards massive parallel nanofabrication by two-photon polymerization with improved photoresists**, Caroline Arnoux, Cyrille Monnereau, Akos Banyasz, Ecole Normale Supérieure de Lyon (France); Kevin Heggarty, IMT Atlantique Bretagne-Pays de la Loire (France); Patrice Baldeck, Ecole Normale Supérieure de Lyon (France) [11349-2]
- Fast multifocus 3D printing based on two-photon polymerization**, Wenqi Ouyang, Songyung Gu, Shih-Chi Chen, The Chinese Univ. of Hong Kong (Hong Kong, China) [11349-3]
- Lunch Break Mon 12:40 to 13:50

SESSION 2 MON 13:50 TO 15:20

3D Printed Optics

- Translating optical design freedom into 3D printed complex micro-optics** (*Invited Paper*), Simon Thiele, Andrea Toulouse, Simon Ristok, Harald Giessen, Alois Herkommer, Univ. Stuttgart (Germany) [11349-4]
- Design, fabrication and characterization of freeform optical microstructures for complex illumination tasks**, Tamara Aderneuer, Oscar Fernández, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland); Maximilian Marhöfer, Jonathan Schmidli, Fachhochschule NordWestschweiz (Switzerland); Magnus Kristiansen, Fachhochschule NordWestschweiz (Switzerland) and Paul Scherrer Institut (Switzerland); Rolando Ferrini, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland) [11349-5]

Refractive index tuning of optical photopolymer materials through multimaterial aerosol jet printing for additive manufacturing of gradient-index optics, Hossein Salmani Rezaei, Gerrit Hohenhoff, Peter Jäschke, Stefan Kaierle, Ludger Overmeyer, Laser Zentrum Hannover e.V. (Germany) [11349-6]

Femtosecond laser 3D microfabrication of medical microdevices via hybrid additive-subtractive manufacturing, Linas Jonušauskas, Dovile Andrijev, Tomas Baravykas, Agne Butkute, Femtika UAB (Lithuania), Vilnius Univ. (Lithuania); Olga Kornysheva, Mantas Stankevicius, Vytautas Magnus Univ. (Lithuania); Tomas Gadišauskas, Femtika UAB (Lithuania); Tomas Dervinskas, Vytautas Magnus Univ. (Lithuania); Vytautas Purlys, Femtika UAB (Lithuania), Vilnius Univ. (Lithuania); Audrius Maruška, Vytautas Magnus Univ. (Lithuania) [11349-7]

SESSION 3 MON 15:50 TO 17:40

Fibres and Interconnects

- Ultra-compact single-mode fiber optical tweezer based on a 3D printed hybrid micro-optical structure** (*Invited Paper*), Andrea Bertocini, King Abdullah Univ. of Science and Technology (Saudi Arabia); Innem V. A. K. Reddy, King Abdullah Univ. of Science and Technology (Saudi Arabia) and Univ. at Buffalo (United States); Carlo Liberale, King Abdullah Univ. of Science and Technology (Saudi Arabia) [11349-8]
- Mode-field matching design, 3D fabrication and characterization of down-tapers on single-mode optical fiber tips for coupling to photonic integrated circuits**, Koen Vanmol, Vrije Univ. Brussel (Belgium); Vivek Panapakkam, Saurav Kumar, CommScope, Inc. (Belgium); Hugo Thienpont, Vrije Univ. Brussel (Belgium); Jan Watté, CommScope, Inc. (Belgium); Jürgen Van Erps, Vrije Univ. Brussel (Belgium) [11349-9]
- Light cage: centimeters-long 3D printed hollow-core waveguide for light-matter interaction and light manipulation**, Bumjoon Jang, Leibniz-Institut für Photonische Technologien e.V. (Germany); Julian Gargiulo, Nanoinstitut München, Ludwig-Maximilians-Univ. München (Germany); Mario Ziegler, Uwe Hübner, Leibniz-Institut für Photonische Technologien e.V. (Germany); Stefan A. Maier, Nanoinstitut München, Ludwig-Maximilians-Univ. München (Germany) and Imperial College London (United Kingdom); Markus A. Schmidt, Leibniz-Institut für Photonische Technologien e.V. (Germany) and Otto-Schott-Institut für Materialforschung, Friedrich-Schiller-Univ. Jena (Germany) and Abbe Ctr. of Photonics, Friedrich-Schiller-Univ. Jena (Germany) [11349-10]
- Generation of functional curved waveguides by CO₂-laser based deposition of coreless fused silica fibers**, Fabian Kranert, Laser Zentrum Hannover e.V. (Germany); Katharina Rettschlag, Leibniz Univ. Hannover (Germany) and Laser Zentrum Hannover e.V. (Germany); Andreas Wienke, Arndt Hohnholz, Jörg Neumann, Peter Jäschke, Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany); Roland Lachmayer, Institut für Produktentwicklung und Gerätebau, Leibniz Univ. Hannover (Germany) and Laser Zentrum Hannover e.V. (Germany) [11349-11]
- Stereolithographic printed polymers on ceramic for 3D opto-MID**, Lukas Lorenz, Thomas Ackstaller, Karlheinz Bock, TU Dresden (Germany) [11349-12]

TUESDAY 31 MARCH

SESSION 4..... TUE 8:30 TO 10:00

3D Printed Metals and Ceramics

Fabrication and characterization of 3D silver microstructures (*Invited Paper*), Erik Hagen Waller, Technische Univ. Kaiserslautern (Germany); Georg von Freymann, Technische Univ. Kaiserslautern (Germany) and Fraunhofer-Institut für Techno- und Wirtschaftsmathematik ITWM (Germany) [11349-13]

Additive manufacturing of copper-molybdenum pseudoalloys, Robert Bernhard, Philipp Neef, Henning Wiche, Volker Wesling, Technische Univ. Clausthal (Germany) [11349-14]

Use of 3D printing in astronomical mirror fabrication, Mélanie Roulet, Lab. d'Astrophysique de Marseille, Aix Marseille Univ. (France) and CNRS (France); Carolyn Atkins, UK Astronomy Technology Ctr. (United Kingdom); Emmanuel Hugot, Lab. d'Astrophysique de Marseille, Aix Marseille Univ. (France) and CNRS (France); Hermine Schnelzer, UK Astronomy Technology Ctr. (United Kingdom); Michel Marcos, Lab. d'Astrophysique de Marseille, Aix Marseille Univ. (France) and CNRS (France); Rob Snell, The Univ. of Sheffield (United Kingdom); Leon Brouwers, TNO (Netherlands); Sabri Lemared, Lab. d'Astrophysique de Marseille, Aix Marseille Univ. (France) and CNRS (France); Katherine Morris, UK Astronomy Technology Ctr. (United Kingdom) [11349-15]

Preparation of 3D glass ceramic micro-/nanostructures by combining laser nanolithography with calcination, Greta Merkininkaitė, Femtika UAB (Lithuania) and Vilnius Univ. (Lithuania); Edvinas Aleksandravicius, Vilnius Univ. (Lithuania); Darius Gailevicius, Femtika UAB (Lithuania) and Vilnius Univ. (Lithuania); Simonas Varapnickas, Mangirdas Malinauskas, Simas Šakirzanovas, Vilnius Univ. (Lithuania) [11349-16]

SESSION 5..... TUE 10:30 TO 11:40

3D Printing of Macro-optics

3D-printed freeform macro-optics for illumination and imaging (*Invited Paper*), Jyrki Saarinen, Univ. of Eastern Finland (Finland) [11349-17]

Mode-locked diode lasers as sources for two-photon polymerization, Nils Surkamp, Gordon Zyla, Evgeny L. Gurevich, Ruhr-Univ. Bochum (Germany); Andreas Klehr, Andrea Knigge, Ferdinand-Braun-Institut Leibniz-Institut für Höchstfrequenztechnik (Germany); Andreas Ostendorf, Martin R. Hofmann, Ruhr-Univ. Bochum (Germany) [11349-18]

Investigation of the ability of SLB 3D printing process for fabrication of micro-optical structures, Mohammadreza Riahi, Shahid Beheshti Univ. (Iran, Islamic Republic of); Payam Habibzadeh, Hadis Goudarzi, K.N. Toosi Univ. of Technology (Iran, Islamic Republic of) [11349-19]

SESSION 6..... TUE 11:40 TO 13:00

Metasurfaces and Resonators

3D printed metasurface for high-capacity orbital angular momentum holography, Haoran Ren, Ludwig-Maximilians-Univ. München (Germany); Jaehyuck Jang, Pohang Univ. of Science and Technology (Korea, Republic of); Xinyuan Fang, Univ. of Shanghai for Science and Technology (China); Johannes Buerger, Ludwig-Maximilians-Univ. München (Germany); Junsuk Rho, Pohang Univ. of Science and Technology (Korea, Republic of); Stefan A. Maier, Ludwig-Maximilians-Univ. München (Germany) ... [11349-20]

On-fiber nanoprinted metalens for optical trapping, Malte Pliedschun, Leibniz-Institut für Photonische Technologien e.V. (Germany); Haoran Ren, Nanoinstitut München (Germany); Bumjoon Jang, Leibniz-Institut für Photonische Technologien e.V. (Germany); Stefan A. Maier, Nanoinstitut München (Germany) and Imperial College London (United Kingdom); Markus A. Schmidt, Leibniz-Institut für Photonische Technologien e.V. (Germany) and Otto-Schott-Institut für Materialforschung, Friedrich-Schiller-Univ. Jena (Germany) [11349-21]

Size-selective optical printing of silicon nanoparticles through their dipolar magnetic resonance, María Cecilia Zaza, Ctr. de Investigaciones in Bionanociencias (Argentina) and Univ. de Buenos Aires (Argentina); Ianina L. Violi, Ctr. de Investigaciones in Bionanociencias (Argentina); Julian Gargiulo, Imperial College London (United Kingdom); Germán Chiarelli, Ctr. de Investigaciones in Bionanociencias (Argentina) and Univ. de Buenos Aires (Argentina); Ludmila Schumacher, Jurij Jakobi, Univ. Duisburg-Essen (Germany); Jorge Olmos Trigo, Donostia International Physics Ctr. (Spain); Emiliano Cortés, Imperial College London (United Kingdom) and Ludwig-Maximilians-Univ. München (Germany); Matthias König, Stephan Barcikowski, Sebastian Schlücker, Univ. Duisburg-Essen (Germany); Juan José Sáenz, Donostia International Physics Ctr. (Spain) and IKERBASQUE, Basque Foundation for Science (Spain); Stefan A. Maier, Imperial College London (United Kingdom) and Ludwig-Maximilians-Univ. München (Germany); Fernando D. Stefani, Ctr. de Investigaciones in Bionanociencias (Argentina) and Univ. de Buenos Aires (Argentina) [11349-22]

Polymer-based racetrack microring resonator fabricated on micropillars, Kamal Rudra, Indian Institute of Science, Bengaluru (India) and Indian Institute of Technology Kharagpur (India); Shailendra K. Varshney, Indian Institute of Technology Kharagpur (India) [11349-23]

POSTERS-TUESDAY TUE 18:05 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Tuesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

Design and prototyping of beam shapers to generate circular or square top hat beams of different size for additive manufacturing applications, Gebirte Yizengaw Belay, Michael Vervaeke, Sijie Liao, Vrije Univ. Brussel (Belgium); Piet Vandenecker, Tom Y. Craeghs, Materialise N.V. (Belgium); Hugo Thienpont, Jürgen Van Erps, Vrije Univ. Brussel (Belgium) ... [11349-24]

Manufacturing and analyzing of cost-efficient Fresnel lenses using stereolithography, Abhijeet Shrotri, Micha Beyer, Oliver Stübbe, Technische Hochschule Ostwestfalen-Lippe (Germany) [11349-25]

Proximity effect in parallelized microfabrication using two-photon polymerization, Luis Adrian Pérez Covarrubias, IMT Atlantique Bretagne-Pays de la Loire (France); Caroline Arnoux, Ecole Normale Supérieure de Lyon (France); Quentin Carlier, Alexandre Khaldi, IMT Atlantique Bretagne-Pays de la Loire (France); Patrice Baldeck, Ecole Normale Supérieure de Lyon (France); Kevin Heggarty, IMT Atlantique Bretagne-Pays de la Loire (France) . [11349-26]

Laser forming of tissue-engineering structures with nanocarbon scaffolds in the bioorganic matter, Alexander Y. Gerasimenko, Dmitry Ryabkin, National Research Univ. of Electronic Technology (Russian Federation) and I. M. Sechenov First Moscow State Medical Univ. (Russian Federation) [11349-27]

3D selective laser etching for microfluidical and micromechanical applications, Agne Butkute, Femtika UAB (Lithuania), Vilnius Univ. (Lithuania); Tomas Baravykas, Femtika UAB (Lithuania); Tomas Gadišauskas, Femtika UAB (Lithuania), The General Jonas Žemaitis Military Academy of Lithuania (Lithuania); Linas Jonušauskas, Vytautas Purlys, Femtika UAB (Lithuania), Vilnius Univ. (Lithuania); Valdas Sirutkaitis, Vilnius Univ. (Lithuania) [11349-28]

Femtosecond laser micromachining: towards industrial solutions, Gedvinas Nemickas, Gabrielius Kontenis, Arnas Zemaitis, Linas Jonušauskas, Vytautas Purlys, Femtika UAB (Lithuania), Vilnius Univ. (Lithuania) .. [11349-29]

Ultrafast 3D printing with bottom side exposure in selective laser baking technology of PDMS elastomer for 3D printing of PDMS mold for optical component replication, Mohammadreza Riahi, Shahid Beheshti Univ. (Iran, Islamic Republic of); Hadis Goudarzi, Payam Habibzadeh, K.N. Toosi Univ. of Technology (Iran, Islamic Republic of) [11349-30]

Additive manufacturing of magnetic materials using selective laser melting, Baydaa Obeid, Lab. Hubert Curien (France); David Piétroy, Lab. Hubert Curien (France); Bernard Bayard, Lab. Hubert Curien (France); Jean-Pierre Chatelon, Lab. Hubert Curien (France); Stéphane Capraro, Jean-Jacques Rousseau, Lab. Hubert Curien (France) [11349-31]

Laser formation of electrically conductive nanocomposites for bioelectronic applications, Natalia Demidenko, National Research Univ. of Electronic Technology (Russian Federation) [11349-32]

Digital Optics for Immersive Displays II (DOID20)

Conference Chairs: **Bernard C. Kress**, Microsoft Corp. (United States); **Christophe Peroz**, Magic Leap, Inc. (United States)

Programme Committee: **Tibor Balogh**, Holografika Kft. (Hungary); **Christian Bosshard**, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland); **Federico Capasso**, Harvard School of Engineering and Applied Sciences (United States); **Dan Curticapean**, Hochschule Offenburg (Germany); **Arie den Boef**, ASML Netherlands B.V. (Netherlands); **Andreas Hermerschmidt**, HOLOEYE Photonics AG (Germany); **Hong Hua**, College of Optical Sciences, The Univ. of Arizona (United States); **Norbert Kerwien**, Carl Zeiss AG (Germany); **Stan Larroque**; **ByoungHo Lee**, Seoul National Univ. (Korea, Republic of); **Scott McElDowney**, Oculus VR, LLC (United States); **Darran Milne**; **Juan C. Miñano**, Limbak 4PI S.L. (Spain); **Ilmars Osmanis**, Lightspace Technologies, SIA (Latvia); **Silvania F. Pereira**, Technische Univ. Delft (Netherlands); **Pascal Picart**, Univ. du Maine (France); **Demetri Psaltis**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Monika Ritsch-Marte**, Medizinische Univ. Innsbruck (Austria); **Peter Schelkens**, Vrije Univ. Brussel (Belgium); **Robert Stevens**, Adlens Ltd (United Kingdom); **Hagen Stolle**, SeeReal Technologies GmbH (Germany); **Hugo Thienpont**, Vrije Univ. Brussel (Belgium); **Reinhard Voelkel**, SUSS MicroOptics SA (Switzerland)

MONDAY 30 MARCH

HOT TOPICS I MON 9:00 TO 11:00

Photonics Europe 2020: Hot Topics Session I

- 9:00 - 9:20 **SPIE Welcome and Award Presentation**
John E. Greivenkamp, Univ of Arizona, United States
 SPIE President
- Welcome**
Paul Montgomery, Univ. of Strasbourg, France
 2019 Symposium Chair
- City of Strasbourg Welcome**
- 9:25 - 9:30 **Introduction to Hot Topics**
Paul Montgomery, Univ. of Strasbourg, France
 2019 Symposium Chair
- 9:30 - 10:15 **Naturally fast and low power electro-optic polymer optical devices are ideally positioned for the next-generation Internet photonics roadmap**
Michael Leppy, CEO Lightwave Logic, United Kingdom
- 10:15 - 11:00 **3D printed micro-optics: state of the art and future challenges**
Harald Giessen, University of Stuttgart, Germany

For additional details see pages 6-7

SESSION 1 MON 11:20 TO 13:00

Digital Optics for AR and VR Systems

Session Chair: **Bernard C. Kress**, Microsoft Corp. (United States)

- Effects of polarisation and spatial coherence for pupil expansion with crossed gratings in an AR display**, Choon How Gan, Marie-Elena Kleemann, Anna Golos, Salim Valera, WaveOptics, Ltd. (United Kingdom) [11350-1]
- The design of geometric optical lightguide for augmented reality display**, Shuo Zhao, Shenzhen Lochn Optics Technology Co., Ltd. (China) . . . [11350-2]
- Design metric for forming holographic lenses at 850nm with volume Bragg grating**, Jianbo Zhao, Benjamin D. Chrysler, Jillian Nguyen, Raymond K. Kostuk, The Univ. of Arizona (United States) [11350-3]
- Double-pass HOE operation for compact AR glasses design**, Kseniia Lvova, Bauman Moscow State Technical Univ. (Russian Federation)

and P. N. Lebedev Physical Institute (Russian Federation); Anastasiia Kalinina, Moscow Institute of Physics and Technology (Russian Federation); Anastasia Perevoznikova, Bauman Moscow State Technical Univ. (Russian Federation) and P. N. Lebedev Physical Institute (Russian Federation); Andrey Putilin, P. N. Lebedev Physical Institute (Russian Federation) . [11350-4]

Wide-field-of-view augmented reality eyeglasses using curved wedge waveguide, Anastasiia Kalinina, Moscow Institute of Physics and Technology (Russian Federation); Andrey Putilin, P. N. Lebedev Physical Institute (Russian Federation) [11350-5]

Lunch Break Mon 13:00 to 14:00

SESSION 2 MON 14:00 TO 15:30

Digital Optics Fabrication and Testing for Immersive Displays

Session Chair: **Christophe Peroz**, Magic Leap, Inc. (United States)

Curved microdisplay, from optical design to mechanical study: impact on form-factor and light efficiency in visual systems (Invited Paper), Simon Charrière, CEA-Tech Grenoble (France) [11350-6]

High refractive index glass wafers for AR waveguide technology: glass wafers in larger diameter to enable cost efficiency for consumer ready devices, Berthold Lange, SCHOTT AG (Germany) [11350-7]

Evaluation of augmented reality (AR) displays performance based on human visual perception, Sébastien de Cunsel, WaveOptics, Ltd. (United Kingdom) [11350-8]

Large-area geometric-phase optics fabricated by microdot hologram rubbing, Yeonghwa Ryu, Jonghyuk Park, Seok Ho Song, Hanyang Univ. (Korea, Republic of) [11350-9]

SESSION 3 MON 16:00 TO 17:20

Digital Optics for 3D Imaging and 3D Display

Xsliit cameras for free navigation with depth image-based rendering, Sarah Fachada, Gauthier Lafruit, Univ. Libre de Bruxelles (Belgium) [11350-10]

Waveguide-type stereoscopic display using grating matrix array, Hyung Ju Rah, Seung Min Lee, Yeonghwa Ryu, Seok Ho Song, Hanyang Univ. (Korea, Republic of) [11350-11]

Projection type 3D display using multidirectional screen, Seung Min Lee, Hyung Ju Rah, Yeonghwa Ryu, Seok Ho Song, Hanyang Univ. (Korea, Republic of) [11350-12]

EEG-based assessment of user performance for a volumetric multiplanar display, Mehrdad Naderi, Tatjana Pladere, Gunta Krūmina, Univ. of Latvia (Latvia) [11350-13]

CONFERENCE 11351

Monday–Thursday 30 March–2 April 2020 • Proceedings of SPIE Vol. 11351

Unconventional Optical Imaging II

Conference Chairs: **Corinne Fournier**, Univ. Jean Monnet Saint-Etienne (France); **Marc P. Georges**, Liège Univ. (Belgium); **Gabriel Popescu**, Univ. of Illinois at Urbana-Champaign (United States)

Programme Committee: **Tatiana Alieva**, Univ. Complutense de Madrid (Spain); **Pierre H. Chavel**, Institut d'Optique Graduate School (France); **Jürgen W. Czarske**, TU Dresden (Germany); **Julien Fade**, Univ. de Rennes 1 (France); **Irene Georgakoudi**, Tufts Univ. (United States); **Sylvain Gioux**, Univ. de Strasbourg (France); **Olivier Haerberlé**, Univ. de Haute Alsace (France); **Elizabeth M.C. Hillman**, Columbia Univ. (United States); **Giancarlo Pedrini**, Institut für Technische Optik (Germany); **Neus Sabater**, Technicolor (France); **Anne Sentenac**, Institut Fresnel (France); **Guohai Situ**, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences (China); **Enrique Tajahuerce**, Univ. Jaume I (Spain); **Pauline Trouvé**, ONERA (France); **Wilfried Uhring**; **Laura Waller**, Univ. of California, Berkeley (United States); **Keisuke Goda**, The Univ. of Tokyo (Japan)

MONDAY 30 MARCH

HOT TOPICS I MON 9:00 TO 11:00

Photonics Europe 2020: Hot Topics Session I

- 9:00 - 9:20 **SPIE Welcome and Award Presentation**
John E. Greivenkamp, Univ. of Arizona, United States
SPIE President
Welcome
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
City of Strasbourg Welcome
- 9:25 - 9:30 **Introduction to Hot Topics**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- 9:30 - 10:15 **Naturally fast and low power electro-optic polymer optical devices are ideally positioned for the next-generation Internet photonics roadmap**
Michael Lebby, CEO Lightwave Logic, United Kingdom
- 10:15 - 11:00 **3D printed micro-optics: state of the art and future challenges**
Harald Giessen, University of Stuttgart, Germany

For additional details see pages 6-7

SESSION 1 MON 11:30 TO 12:40

Advanced Methods: Tomography I

Session Chair: **Gabriel Popescu**, Univ. of Illinois (United States)

Computational imaging techniques in optical diffraction tomography (Keynote Presentation), Demetri Psaltis, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [11351-1]

Unconventional optical coherence tomography (Invited Paper), Adrian G. H. Podoleanu, Adrian Bradu, Ramona C. Cernat, Manuel Jorge M. Marques, Konstantin Kapinchev, Univ. of Kent (United Kingdom); Sylvain Rivet, Univ. de Bretagne Occidentale (France) [11351-2]
Lunch Break Mon 12:40 to 13:50

SESSION 2 MON 13:50 TO 15:10

Advanced Methods: Tomography II

Session Chair: **Olivier Haerberlé**, Univ. de Haute Alsace (France)

Recent progress in tomographic diffractive microscopy, Matthieu Debailleul, Nicolas Verrier, Olivier Haerberlé, Institut Univ. de Technologie de Mulhouse (France) [11351-3]
Large-scale polarization contrast optical diffraction tomography, Jeroen Kalkman, Jos van Rooij, Technische Univ. Delft (Netherlands) [11351-4]
Mirror effect-based tomographic diffraction microscopy, Nicolas Verrier, Ludovic Foucault, Matthieu Debailleul, Jean-Baptiste Courbot, Bruno Colicchio, Institut Univ. de Technologie de Mulhouse (France); Bertrand Simon, Institut d'Optique Graduate School (France); Laurent Vonna, Institut de Sciences des Matériaux de Mulhouse (France); Olivier Haerberlé, Institut Univ. de Technologie de Mulhouse (France) [11351-5]
A 3D imaging system based on scattered ionizing radiation, Cécilia Tarpau, Mai K. Nguyen, Équipes Traitement de l'Information et Systèmes (France) [11351-6]

SESSION 3 MON 15:40 TO 16:20

Advanced Methods: Scattering

Fluorescence speckle image correlation spectroscopy, Anirban Sarkar, Irène Wang, Lab. Interdisciplinaire de Physique (France); Aditya Katti, Jörg Enderlein, Georg-August-Univ. Göttingen (Germany); Jacques Derouard, Antoine Delon, Lab. Interdisciplinaire de Physique (France) [11351-7]
Imaging the optical properties of turbid media with single-pixel detection, Armin J. M. Lenz, Pere J. Clemente Pesudo, Vicent Climent Jordá, Jesús Lancis, Enrique Tajahuerce, Univ. Jaume I (Spain) [11351-8]

SESSION 4 MON 16:20 TO 17:20

Advanced Methods: Microscopy

Laser scanning optical-frequency-comb microscopy for multivariate measurement related to amplitude and phase, Takeo Minamikawa, Shota Nakano, Eiji Hase, Tokushima Univ. (Japan); Akifumi Asahara, The Univ. of Electro-Communications (Japan); Hidenori Koresawa, Takahiko Mizuno, Tokushima Univ. (Japan); Hirotsugu Yamamoto, Utsunomiya Univ. (Japan); Kaoru Minoshima, The Univ. of Electro-Communications (Japan); Takeshi Yasui, Tokushima Univ. (Japan) [11351-9]
Resolution enhancement by photon reassignment in confocal reflectance white light microscopy, Jose-Alberto Aguilar Mora, Lab. Photonique, Numérique et Nanosciences (France); Laurent Cognet, Lab. Photonique, Numérique et Nanosciences (France) and Univ. de Bordeaux (France); Pierre Bon, Lab. Photonique, Numérique et Nanosciences (France) [11351-10]
A shadow image microscope based on an array of nanoLEDs, Joan Canals, Univ. of Barcelona (Spain); Nil Franch, Víctor Moro, Sergio Moreno, Oscar Alonso, Anna Vilà, Juan Daniel Prades, Angel Diéguez, Univ. de Barcelona (Spain); Jan Güllink, Daria D. Bezshlyakh, Andreas Waag, Technische Univ. Braunschweig (Germany) [11351-11]

TUESDAY 31 MARCH

SESSION 5 TUE 8:40 TO 10:20

Modelling, Computing, Design: Co-design

Session Chair: **Pauline Trouvé-Peloux**, ONERA (France)

Can phase masks extend depth-of-field in localization microscopy?, Olivier Lévêque, Caroline Kulcsár, François Goudail, Institut d'Optique Graduate School (France) [11351-12]
Employing complementary random mask patterns in double-lens CASSI method, Jiri Hlubucek, Karel Zidek, Institute of Plasma Physics of the CAS, v.v.i. (Czech Republic) [11351-13]
What is the depth of field reachable in practice with generic binary phase masks and digital deconvolution?, Alice Fontbonne, Hervé Sauer, Caroline Kulcsár, Anne-Lise Coutrot, François Goudail, Lab. Charles Fabry (France) [11351-14]
Image sensor with parallel signal processing for motion detection, Volodymyr N. Borovytsky, National Technical Univ. of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" (Ukraine); Vitalii Antonenko, National Technical Univ. of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" (Ukraine) [11351-15]
Analog diffractive optical elements for Gabor-Denisjuk holographic imaging, Jennifer Nguyen, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France) and PSA Group (France); Yoshitake Takakura, Marc P. Torzynski, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France); Jihad Zallat, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France) and Télécom Physique Strasbourg (France) [11351-16]

CONFERENCE 11351

SESSION 6..... TUE 10:50 TO 12:40

Applications: Biomed I

Session Chair: **Gabriel Popescu**, Univ. of Illinois (United States)

Large-scale multicolor multiphoton microscopy of brain tissue (*Keynote Presentation*), Emmanuel Beaufreire, Ecole Polytechnique (France) [11351-17]

Monitoring of cardiovascular pathologies by laser Doppler holography of the retina (*Invited Paper*), Michael Atlan, Institut Langevin Ondes et Images (France); Leo Puyo, Ctr. Hospitalier National d'Ophthalmologie des Quinze-Vingts (France); Mathias Fink, Institut Langevin Ondes et Images (France); Michel Paques, José-Alain Sahel, Ctr. Hospitalier National d'Ophthalmologie des Quinze-Vingts (France) [11351-18]

Automatic counting of microorganisms with a lens-free microscope combined with dedicated algorithms, Caroline Paulus, Thomas Bordy, Camille Deforceville, Olivier Cioni, Sophie Morales, CEA-LETI (France); Elodie Colin, Jean-François Hupé, Mathieu Castex, Lallemand Inc. (France) [11351-19]

On-chip holographic cyto-tomography, Pasquale Memmolo, Lisa Miccio, Martina Mugnano, Francesco Merola, Pietro Ferraro, Istituto di Scienze Applicate e Sistemi Intelligenti "Eduardo Caianiello" (Italy) [11351-20]

Lunch/Exhibition Break Tue 12:40 to 13:50

SESSION 7..... TUE 13:50 TO 16:00

Applications: Biomed II

Session Chair: **Irene Georgakoudi**, Tufts Univ. (United States)

Biological lenses as new archetype in optics and photonics (*Keynote Presentation*), Pietro Ferraro, Lisa Miccio, Francesco Merola, Martina Mugnano, Simonetta Grilli, Jaromir Behal, Biagio Mandracchia, Pasquale Memmolo, Istituto di Scienze Applicate e Sistemi Intelligenti "Eduardo Caianiello" (Italy) [11351-21]

Video lens-free microscopy of human cells: from standard 2D to 3D organoids culture (*Invited Paper*), Cédric Allier, Sophie Morel, Anthony Berdeu, Lionel Hervé, Thomas Bordy, CEA-LETI (France); Michel Bornens, Sabine Bardin, Institut Curie, CNRS (France) and Univ. PSL (France); Xavier Gidrol, Nathalie Picollet-D'hahan, CEA-DRF (France) and INSERM (France); Sophie Morales, CEA-LETI (France) [11351-22]

Spectral encoded spatial frequency-based submicron scale microscopy to detect nanosensitive ultrastructural tissue morphology and its alteration in precancer progress, Nandan K. Das, National Univ. of Ireland, Galway (Ireland) [11351-23]

Chromatic aberration-based phase and fluorescence microscope for cell cycle study, Ondrej Mandula, Univ. Grenoble Alpes (France) and CEA-LETI (France); Jean-Philippe Kleman, Françoise Lacroix, Univ. Grenoble Alpes (France) and Institut de Biologie Structurale, CNRS (France); Dainel Fiore, Cédric Allier, Lionel Hervé, Sophie Morales, Univ. Grenoble Alpes (France) and CEA-LETI (France) [11351-24]

Automated lens-free, fluorescent microscopy to study cell populations, Dorothee Kraemer, Cédric Allier, Lionel Hervé, CEA-LETI (France); Kiran Padmanabhan, Institut de Génomique Fonctionnelle de Lyon (France); Adlen Foudi, INSERM (France); Sophie Morales, CEA-LETI (France) [11351-25]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair

16:35 to 17:20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States

17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

WEDNESDAY 1 APRIL

SESSION 8..... WED 9:00 TO 10:20

Modelling, Computing, Design: Deep Learning I

Session Chair: **Corinne Fournier**, Univ. Jean Monnet Saint-Etienne (France)

Intelligent imaging under extreme conditions (*Keynote Presentation*), Guohai Situ, Shanghai Institute of Optics and Fine Mechanics (China) [11351-26]

Deep neural networks for single-pixel compressive video reconstruction, Antonio Lorente Mur, Françoise Peyrin, Bruno Montcel, Nicolas Ducros, Ctr. de Recherche en Acquisition et Traitement d'images pour la Santé (France) [11351-27]

Quantitative phase retrieval and illumination learning via model-based deep learning, Ziling Wu, Yunhui Zhu, Virginia Polytechnic Institute and State Univ. (United States) [11351-28]

SESSION 9..... WED 10:50 TO 11:50

Modelling, Computing, Design: Deep Learning II

Session Chair: **Guohai Situ**, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences (China)

Alternation of inverse problem and deep learning approaches for phase retrieval with lens-free microscopy, Cédric Allier, Lionel Hervé, Olivier Cioni, Dorothee Kraemer, Ondrej Mandula, Mathilde Menneteau, Sophie Morales, CEA-LETI (France) [11351-29]

Real-time imaging through moving scattering layers via a two-step deep learning strategy, Meihua Liao, Dajiang Lu, Shenzhen Univ. (China); Giancarlo Pedrini, Wolfgang Osten, Univ. Stuttgart (Germany); Xiang Peng, Shenzhen Univ. (China) [11351-30]

Deep-learning neural network-based phase retrieval in quantitative phase microscopy, Yao Ye, Xin Shu, Renjie Zhou, The Chinese Univ. of Hong Kong (Hong Kong, China) [11351-31]

Lunch/Exhibition Break Wed 11:50 to 13:30

SESSION 10..... WED 13:30 TO 15:10

Modelling, Computing, Design: Computational Imaging

Session Chair: **Marc P. Georges**, Liège Univ. (Belgium)

Building an inverse approach for the reconstruction of in-line holograms: a parallel with Fienup's phase retrieval technique, Fabien Momey, Loïc Denis, Thomas Olivier, Lab. Hubert Curien (France); Corinne Fournier, Lab. Hubert Curien (France) and Univ. Jean Monnet Saint-Etienne (France) [11351-32]

Analysis of three-dimensional objects in quantitative phase contrast microscopy: a validity study of the planar approximation for spherical particles, Jérôme Dohet-Eraly, Univ. Libre de Bruxelles (Belgium); Loïc Méès, Univ. de Lyon (France); Thomas Olivier, Univ. Jean Monnet Saint-Etienne (France); Frank Dubois, Univ. Libre de Bruxelles (Belgium); Corinne Fournier, Univ. Jean Monnet Saint-Etienne (France) [11351-33]

Active chromatic depth from defocus for industrial inspection, Benjamin Buat, Pauline Trouvé-Peloux, Frédéric Champagnat, Guy Le Besnerais, ONERA (France); Thierry Simon, IUT Figeac (France) [11351-34]

Computational multimodal and multifocus 3D microscopy, Julia R. Alonso, Alejandro Silva, Univ. de la República Uruguay (Uruguay); Miguel Arocena, Univ. de la República Uruguay (Uruguay) and Instituto de Investigaciones Biológicas Clemente Estable (Uruguay) [11351-35]

Inverse problem approach for the reconstruction of lateral shearing digital holograms, Dylan Brault, Univ. de Lyon (France) and Lab. Hubert Curien, CNRS (France) and Institut d'Optique Graduate School (France); Corinne Fournier, Univ. de Lyon (France) and Univ. Jean Monnet Saint-Etienne (France) and École Supérieure d'optique (France); Thomas Olivier, Univ. de Lyon (France) and Univ. Jean Monnet Saint-Etienne, CNRS (France) and Institut d'Optique Graduate School (France); Arun Anand, The Maharaja Sayajirao Univ. of Baroda (India) [11351-36]

SESSION 11 WED 15:40 TO 17:40

Advanced Methods: QPI/DH

Partial coherence effects in digital holographic microscopy (*Keynote Presentation*), Frank Dubois, Jérôme Dohet-Eraly, Catherine Yourassowsky, Univ. Libre de Bruxelles (Belgium) [11351-37]

Accounting for the nonstationary correlated noise in digital holography, Olivier Flasseur, Loïc Denis, Univ. Jean Monnet Saint-Etienne (France); Éric Thiébaud, Ctr. de Recherche Astrophysique de Lyon (France); Thomas Olivier, Corinne Fournier, Univ. Jean Monnet Saint-Etienne (France) [11351-38]

Quantifying myelination of axons using spatial light interference microscopy (SLIM), Michael J. Fanous, Beckman Institute for Advanced Science and Technology (United States); Young Jae Lee, Beckman Institute for Advanced Science and Technology (United States) and Univ. of Illinois (United States); Catherine A. Best-Popescu, Beckman Institute for Advanced Science and Technology (United States); Allison Louie, Andrew Steelman, Univ. of Illinois (United States); Matthew J. Kuchan, Abbott Nutrition (Uruguay); Tapas Das, Abbott Nutrition (United States); Gabriel Popescu, Beckman Institute for Advanced Science and Technology (United States) [11351-39]

Fourier ptychographic microscopy using Fresnel propagation with reduced number of images, Mojde Hasanzade, Univ. College of Southeast Norway (Norway); Anel Alekic, Eltek Valere AS (Norway); Knut Olav Schnell, Dag W. Breiby, Norwegian Univ. of Science and Technology (Norway); Muhammad Nadeem Akram, Univ. College of Southeast Norway (Norway) [11351-40]

Assessment of inline lensless digital holographic microscopy and Fourier ptychographic microscopy for phase estimation of large transparent objects, Hongyu Li, Anastasia Bozhok, Yoshitake Takakura, Jihad Zallat, Patrice Twardowski, Univ. de Strasbourg (France) [11351-41]

SESSION 12 WED 16:00 TO 17:10

Terahertz Imaging I

Session Chair: **Marc P. Georges**, Liège Univ. (Belgium)

Joint Session between Conferences Terahertz Photonics (11348) and Unconventional Optical Imaging (11351)

Note: this session runs concurrently with Session 4 in Terahertz Photonics Conference (11348) and with Session 10 in Unconventional Optical Imaging Conference (11351).

Digital image reconstruction for single-pixel terahertz imaging (*Invited Paper*), Xinke Wang, Yan Zhang, Capital Normal Univ. (China) [11351-42]

Continuous-wave terahertz common-path self-referencing digital holographic imaging based on Fresnel bimirror, Yaya Zhang, Dayong Wang, Lu Rong, Duoxuan Ma, Yunxin Wang, Jie Zhao, Beijing Univ. of Technology (China) [11351-43]

Terahertz reflective ptychography, Marc P. Georges, Liège Univ. (Belgium); Chao Tang, Beijing Univ. of Technology (China); Yuchen Zhao, Liège Univ. (Belgium); Lu Rong, Dayong Wang, Fangrui Tan, Beijing Univ. of Technology (China) [11351-44]

POSTERS-WEDNESDAY WED 18:00 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Wednesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

Deep learning image transmission through a multimode fiber, Sahin Kurekci, Abdussamet Tarik Temur, Muhammed Ekrem Odabas, Emre Yüce, Middle East Technical Univ. (Turkey) [11351-60]

Digital holographic module based on near-common-path interferometer, Liudmila Burmak, Alexander S. Machikhin, Scientific and Technological Ctr. of Unique Instrumentation (Russian Federation) [11351-61]

Residue-determined threshold phase unwrapping algorithm, Meiqi Fang, Hong Zhao, Pingping Jia, Xi'an Jiaotong Univ. (China) [11351-62]

Lensless digital holographic imaging with use of volume holographic optical element, Ching-Cherng Sun, Yeh-Wei Yu, Yi Hao Huang, Po-Kai Hsieh, Tsung-Hsun Yang, National Central Univ. (Taiwan) [11351-63]

Quantitative 3D fluorescence diffuse optical tomography with 3D ultrasound imaging registration in small animal study, Chen-Yu Liu, Pei-An Lo, Shih-Po Su, Hui-Hua K. Chiang, National Yang-Ming Univ. (Taiwan) [11351-64]

Nonrigid registration of 3D points clouds of deformed liver models with Open3D and PyCPD, Audrey Leong-Hoï, Anaïs Chambrial, Marine Collet, Jean-Pierre Radoux, Altran Technologies (France) [11351-65]

Line-field confocal optical coherence tomography based on a Mirau interferometer, Weikai Xue, Lab. Charles Fabry (France); Jonas Ogiën, Olivier Levecq, DAMAE Medical (France); Arnaud Dubois, Lab. Charles Fabry (France) [11351-66]

Liquid crystal polarization-state generator, Guadalupe López Morales, María del Mar Sánchez-López, Ignacio Moreno Soriano, Univ. Miguel Hernández (Spain) [11351-67]

Review of spectral and polarization imaging systems, Sumera Sattar, Ecole Nationale Supérieure d'Ingénieurs Sud Alsace (France) and Univ. de Haute Alsace (France); Pierre-Jean Lapray, Alban Foulonneau, Laurent Bigué, Ecole Nationale Supérieure d'Ingénieurs Sud Alsace (France) [11351-68]

Retrieving objects hidden behind diffusing layer through coherence gating, Arnav Tamrakar, Indian Institute of Space Science and Technology (India) [11351-69]

Polarimetric imaging microscopy in real-time, Ariel Fernández, Juan M. Llaguno, Univ. de la República Uruguay (Uruguay) [11351-70]

Use of the fractional Fourier transform in terahertz imaging, Min Wan, Yue Wang, Univ. College Dublin (Ireland); Liang Zhao, Central China Normal Univ. (China); John J. Healy, Univ. College Dublin (Ireland) [11351-71]

A fast numerical algorithms for the 2D nonseparable linear canonical transform: noncartesian image reconstruction, Liang Zhao, Central China Normal Univ. (China); John T. Sheridan, John J. Healy, Univ. College Dublin (Ireland) [11351-72]

A digital image watermarking method based on the 2D nonseparable linear canonical transform (2D-NS-LCT), Liang Zhao, Central China Normal Univ. (China); John T. Sheridan, John J. Healy, Univ. College Dublin (Ireland) [11351-73]

Imaging an extended object through a thin scattering layer via various point spread functions, Dajiang Lu, Meihua Liao, Wenqi He, Xiang Peng, Shenzhen Univ. (China) [11351-74]

Luminous stream applications in modeling and measurement of the microstructure properties of mirrors in solar concentrator system, Kamil Plachta, Wrocław Univ. of Science and Technology (Poland) [11351-75]

Influence of substrate patterning on spheroidal growth and dynamics studied by gradient light interference microscopy (GLIM), Michael J. Fanous, Beckman Institute for Advanced Science and Technology (United States); Yanfen Li, Univ. of Massachusetts Lowell (United States); Mikhail E. Kandel, Univ. of Illinois (United States); Kristopher A. Kilian, Univ. of New South Wales (Australia); Gabriel Popescu, Beckman Institute for Advanced Science and Technology (United States) [11351-76]

Deep learning-based digital histology staining using spatial light interference microscopy (SLIM) data, Michael J. Fanous, Hassaan Majeed, Yuchen R. He, Beckman Institute for Advanced Science and Technology (United States); Nahil Sobh, Beckman Institute for Advanced Science and Technology (United States) and Univ. of Illinois (United States); Gabriel Popescu, Beckman Institute for Advanced Science and Technology (United States) [11351-77]

Spherical object segmentation in digital holographic microscopy by deep learning, Carlos Valadares, Télécom Saint-Etienne (France) [11351-78]

Optical architectures for pattern recognition with generalized Hough transform, Ariel Fernández, Univ. de la República Uruguay (Uruguay) [11351-79]

Fourier ptychographic microscopy and Mueller matrix microscopy: differences and complementarity, Anastasia Bozhok, Jean Dellinger, Jihad Zallat, Yoshitake Takakura, Christian Heinrich, Univ. de Strasbourg (France) [11351-80]

Simple and low-cost method for particulate matter size determination based on far-field interference pattern image processing, Hend H. Kholeif, Ain Shams Univ. (Egypt); Yasser M. Sabry, Ain Shams Univ. (Egypt) and Si-Ware Systems (Egypt); Michael M. Rizk, Ain Shams Univ. (Egypt); Diaa A. M. Khalil, Ain Shams Univ. (Egypt) and Si-Ware Systems (Egypt) [11351-81]

Optical performance of photon-sieve-based corneal inlays for presbyopia treatment, Walter D. Furlan, Univ. de València (Spain); Diego Montagud-Martínez, Vicente Ferreando, Juan A. Monsoriu, Univ. Politècnica de València (Spain) [11351-82]

CONFERENCE 11351

THURSDAY 2 APRIL

HOT TOPICS III THU 9:00 TO 10:35

Photonics Europe 2020: Hot Topics Session III

- 9.00 - 9.05 **Introduction**
Thierry Georges, Oxxius, France
2019 Symposium Chair
- 9.05 - 9.50 **Ultrafast solid-state lasers: a success story for the last 30 years with no end in sight**
Ursula Keller, ETH Zurich, Switzerland
- 9:50 - 10:35 **From inverse design to implementation of practical quantum photonics**
Jelena Vuckovic, Stanford Univ., United States
For additional details see page 9

SESSION 13 THU 11:00 TO 12:20

Terahertz Imaging II

Joint Session between Conferences Unconventional Optical Imaging (11351) and Terahertz Photonics (11348)

Note: this session runs concurrently with Session 7 in Terahertz Photonics Conference (11348) and with Session 15 in Unconventional Optical Imaging Conference (11351).

Practical aid of LTEM for semiconductor R&D (*Invited Paper*), Masayoshi Tonouchi, Osaka Univ. (Japan) [11348-26]

THz imaging-assisted alignment of submillimeter wave spectroscopic system for quantification of corneal water content (*Invited Paper*), Mariangela Baggio, Aalto Univ. (Finland); Yong Hu, Univ. of California, Los Angeles (United States); Aleks Tamminen, Irina Nefedova, Juha Ala-Laurinaho, Zachary Taylor, Aalto Univ. (Finland) [11348-27]

A novel approach for lensless high-resolution terahertz imaging, Dilyan Damyanov, Benedikt Friederich, Kevin Kolpatzek, Xuan Liu, Andreas Czylik, Thorsten Schultze, Ingolf Willms, Jan C. Balzer, Univ. Duisburg-Essen (Germany) [11348-28]

Terahertz LASSO compressed sensing tomography system, Khine Thin Zar Htun, Yangon Technological Univ. (Myanmar) and National Tsing Hua Univ. (Taiwan); Bo-Yi Wu, Feng-Lien Wang, Yi-Chun Hung, Shang-Hua Yang, National Tsing Hua Univ. (Taiwan) [11348-29]

SESSION 14 THU 11:00 TO 12:30

Advanced Methods: Advanced Devices and Modalities for Imaging I

Session Chair: **Enrique Tajahuerce**, Univ. Jaume I (Spain)

Ultrahigh speed imaging, from vacuum tube technology to solid state sensors, a state of the art (*Invited Paper*), Wilfried Uhring, Univ. de Strasbourg, CNRS (France) [11351-45]

Full-field all-optical snapshot technique for QUADrature (FAST-QUAD) demodulation of optical signals at radio-frequencies: principle and experimental proof-of-concept, Swapnesh Panigrahi, Julien Fade, Romain Agaisse, Univ. de Rennes 1(France); Hema Ramachandran, Raman Research Institute (India); Mehdi Alouini, Fonctions Optiques pour les Technologies de l'information (France) [11351-46]

Imaging systems based on active optical signal converters, Maxim V. Trigub, V. E. Zuev Institute of Atmospheric Optics (Russian Federation) [11351-47]

Characterization of double-deformable-mirror adaptive optics for IR beam shaping in hyperspectral imaging, Mohammad Azizian Kalkhoran, Ann Fitzpatrick, Edmund Warrick, Chris S. Kelley, Mark Frogley, Gianfelice Cinque, Diamond Light Source Ltd. (United Kingdom) [11351-48]

Lunch Break Thu 12:30 to 14:00

SESSION 15 THU 13:40 TO 15:30

Quantitative Imaging

Session Chairs: **Pascal Picart**, Lab. d'Acoustique de l'Univ. du Maine (France); **Corinne Fournier**, Univ. Jean Monnet Saint-Etienne (France)

Joint Session between Conferences Unconventional Optical Imaging (11351) and Optics and Photonics for Advanced Dimensional Metrology (11352)

Note: this session runs concurrently with Session 14 in the Unconventional Optical Imaging Conference (11351).

Phase imaging with computational specificity (PICS) (*Invited Paper*), Gabriel Popescu, Univ. of Illinois (United States) [11352-41]

Scanning wavefront detection coherent Fourier scatterometry, Jörg Bischoff, Rostyslav Mastylo, Eberhard Manske, Technische Univ. Ilmenau (Germany) [11352-42]

Visible and near-infrared spectral transmittance and scattering measurements of complex thin-film filters, Marin Fouchier, Institut Fresnel (France) and Ctr. National d'Études Spatiales (France); Myriam Zerrad, Michel Lequime, Claude Amra, Institut Fresnel (France) [11352-43]

Quantitative phase imaging for nanophotonics, Guillaume Baffou, Samira Khadir, Anne Sentenac, Serge Monneret, Institut Fresnel (France) [11351-53]

Probing laser-produced cavitation bubble dynamics in liquid via shadowgraphic imaging, Prahlad Kumar Baruah, Pandit Deendayal Petroleum Univ. (India); Ashwini Kumar Sharma, Alike Khare, Indian Institute of Technology Guwahati (India) [11351-54]

SESSION 16 THU 14:00 TO 15:20

Advanced Methods: Advanced Devices and Modalities for Imaging II

Session Chair: **Jürgen W. Czarske**, TU Dresden (Germany)

Scanless and detectorless chemical imaging by single-arm interferometry: a proof of principle, Maurizio Dabbicco, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Univ. degli Studi di Bari Aldo Moro (Italy); Paolo Sylos Labini, Alessandro Lupo, Univ. degli Studi di Bari Aldo Moro (Italy) [11351-49]

Piezo-actuated adaptive elements in scanning microscopy, Wenjie Wang, Nektarios Koukourakis, Jürgen W. Czarske, TU Dresden (Germany) [11351-50]

Near-infrared active and selective polarization imaging by orthogonality-breaking: calibration of the acquisition chain, Jonathan Staes, François Parnet, Julien Fade, Noé Ortega-Quijano, Mehdi Alouini, Fonctions Optiques pour les Technologies de l'information (France) [11351-51]

Large-area transmission modulators for 3D time-of-flight imaging, Markus Miller, Hongwang Xia, Mina Beshara, Susanne Menzel, Karl Joachim Ebeling, Rainer Michalzik, Univ. Ulm (Germany) [11351-52]

SESSION 17 THU 15:50 TO 17:30

Advanced Methods: Multi-Hyperspectral

Session Chair: **Julien Fade**,

Fonctions Optiques pour les Technologies de l'information (France)

Hyperspectral phase retrieval, Vladimir Y. Katkovnik, Igor A. Shevkunov, Karen Eguiazarian, Tampere Univ. (Finland) [11351-55]

Efficient light collection from a micromirror array: towards simultaneous hyperspectral and hypertextemporal mapping of luminophores, Lukas Klein, Karel Zidek, Institute of Plasma Physics of the CAS, v.v.i. (Czech Republic) [11351-56]

Mapping the optical dielectric response of isolated monolayer MoS₂ by push-broom microspectroscopy, Xingchen Dong, Michael H. Köhler, Kun Wang, Martin Jakobi, Alexander W. Koch, Technische Univ. München (Germany) [11351-57]

Spectroscopic Imaging in wide-field microscopy using DMD-based programmable illumination, Hitoshi Kawai, Yuji Kokumai, Nikon Corp. (Japan) [11351-58]

Endoscopic probe for multispectral 3D imaging, Alexander S. Machikhin, National Research Univ. "MPEI" (Russian Federation) and Scientific and Technological Ctr. of Unique Instrumentation (Russian Federation); Alexey V. Gorevoy, National Research Univ. "MPEI" (Russian Federation) and Scientific and Technological Ctr. of Unique Instrumentation (Russian Federation) and Bauman Moscow State Technical Univ. (Russian Federation); Demid D. Khokhlov, National Research Univ. "MPEI" (Russian Federation) and Scientific and Technological Ctr. of Unique Instrumentation (Russian Federation); Vladislav I. Batshev, National Research Univ. "MPEI" (Russian Federation) and Scientific and Technological Ctr. of Unique Instrumentation (Russian Federation) and Bauman Moscow State Technical Univ. (Russian Federation) [11351-59]

Optics and Photonics for Advanced Dimensional Metrology

Conference Chairs: **Peter J. de Groot**, Zygo Corporation (United States); **Richard K. Leach**, The Univ. of Nottingham (United Kingdom); **Pascal Picart**, Lab. d'Acoustique de l'Univ. du Maine (France)

Programme Committee: **Jürgen W. Czarske**, Technische Univ. Dresden (Germany); **Fengzhou Fang**, Tianjin Univ. (China); **Pietro Ferraro**, Istituto Nazionale di Ottica (Italy); **Cosme Furlong**, Worcester Polytechnic Institute (United States); **Yoshio Hayasaki**, Utsunomiya Univ. (Japan); **Michał Józwiak**, Warsaw Univ. of Technology (Poland); **Dae Wook Kim**, College of Optical Sciences, The Univ. of Arizona (United States); **Peter H. Lehmann**, Univ. Kassel (Germany); **Paul C. Montgomery**, Univ. de Strasbourg (France); **Andreas Ostendorf**, Ruhr-Univ. Bochum (Germany); **Yukitoshi Otani**, Utsunomiya Univ. (Japan); **Heidi Ottevaere**, Vrije Univ. Brussel (Belgium); **Nicolas Passilly**, FEMTO-ST (France); **Gabriel Popescu**, Univ. of Illinois (United States); **Christof Pruss**, Univ. Stuttgart (Germany); **Guohai Situ**, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences (China); **Rong Su**, The Univ. of Nottingham (United Kingdom); **Jean-François Vandenrijt**, Ctr. Spatial de Liège (Belgium); **Xiaocong Yuan**, Nankai Univ. (China)

TUESDAY 31 MARCH

SESSION 1 TUE 8:30 TO 10:20

Measuring Complex Optical Systems and Components

Session Chair: **Peter J. de Groot**, Zygo Corporation (United States)

Reconfigurable dynamic optical system design, testing, and data analysis (*Invited Paper*), Dae Wook Kim, Maham Aftab, Isaac L. Trumper, Logan R. Graves, Henry Quach, Hyukmo Kang, Heejoo Choi, Andrew E. Lowman, Greg A. Smith, Matthew B. Dubin, Chang-Jin Oh, Wyant College of Optical Sciences (United States) [11352-1]

Measurement of a freeform mirror with high-slope departure from base shape using deflectometry, Thomas Houllier, Sophia Engineering (France); Yves Surrel, Yves Surrel Expertise & Consultancy (France); David Gluchowski, Jean-Pierre Lauret, Martin Berthel, GAGGIONE SA (France); Guillaume Cassar, Sophia Engineering (France); Thierry Lépine, Lab. Hubert Curien (France) and Institut d'Optique Graduate School (France) [11352-2]

Accurate 3D coordinate measurement using holographic multipoint technique, Simon Hartlieb, Tobias Haist, Flavio S. Guerra, Univ. Stuttgart (Germany) [11352-3]

Increasing the accuracy of imaging-based dimensional measurements, Tobias Haist, Institut für Technische Optik (Germany) [11352-4]

UV absorption mapping as subsurface damage inspection in transparent optical materials, Heidi Cattaneo, Roelene Botha, Carsten Ziolek, NTB Interstaatliche Hochschule für Technik Buchs (Switzerland) [11352-5]

SESSION 2 TUE 10:50 TO 12:40

Extending the Limits of What Can be Measured

Session Chair: **Pascal Picart**, Lab. d'Acoustique de l'Univ. du Maine (France)

Fabricating freeform optics: advances and gaps in freeform metrology (*Invited Paper*), Jessica DeGroot Nelson, Matthew J. Brunelle, Todd F. Blalock, Jennifer Coniglio, Daniel R. Brooks, Ian Ferralli, Brian W. Myer, Optimax Systems, Inc. (United States) [11352-6]

Optical topography measurement of steeply sloped surfaces beyond the specular numerical aperture limit, Matthew Thomas, Rong Su, The Univ. of Nottingham (United Kingdom); Peter J. de Groot, Zygo Corporation (United States); Richard K. Leach, The Univ. of Nottingham (United Kingdom) [11352-7]

Accurate and low-cost ENEA solar compass for precision metrology of true azimuth: instrumental and smart versions, Sarah Bollanti, Francesco Flora, Fabrizio Andreoli, Luca Mezi, ENEA (Italy); Lili Cafarella, Istituto Nazionale di Geofisica e Vulcanologia (Italy); Domenico De Meis, ENEA (Italy); Domenico Di Mauro, Istituto Nazionale di Geofisica e Vulcanologia (Italy); Gian Piero Gallerano, Paolo Di Lazzaro, Daniele Murra, ENEA (Italy); Luca Murra, Student (Italy); Davide Vicca, Giordano Vicoli, ENEA (Italy); Achille Zirizzotti, Istituto Nazionale di Geofisica e Vulcanologia (Italy) [11352-8]

Miniaturized dual-VCSEL-based multiple wavelength digital holography for robust and stable optical metrology, Daniel Claus, Igor Alekseenko, Institut für Lasertechnologien in der Medizin und Messtechnik (Germany); Martin Grabherr, Priolas GmbH (Germany); Raimund Hibst, Institut für Lasertechnologien in der Medizin und Messtechnik (Germany) [11352-9]

Robot-assisted BRDF measurement and surface characterization of inhomogeneous freeform shapes, Nils Melchert, Markus Kästner, Eduard Reithmeier, Leibniz Univ. Hannover (Germany) [11352-10]

Lunch/Exhibition Break Tue 12:40 to 13:50

SESSION 3 TUE 13:50 TO 16:00

State-of-the-Art Photogrammetry and Structured Light

Session Chair: **Richard K. Leach**, The Univ. of Nottingham (United Kingdom)

Smart photogrammetry for 3D shape measurements (*Invited Paper*), Samanta Piano, Joe Eastwood, Hui Zhang, Danny Sims-Waterhouse, Mohammad Isa, Richard K. Leach, The Univ. of Nottingham (United Kingdom) [11352-11]

Concept of a control system based on 3D geometry measurement for open die forging of large-scale components, Lorenz Quentin, Rüdiger Beermann, Kai Brunotte, Markus Kästner, Eduard Reithmeier, Bernd-Arno Behrens, Leibniz Univ. Hannover (Germany) [11352-12]

3D registration of multiple surface measurements using projected random patterns, Tim Betker, Lorenz Quentin, Markus Kästner, Eduard Reithmeier, Leibniz Univ. Hannover (Germany) [11352-13]

Application of ISO 25178 part 600 metrological characteristics for fringe projection, George Gayton, The Univ. of Nottingham (United Kingdom) [11352-14]

Affine structured light sensor for measurements through inspection windows: basic concept and direct calibration approach, Rüdiger Beermann, Lorenz Quentin, Markus Kästner, Eduard Reithmeier, Leibniz Univ. Hannover (Germany) [11352-15]

High-speed fringe projection for robot 3D vision system, Wen Guo, Charles R. Coggrave, Jonathan M. Huntley, Loughborough Univ. (United Kingdom); Harshana G. Dantanarayana, AMETEK Taylor Hobson Ltd. (United Kingdom); Pablo D. Ruiz, Loughborough Univ. (United Kingdom) ... [11352-16]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair

16.35 to 17:20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States

17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

CONFERENCE 11352

WEDNESDAY 1 APRIL

SESSION 4.....WED 8:30 TO 10:20

Optical Metrology in Practice

Session Chair: **Richard K. Leach**,
The Univ. of Nottingham (United Kingdom)

Optical system metrology vs. component metrology (*Invited Paper*), Kate Medicus, Kenneth R. Castle, Tilman W. Stuhlinger, Jeremy Turner, Ruda-Cardinal, Inc. (United States) [11352-17]

Adaptive merging of large datasets of a 3D measuring endoscope in an industrial environment, Lennart Hinz, Markus Kästner, Eduard Reithmeier, Leibniz Univ. Hannover (Germany) [11352-18]

Grazing incidence interferometry for testing rough aspherics: experimental results and data analysis, Sergej Rothau, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Klaus Mantel, Max-Planck-Institut für die Physik des Lichts (Germany); Johannes Schwider, Norbert Lindlein, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) . . [11352-19]

Measurement technique of extended optical fibers with high precision, Yuriy D. Arapov, Alexander A. Tikhov, Pavel V. Kubasov, N.L. Dukhov All-Russian Scientific Research Institute of Automatics (VNIIA) (Russian Federation) [11352-20]

Fast fringe analysis method using graphics processing unit acceleration for dynamic fault identification, Ankur Vishnoi, Rajshekhar Gannavarpu, Indian Institute of Technology Kanpur (India) [11352-21]

SESSION 5.....WED 10:50 TO 12:20

Advanced Measuring Microscopes

Session Chair: **Jürgen W. Czarske**, TU Dresden (Germany)

Surface scattering and the 3D transfer characteristics of optical profilers (*Invited Paper*), Jeremy Coupland, Loughborough Univ. (United Kingdom) [11352-22]

Three-dimensional imaging confocal profiler without in-plane scanning, Pol Martínez, Carlos Bermudez, Cristina Cadevall, Aitor Matilla Ayala, Roger Artigas, Sensofar-Tech, S.L. (Spain) [11352-23]

Interferometric measurements of mold-plate assemblies designed for high-volume manufacturing of aspheric microlenses, Jack DiSciaccia, Richard Pultar, Xavier Colonna de Lega, Peter J. de Groot, Zygo Corporation (United States) [11352-24]

High-frequency modulated differential confocal depth sensing by an oscillating pinhole, Johannes Belkner, Eberhard Manske, Technische Univ. Ilmenau (Germany) [11352-25]

Lunch/Exhibition Break Wed 12:20 to 13:30

SESSION 6.....WED 13:30 TO 15:20

Deep Learning, Machine Learning, and Model-based Methods

Session Chair: **Pietro Ferraro**, Istituto di Scienze Applicate e Sistemi Intelligenti "Eduardo Caianiello" (Italy)

Phase retrieval with deep learning (*Invited Paper*), Guohai Situ, Fei Wang, Yaoming Bian, Shanghai Institute of Optics and Fine Mechanics (China) [11352-26]

Model-based dimensional optical metrology, Jörg Bischoff, Technische Univ. Ilmenau (Germany); Tobias Pahl, Peter Lehmann, Univ. Kassel (Germany); Eberhard Manske, Technische Univ. Ilmenau (Germany) [11352-27]

Cascaded machine learning model for reconstruction of surface topography from light scattering, Mingyu Liu, The Univ. of Nottingham (United Kingdom) [11352-28]

Deep learning-based speckle decorrelation denoising for wide-field optical metrology, Silvio Montrésor, Lab. d'Acoustique de l'Univ. du Maine (France); Marie Tahon, Antoine Laurent, Lab. d'Informatique de l'Univ. du Mans (France); Pascal Picart, Lab. d'Acoustique de l'Univ. du Maine (France) [11352-29]

Model-based calibration routine for a triangulation sensor for inner radius measurements of cylindrical components, Rüdiger Beermann, Hagen Bossemeyer, Robin Diekmann, Markus Kästner, Eduard Reithmeier, Leibniz Univ. Hannover (Germany) [11352-30]

SESSION 7.....WED 15:50 TO 18:00

Resolution, Ellipsometry, and Hyperspectral Imaging

Session Chair: **Jean-François Vandenrijt**,
Ctr. Spatial de Liège (Belgium)

Super-resolution imaging through microspheres (*Invited Paper*), Stéphane Perrin, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France) and Univ. de Strasbourg (France); Sylvain Lecler, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France) and Institut National des Sciences Appliquées de Strasbourg (France); Paul C. Montgomery, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie, CNRS (France) [11352-31]

Measuring the spatial distribution of liquid crystal alignment and retardation using stokes polarimetry, Yannick Folwill, Hans Zappe, Univ. of Freiburg (Germany) [11352-32]

Multicolor segmented wavefront metrology using PISTIL interferometry, Bastien Rouzé, Cindy Bellanger, Jérôme Primot, ONERA (France) . . [11352-33]

Resolution and computational strategy in wideband multiphoton microscopy, Ali Abjaghoun, Univ. de Limoges (France) and XLIM (France); Claire Carrion, Laetitia Magnol, Fabienne Baraige, Véronique Blanquet, Univ. de Limoges (France); Claire Lefort, XLIM (France) [11352-34]

Enhanced nanoform metrology by imaging Mueller matrix ellipsometry combined with plasmonic support structures, Tim Käseberg, Physikalisch-Technische Bundesanstalt (Germany) [11352-35]

Detailed characterization of a hyperspectral snapshot imager for full-field chromatic confocal microscopy, Robin Hahn, Tobias Haist, Freya-Elin Hämmerling, Institut für Technische Optik (Germany) and Univ. Stuttgart (Germany); David Fleischle, Oliver Schwanke, Twip Optical Solutions GmbH (Germany); Otto Hauler, Karsten Rebner, Marc Brecht, Reutlingen Univ. (Germany); Wolfgang Osten, Institut für Technische Optik (Germany) and Univ. Stuttgart (Germany) [11352-36]

POSTERS-WEDNESDAY WED 18:00 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Wednesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

The multichannel optical spectrometer for combustion processes control, Mikhail A. Vaganov, Julianna A. Novikova, Saint-Petersburg State Univ. of Aerospace Instrumentation (Russian Federation) [11352-44]

Precision inspection of microcomponents freeform by Moiré interferometry, Saïd Meguellati, Univ. Ferhat Abbas de Sétif (Algeria) [11352-45]

Design of a compact corneal topographer to characterize the shape of the cornea, Manuel Campos-García, Daniel Aguirre-Aguirre, Juan Salvador Pérez-Lomelí, Andrés Peña-Conzuelo, Oliver Huerta-Carranza, Univ. Nacional Autónoma de México (Mexico); Christian Camargo-Fierro, Instituto Politécnico Nacional (Mexico) [11352-46]

Measurement of optical thickness of transparent plates using phase-shifting interferometer with suppression of spatially uniform error, Sung Tae Kim, Yangjin Kim, Pusan National Univ. (Korea, Republic of) [11352-47]

White light interference microscopy system design, Sébastien Marbach, Christophe Cordier, Univ. de Strasbourg (France); Rémy Claveau, Univ. College London (United Kingdom); Thierry Engel, Paul C. Montgomery, Manuel Flury, Univ. de Strasbourg (France) [11352-48]

Investigation on temporal phase shifting in digital shearography during transient process, Jay Krishna Ananad, Indian Institute of Space Science and Technology (India); Digendranath Swain, Binu P. Thomas, Vikram Sarabhai Space Ctr. (India); C. S. Narayanamurthy, Indian Institute of Space Science and Technology (India) [11352-49]

Modeling the conical corneal null-screen topographer with the Fermat principle, Andrés Peña-Conzuelo, Manuel Campos-García, Univ. Nacional Autónoma de México (Mexico) [11352-50]

Comprehensive ranging disambiguation for amplitude-modulated continuous wave laser scanner, Chao Zhang, Sifan Liu, Zheyuan Zhang, The Univ. of Tokyo (Japan); Neisei Hayashi, Tokyo Institute of Technology (Japan); Lei Jin, Sze Yun Set, Shinji Yamashita, The Univ. of Tokyo (Japan) . . [11352-51]

3D images processing using acousto-optic Bragg diffraction, Boris S. Gurevich, Krill V. Zaichenko, Institute for Analytical Instrumentation (Russian Federation) [11352-52]

In-process monitoring of a hole depth processed with femtosecond laser pulses in glass using swept-source optical coherence tomography, Satoshi Hasegawa, Utsunomiya Univ. (Japan); Masatoshi Fujimoto, Toshihisa Atsumi, Hamamatsu Photonics K.K. (Japan); Yoshio Hayasaki, Utsunomiya Univ. (Japan). [11352-53]

Graph convolutions meets local retinal pattern manifolds: a geometric deep learning approach for diabetic retinopathy diagnosis, Rishabh Gupta, Indian Institute of Technology Kharagpur (India); Subhankar Chattoraj, Univ. Jean Monnet Saint-Etienne (France); Sawon Pratiher, Indian Institute of Technology Kharagpur (India) [11352-54]

Optical measurement of discontinuous surface topography using double beam-splitter interferometer, Arda Inanç, Isra Merve Cetin, Mehmet Naci Inci, Bogaziçi Üniv. (Turkey) [11352-55]

Analysis of the systematic and random errors in the conical corneal null-screen topographer, Andrés Peña-Conzuelo, Manuel Campos-García, Daniel Aguirre-Aguirre, Oliver Huerta-Carranza, Univ. Nacional Autónoma de México (Mexico) [11352-56]

Robustness Improvement for the calibration of stereo deflectometry based on a search algorithm, Yongjia Xu, Feng Gao, Xiangqian Jiang, Univ. of Huddersfield (United Kingdom) [11352-57]

Optical sensor for drone coordinate measurements, Volodymyr N. Borovytsky, Dmytro Averin, National Technical Univ. of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" (Ukraine) [11352-58]

Development of a double-diffraction grating interferometer for measurements of displacement and angle, Shao-Heng Chen, Hung-Lin Hsieh, Hong-Yi Chen, Yi-Xing Lai, National Taiwan Univ. of Science and Technology (Taiwan) [11352-59]

Velocity estimation from fringe contrast variation due to motion of the object under different geometries of holographic recording, Urvashi Jinwal, Indian Institute of Space Science and Technology (India). [11352-60]

Integration of an endoscopic fringe projection system into a milling machine for the regeneration of complex capital goods: a first prototype, Philipp Middendorf, Markus Kästner, Eduard Reithmeier, Leibniz Univ. Hannover (Germany). [11352-61]

Phase calibration of a basic bright-field microscope for 3D metrology of transparent samples at the nanoscale, Bingying Zhao, Karlsruher Institut für Technologie (Germany); Daniel Migliozi, Martin A. M. Gijs, Ecole Polytechnique Fédérale de Lausanne (Switzerland). [11352-62]

Picometer-resolved universal single-lens interferometer unveiling ultraprecise frugal devices, Pooja Munjal, Kamal P. Singh, Indian Institute of Science Education and Research Mohali (India). [11352-63]

THURSDAY 2 APRIL

HOT TOPICS III THU 9:00 TO 10:35

Photonics Europe 2020: Hot Topics Session III

- 9.00 - 9.05 **Introduction**
Thierry Georges, Oxxius, France
2019 Symposium Chair
- 9.05 - 9.50 **Ultrafast solid-state lasers: a success story for the last 30 years with no end in sight**
Ursula Keller, ETH Zurich, Switzerland
- 9:50 - 10:35 **From inverse design to implementation of practical quantum photonics**
Jelena Vuckovic, Stanford Univ., United States

For additional details see page 9

SESSION 8 THU 11:00 TO 12:30

Optical Tomography

Session Chair: **Yoshio Hayasaki**,

Utsunomiya Univ. Ctr. for Optical Research & Education (Japan)

Optical coherence tomography in nondestructive testing (*Invited Paper*), Bettina Heise, Research Ctr. for Non Destructive Testing GmbH (Austria) and Johannes Kepler Univ. Linz (Austria); Guenther Hanneschlaeger, Elisabeth Leiss-Holzinger, Ivan Zorin, Research Ctr. for Non Destructive Testing GmbH (Austria). [11352-37]

Optical integration of time-of-flight measurement to optical coherence tomography for extending its operating range, Yoshio Hayasaki, Yuki Shimamoto, Shunya Masaki, Utsunomiya Univ. (Japan); Joel Cervantes, Univ. de Guadalajara (Mexico); QuangDuc Pham, National Ctr for Technical Progress (Viet Nam); Kei-ichiro Kagawa, Shizuoka Univ. (Japan); Hajime Nagahara, Osaka Univ. (Japan) [11352-38]

Continuous arterial pulsation signal measurement using structured light projection method, Hui-Ting Chang, Chun-Hsiung Wang, National Taiwan Univ. (Taiwan); Shu-Sheng Lee, National Taiwan Ocean Univ. (Taiwan); Wen-Jong Wu, Chih-Kung Lee, National Taiwan Univ. (Taiwan) [11352-39]

One-shot roughness measurements based on dispersion-encoded low coherence interferometry, Christopher Taudt, Tobias Baselt, Westsächsische Hochschule Zwickau (Germany) and Fraunhofer-Institut für Werkstoff- und Strahltechnik IWS (Germany); Bryan L. Nelsen, Westsächsische Hochschule Zwickau (Germany); Edmund Koch, TU Dresden (Germany); Peter Hartmann, Westsächsische Hochschule Zwickau (Germany) [11352-40]

Lunch Break Thu 12:30 to 13:40

SESSION 9 THU 13:40 TO 15:30

Quantitative Imaging

Session Chairs: **Pascal Picart**, Lab. d'Acoustique de l'Univ. du Maine (France); **Corinne Fournier**, Univ. Jean Monnet Saint-Etienne (France)

Joint Session between Conferences Unconventional Optical Imaging (11351) and Optics and Photonics for Advanced Dimensional Metrology (11352)

Note: this session runs concurrently with Session 14 in the Unconventional Optical Imaging Conference (11351).

Phase imaging with computational specificity (PICS) (*Invited Paper*), Gabriel Popescu, Univ. of Illinois (United States) [11352-41]

Scanning wavefront detection coherent Fourier scatterometry, Jörg Bischoff, Rostyslav Mastlyo, Eberhard Manske, Technische Univ. Ilmenau (Germany) [11352-42]

Visible and near-infrared spectral transmittance and scattering measurements of complex thin-film filters, Marin Fouchier, Institut Fresnel (France) and Ctr. National d'Études Spatiales (France); Myriam Zerrad, Michel Lequime, Claude Amra, Institut Fresnel (France) [11352-43]

Quantitative phase imaging for nanophotonics, Guillaume Baffou, Samira Khadir, Anne Sentenac, Serge Monneret, Institut Fresnel (France) [11351-53]

Probing laser-produced cavitation bubble dynamics in liquid via shadowgraphic imaging, Prahlad Kumar Baruah, Pandit Deendayal Petroleum Univ. (India); Ashwini Kumar Sharma, Alika Khare, Indian Institute of Technology Guwahati (India) [11351-54]

Optics, Photonics and Digital Technologies for Imaging Applications VI

Conference Chairs: **Peter Schelkens**, Vrije Univ. Brussel (Belgium); **Tomasz Kozacki**, Warsaw Univ. of Technology (Poland)

Programme Committee: **Olivier Aubreton**, Univ. de Bourgogne (France); **Jan T. Bosiers**, Teledyne DALSA (Netherlands); **Daping Chu**, Univ. of Cambridge (United Kingdom); **Gabriel Cristóbal**, Consejo Superior de Investigaciones Científicas (Spain); **Jana Dittmann**, Otto-von-Guericke- Univ. Magdeburg (Germany); **Marek Domanski**, Univ. of Poznan (Poland); **Touradj Ebrahimi**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Boris Escalante-Ramírez**, Univ. Nacional Autónoma de México (Mexico); **Pascuala García-Martínez**, Univ. de València (Spain); **Laurent Jacques**, Univ. Catholique de Louvain (Belgium); **Dragan Kukulj**, RT-RK Institute for Computer Based Systems (Serbia); **Jukka-Tapani Mäkinen**, VTT Technical Research Ctr. of Finland (Finland); **María S. Millán García-Varela**, Univ. Politècnica de Catalunya (Spain); **Cristian Perra**, Univ. degli Studi di Cagliari (Italy); **Stuart W. Perry**, Canon Information Systems Research (Australia); **Pasi Saarikko**, Oculus VR, LLC (United States); **Martin Schrader**, Nokia Research Ctr. (Finland); **Tomoyoshi Shimobaba**, Chiba Univ. (Japan); **Lea Skorin-Kapov**, Univ. of Zagreb (Croatia); **Colin James Richard Sheppard**, National Univ. of Singapore (Singapore); **Athanassios N. Skodras**, Univ. of Patras (Greece); **Andrew G. Tescher**, AGT Associates (United States); **Frédéric Truchetet**, Univ. de Bourgogne (France); **Gerald Zauner**, FH OÖ Forschungs & Entwicklungen GmbH (Austria)

TUESDAY 31 MARCH

SESSION 1 TUE 8:50 TO 10:20

Computer-generated Holography

Methods for laser speckle reduction in computer-generated holography (Invited Paper), Alfred J. Newman, Alden O. Spiess, Darran F. Milne, Andrzej Kaczorowski, VividQ (United Kingdom) [11353-1]

Accelerating phase-added stereogram calculations by coefficient grouping for digital holography, David Blinder, Peter Schelkens, Vrije Univ. Brussel (Belgium) [11353-2]

Real-time computer-generated hologram calculation using precomputed angular spectra, Antonin Gilles, b<>com (France); Patrick Gioia, b<>com (France) and Orange Labs (France) [11353-3]

Hologram calculation in sparse Fourier bases using fixed-point operations, and its circuit architecture, Daiki Yasuki, Chiba Univ. (Japan); David Blinder, Vrije Univ. Brussel (Belgium); Tomoyoshi Shimobaba, Chiba Univ. (Japan); Peter Schelkens, Vrije Univ. Brussel (Belgium); Takashi Kakue, Tomoyoshi Ito, Chiba Univ. (Japan) [11353-4]

SESSION 2 TUE 10:50 TO 12:30

Deep Learning

Beam profiler network (BPNet): a deep learning approach to mode demultiplexing of Laguerre-Gaussian optical beams, Amit Bekerman, Sahar Froim, Barak Hadad, Alon Bahabad, Tel Aviv Univ. (Israel) [11353-5]

Active contours for multiregion segmentation with a convolutional neural network initialization, Erik Carbajal-Degante, Steve Avendaño, Leonardo Ledesma, Jimena Olveres, Boris Escalante-Ramírez, Univ. Nacional Autónoma de México (Mexico) [11353-6]

Catheter tracking and data fusion for reducing the X-ray exposition in an interventional radiology procedure, Jesus Zegarra Flores, Hugues De Lastic Saint Jal, Antoine Oberle, Jean-Pierre Radoux, Altran Technologies (France) . . [11353-7]

GANcoder: robust feature point matching using conditional adversarial auto-encoder, Vladimir V. Kniaz, FSUE "State Research Institute of Aviation Systems" (Russian Federation) [11353-8]

CNN feature-based fusion of microscopic multifocus images, Sujatha Krishnamoorthy, Wenzhou-Kean Univ. (China) [11353-9]

Lunch/Exhibition Break Tue 12:30 to 13:40

SESSION 3 TUE 13:40 TO 16:00

Cultural Heritage Preservation

A two-stream neural network architecture for the detection and analysis of cracks in panel paintings, Roman Sizyakin, Aleksandra Pizurica, Laurens Meeus, Univ. Gent (Belgium); Bruno Cornelis, Vrije Univ. Brussel (Belgium); Viacheslav Voronin, Don State Technical Univ. (Russian Federation) [11353-10]

Imaging techniques and methodologies for acquisition, processing and distribution of multimodal image data of the oeuvre of Jan van Eyck, Bart Fransen, The Royal Institute For Cultural Heritage (Belgium); Frederik Temmermans, imec (Belgium) and Vrije Univ. Brussel (Belgium); Christina Currie, The Royal Institute For Cultural Heritage (Belgium) [11353-11]

From a Belgian online image database to a European heritage science repository: the case of BALaT and HESCIDA (E-RIHS), Erik Buelinckx, Wim Fremout, Stephanie Buyle, Edwin De Roock, The Royal Institute For Cultural Heritage (Belgium) [11353-12]

Enhanced reflection transformation imaging (RTI), Peter Fornaro, Vera Chiquet, Univ. Basel (Switzerland) [11353-13]

Noise characterization for historical documents with physical distortions, Tan Lu, Ann Dooms, Vrije Univ. Brussel (Belgium) [11353-14]

PIXEL+: integrating and standardizing of various interactive pixel-based imagery, Hendrik Hameeuw, KU Leuven (Belgium); Vincent Vanweddigen, KU Leuven (Belgium) and Royal Museums of Art and History, Brussels (Belgium); Bruno Vandermeulen, KU Leuven (Belgium); Chris Vastenhou, Royal Museums of Art and History, Brussels (Belgium); Lieve Watteuw, KU Leuven (Belgium); Frédéric Lemmers, KBR (Belgium); Athena Van der Perre, KU Leuven (Belgium) and Royal Museums of Art and History, Brussels (Belgium); Paul Konijn, Luc Van Gool, Marc Proesmans, KU Leuven (Belgium) [11353-15]

Assisting classical paintings restoration: efficient paint loss detection and descriptor-based inpainting using shared pretraining, Laurens Meeus, Shaoguang Huang, Nina Zizakic, Univ. Gent (Belgium); Xianghui Xie, KU Leuven (Belgium); Bart Devolder, Princeton Univ. Art Museum (United States); Hélène Dubois, The Royal Institute For Cultural Heritage (Belgium); Maximiliaan Martens, Aleksandra Pizurica, Univ. Gent (Belgium) [11353-16]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair

16:35 to 17:20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States

17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

POSTERS-TUESDAY TUE 18:05 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Tuesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

Use of machine learning approaches to improve noninvasive skin melanoma diagnostic method in spectral range 450-950 nm, Yuriy Chizhov, Riga Technical Univ. (Latvia); Andrey Bondarenko, Dilshat Uteshev, C.T.Co. Ltd. (Latvia); Dmitrijs Bliznucs, Riga Technical Univ. (Latvia); Ilze Lihacova, Alexey Lihachev, Univ. of Latvia (Latvia) [11353-48]

Infrared and visible image fusion via NSST and PCNN in multiscale morphological gradient domain, Wei Tan, Jiajia Zhang, Pei Xiang, Huixin Zhou, Xidian Univ. (China); William Titan, Univ. of Copenhagen (Denmark) [11353-49]

High-quality X-ray scintillator imager by the spatial frequency spectrum enhanced reconstruction method, Renzhong Tai, Shanghai Synchrotron Radiation Facility (China); Huijuan Xia, Lei Zhang, Yanqing Wu, Shanghai Institute of Applied Physics (China); Yuanhe Sun, Shanghai Synchrotron Radiation Facility (China) [11353-50]

Land-use taxonomy via multiscale graph convolutional neural network, Rishabh Gupta, Indian Institute of Technology Kharagpur (India); Subhankar Chatteraj, Univ. Jean Monnet Saint-Etienne (France); Sawon Pratihier, Indian Institute of Technology Kharagpur (India) [11353-51]

Model-based optical fluence compensation for photoacoustic tomography using a full-ring geometry system, Alexander Pattyn, Zackary Mumm, Naser Alijabbari, Suhail Alshahrani, Mohammad Mehrmohammadi, Wayne State Univ. (United States) [11353-52]

Peak-locking minimization by three adjustment methods, María Baralida Tomás López, David Mas, Belen Ferrer, Univ. de Alicante (Spain) . . . [11353-53]

Cylindrical Fourier holography based on synthetic aperture technique and capturing hologram of real objects, Sungjin Lim, Kyungpook National Univ. (Korea, Republic of); Weronika Zaperty, Warsaw Univ. of Technology (Poland); Joonku Hahn, Kyungpook National Univ. (Korea, Republic of); Tomasz Kozacki, Warsaw Univ. of Technology (Poland) [11353-54]

Electrical resistivity tomography optimization based on parallel electrode linear back projection algorithm, Yiwei Huang, Chunyu Zhao, Jingjing Ding, Shanghai Jiao Tong Univ. (China) [11353-55]

Design of an integral field unit for a solar telescope, Mariia K. Orekhova, Alexey Bakholdin, Anna Voznesenskaya, ITMO Univ. (Russian Federation) [11353-56]

Compact dual-view endoscope imaging system based on annularly stitched aspheres, Lu Chen, Zhishan Gao, Qun Yuan, Ningyan Xu, Xin Cao, Nanjing Univ. of Science and Technology (China) [11353-57]

Research on vision-based accurate UAV ground target location, Yi Zhang, Liping Wang, Jing Han, Nanjing Univ. of Science and Technology (China) [11353-58]

Research on accurate location of unmanned aerial vehicle ground noncooperative targets based on image matching, Liping Wang, Yi Zhang, Guohua Gu, Nanjing Univ. of Science and Technology (China) [11353-59]

Design of micro-optics for display illumination, Nikolai I. Petrov, Galina N. Petrova, Scientific and Technological Ctr. of Unique Instrumentation (Russian Federation) [11353-60]

The capabilities of developing eye tracking for AR systems on the base of a microcontroller Raspberry Pi®, Elena Shlyamova, Kseniia Ezhova, Dmitriy Fedorenko, ITMO Univ. (Russian Federation) [11353-61]

Optimizing rectangular-shaped object tracking with subpixel resolution, Belen Ferrer, Jorge Perez, David Mas, Julián Espinosa, Univ. de Alicante (Spain) [11353-62]

A simulator based on LED technology to study daylight on architectural scale models, Levin Erbilgin, École Nationale Supérieure d'Architecture de Strasbourg (France); Thierry Blandet, ICube, Univ. de Strasbourg (France) [11353-63]

Use of image correlation to measure rock swelling, Belén Ferrer, David Benavente, David Mas, Univ. de Alicante (Spain) [11353-64]

Custom tolerancing of a Plossl eyepiece using ISO 10110 drawing specifications, Erin M. Elliott, Zemax, LLC (United States); Tolis Deslis, JENOPTIK Optical Systems, LLC (United States); Sandrine Auriol, Zemax, LLC (United States); Michael Humphreys, Kaleb Niall, Zemax, LLC (United States) [11353-65]

Design of a MWIR spectral zoom imaging system, Xiaohu Guo, Baoqiang Li, Jingjing Zhu, Weiwei Zhu, China North Vehicle Research Institute (China) [11353-66]

High-speed video analysis of spontaneous and reflex to light blinking, Julián Espinosa, Marina Martínez, Jorge Perez, Begoña Domenech, Carmen Vazquez, David Mas, Univ. de Alicante (Spain) [11353-67]

Development and research of a waveguide for augmented reality systems with diffractive relief-phase gratings, Dmitrii S. Lushnikov, Vladimir Markin, Sergey Odinkov, Mariya Shishova, Bauman Moscow State Technical Univ. (Russian Federation) [11353-68]

Optimization of skeleton identification using a kinect sensor, Jiasheng Yu, Yan Chen, Fangru Liu, Sujatha Krishnamoorthy, Wenzhou-Kean Univ. (China) [11353-69]

Study of color reproduction features of AR device based on optical waveguides, Artem B. Solomashenko, Yanina Grad, Vladimir Nikolaev, Sergey Odinkov, Bauman Moscow State Technical Univ. (Russian Federation) [11353-70]

Touchless interface interaction by hand tracking with a depth camera and a convolutional neural network, Audrey Leong-Hoi, Sarah Murat, Tanguy Acker, Quentin Sattler, Jean-Pierre Radoux, Altran Technologies (France) [11353-71]

The original application of diffractive optical elements in optical industry, Dmitrii Igorevich Egorov, ITMO Univ. (Russian Federation) [11353-72]

Machine learning for scene 3D reconstruction using a single image, Vladimir A. Knyaz, FSUE "State Research Institute of Aviation Systems" (Russian Federation) [11353-73]

Precise guiding and visualization of balloon catheter using photoacoustic imaging, Changho Lee, Chonnam National Univ. Hwasun Hospital, Chonnam National Univ. Medical School (Korea, Republic of) [11353-74]

Image resolution enhancement of vidicon-based radiation-tolerant camera using neural network, Oleg A. Perezyabov, Tatiana P. Pereziabova, Radda A. Iureva, Nadezhda K. Maltseva, ITMO Univ. (Russian Federation) [11353-75]

Deep learning approach for cerebellum localization in prenatal ultrasound images, Rodrigo Ramos, Jimena Olveres, Boris Escalante-Ramírez, Univ. Nacional Autónoma de México (Mexico); Fernando Arambula, Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas, Univ. Nacional Autónoma de México (Mexico) [11353-76]

Hermite transform-based superpixel for texture image segmentation, Vivian Triana-Galeano, Germán González, Jimena Olveres, Boris Escalante-Ramírez, Univ. Nacional Autónoma de México (Mexico) [11353-77]

A novel saliency-driven oil tank detection method for synthetic aperture radar images, Yang Sun, Congyang Liu, Libao Zhang, Beijing Normal Univ. (China) [11353-78]

Airport extraction based on two-layer co-saliency and ROI-guided active contour model, Yang Sun, Yue Liu, Libao Zhang, Beijing Normal Univ. (China) [11353-79]

A subpixel filter to compute partial derivatives and edge detection of CFA images, Baptiste Magnier, IMT Mines Alès (France); Arezki Aberkane, Nicolas Gorrity, Audensiel Technologies (France) [11353-80]

Design of a compact microscope for astrobiology, Keigo Enya, Institute of Space and Astronautical Science (Japan) [11353-81]

Optical design of a high dynamic range instrument for spaceborne telescopes, Keigo Enya, Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency (Japan) [11353-82]

WEDNESDAY 1 APRIL

SESSION 4 WED 8:30 TO 10:20

Holographic Display

Color Fourier imaging for the tabletop holographic display (Invited Paper), Hyon-Gon Choo, Electronics and Telecommunications Research Institute (Korea, Republic of); Weronika Zaperty, Maksymilian Chlipala, Tomasz Kozacki, Warsaw Univ. of Technology (Poland); Jinwoong Kim, Electronics and Telecommunications Research Institute (Korea, Republic of) [11353-17]

Complex amplitude modulation for holographic display based on phase interference, Xiaomeng Sui, Guofan Jin, Liangcai Cao, Tsinghua Univ. (China) [11353-18]

Full bandwidth coarse integral holographic video displays with spatial tuning for scalability, Jin Li, Univ. of Cambridge (United Kingdom); Quinn Smithwick, Disney Research, Los Angeles (United States); Daping Chu, Univ. of Cambridge (United Kingdom) [11353-19]

Speckle-free holographic image projection using hybrid metal halide perovskite-polystyrene-based random lasers, Subha Prakash Mallick, Yu-Heng Hong, Tsung Kao, Tien-Chang Lu, National Chiao Tung Univ. (Taiwan) [11353-20]

Reduction of switching time in ZnO nanoparticle-based reflective OASLM for holographic displays, Daping Chu, Xin Chang, Univ. of Cambridge (United Kingdom) [11353-21]

SESSION 5 WED 10:50 TO 12:40

Holographic Imaging

Near noise-free digital holographic imaging (Invited Paper), Pasquale Memmolo, Vittorio Bianco, Pietro Ferraro, Istituto di Scienze Applicate e Sistemi Intelligenti "Eduardo Caianiello" (Italy) [11353-22]

Numerical reconstruction of large HPO Fourier holograms, Weronika Zaperty, Tomasz Kozacki, Warsaw Univ. of Technology (Poland) [11353-23]

Improvement of image quality of phase-only hologram using random phase-free method, Yumi Yamaguchi, Chiba Univ. (Japan); Yuki Nagahama, Tokyo Univ. of Agriculture and Technology (Japan); Yota Yamamoto, Tomoyoshi Shimobaba, Takashi Kakue, Tomoyoshi Ito, Chiba Univ. (Japan) [11353-24]

Study on holographic special-purpose computer for wavefront printing technology, Yasuyuki Ichihashi, National Institute of Information and Communications Technology (Japan); Takashi Kakue, Chiba Univ. (Japan); Koki Wakunami, Boaz Jessie Jackin, Ryutaro Oi, National Institute of Information and Communications Technology (Japan); Tomoyoshi Shimobaba, Tomoyoshi Ito, Chiba Univ. (Japan) [11353-25]

CONFERENCE 11353

Riesz transform-based digital four-step phase-shifting interferometer, Yassine Tounsi, Univ. Chouaib Doukkali (Morocco); Manoj Kumar, Kobe Univ. (Japan); Ahmed Siari, Univ. Chouaib Doukkali (Morocco); Fernando Mendoza-Santoyo, Centro de Investigaciones en Óptica, A.C. (Mexico); Osamu Matoba, Kobe Univ. (Japan); Abdelkrim Nassim, Univ. Chouaib Doukkali (Morocco) [11353-26]

Lunch/Exhibition Break Wed 12:40 to 13:50

SESSION 6 WED 13:50 TO 15:20

JPEG Coding I

Deep learning for image compression: a review of the early architectures and further developments (*Invited Paper*), Joao M. Ascenso, Fernando Pereira, Instituto Superior Técnico (Portugal); Touradj Ebrahimi, Pinar Akyazi, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [11353-27]

Adopting the JPEG systems layer to create interoperable imaging ecosystems, Frederik Temmermans, Vrije Univ. Brussel (Belgium) and imec (Belgium); Andy Kuzma, Intel Corp. (United States); Seungcheol Choi, Sejong Univ. (Korea, Republic of); Jung-Hwan Park, PJ Factory (Korea, Republic of); Peter Schelkens, Vrije Univ. Brussel (Belgium) and imec (Belgium) [11353-28]

Exploration of media block chain technologies for JPEG privacy and security, Frederik Temmermans, Vrije Univ. Brussel (Belgium) and imec (Belgium); Deepayan Bhowmik, Univ. of Stirling (United Kingdom); Fernando Pereira, Instituto de Telecomunicações, Univ. de Lisboa (Portugal); Peter Schelkens, Vrije Univ. Brussel (Belgium) and imec (Belgium) . . [11353-29]

Parameterization of the quality factor for the high throughput JPEG 2000, Ayyoub Ahar, Saeed Mahmoudpour, Vrije Univ. Brussel (Belgium) and imec (Belgium); Osamu Watanabe, Takushoku Univ. (Japan); David Taubman, The Univ. of New South Wales (Australia); Peter Schelkens, Vrije Univ. Brussel (Belgium) and imec (Belgium) [11353-30]

SESSION 7 WED 15:50 TO 17:10

JPEG Coding II

Efficient raw image sensor compression with JPEG XS, Antonin Descampe, intoPIX s.a. (Belgium); Thomas Richter, Fraunhofer-Institut für Integrierte Schaltungen IIS (Germany); Gaël Rouvroy, intoPIX s.a. (Belgium); Siegfried Foessel, Fraunhofer-Institut für Integrierte Schaltungen IIS (Germany) [11353-31]

Benchmarking JPEG XL lossy/lossless image compression, Jyrki Alakuijala, Sami Boukourt, Evgenii Kliuchnikov, Google Zürich (Switzerland); Jon Sneyers, Cloudinary (United States); Lode Vandevenne, Luca Versari, Jan Wassenberg, Google Zürich (Switzerland) [11353-32]

An overview of the emerging JPEG pleno standard, Cristian Perra, Univ. degli Studi di Cagliari (Italy) [11353-33]

A comparison of hologram plane coding and object plane coding on different types of holograms, Roberto Corda, Cristian Perra, Univ. degli Studi di Cagliari (Italy) [11353-34]

THURSDAY 2 APRIL

HOT TOPICS III THU 9:00 TO 10:35

Photonics Europe 2020: Hot Topics Session III

- 9.00 - 9.05 **Introduction**
Thierry Georges, Oxxius, France
2019 Symposium Chair
- 9.05 - 9.50 **Ultrafast solid-state lasers: a success story for the last 30 years with no end in sight**
Ursula Keller, ETH Zurich, Switzerland
- 9:50 - 10:35 **From inverse design to implementation of practical quantum photonics**
Jelena Vuckovic, Stanford Univ., United States

For additional details see page 9

SESSION 8 THU 11:00 TO 12:00

Image Acquisition and Computational Imaging

Curved sensors for compact and high-performance imaging systems, Kelly Joaquina, Emmanuel Hugot, Thibault Behaghel, Simona Lombardo, Eduard Muslimov, Lab. d'Astrophysique de Marseille (France) [11353-35]

Electrochromic graduated filters with symmetric electrode configuration, Alexander Hein, Carsten Kortz, Technische Univ. Kaiserslautern (Germany); Frederike Carl, Jonas Klein, Markus Haase, Univ. Osnabrück (Germany); Roman Stoll, Renate Warmers, Gerald Jenke, Matthews International GmbH (Germany); Christoph Gimmler, Theo Schotten, Fraunhofer-Zentrum für Angewandte Nanotechnologie CAN (Germany); Michael Haag-Pichl, Jos. Schneider Optische Werke GmbH (Germany); Egbert Oesterschulze, Technische Univ. Kaiserslautern (Germany) [11353-36]

Image processing system for vidicon-based radiation-resistant cameras, Daria Kolesnikova, ITMO Univ. (Russian Federation) [11353-37]

Lunch Break Thu 12:00 to 13:40

SESSION 9 THU 13:40 TO 15:00

Plenoptic Signal Processing

3D point cloud reconstruction from a single 4D light field image, Helia Farhood, Stuart Perry, Eva Cheng, Univ. of Technology, Sydney (Australia); Juno Kim, The Univ. of New South Wales (Australia) . . . [11353-38]

Eye safety considerations and performance comparison of flash- and MEMS-based lidar systems, Roman Burkard, Reinhard Viga, Univ. Duisburg-Essen (Germany); Jennifer Ruskowski, Fraunhofer-Institut für Mikroelektronische Schaltungen und Systeme IMS (Germany); Anton Grabmaier, Univ. Duisburg-Essen (Germany) and Fraunhofer-Institut für Mikroelektronische Schaltungen und Systeme IMS (Germany) [11353-39]

Automated point cloud acquisition system using multiple RGB-D cameras, Daniele Medda, Cristian Perra, Univ. degli Studi di Cagliari (Italy) [11353-40]

Highly parallelized rendering of the retinal image through a computer-simulated human eye for the design of virtual reality head mounted display, Con Tran Vu, Simon Stock, Wilhelm Stork, Karlsruher Institut für Technologie (Germany) [11353-41]

SESSION 10 THU 15:20 TO 17:20

Spectrometry

Optical design and prototyping of a multisection grating for a broadband and miniaturized spectrometer, Gebirge Yizengaw Belay, Vrije Univ. Brussel (Belgium); Willem Hoving, Arthur van der Put, Anteryon B.V. (Netherlands); Michael Vervaeke, Jürgen Van Erps, Hugo Thienpont, Heidi Ottevaere, Vrije Univ. Brussel (Belgium) [11353-42]

A multichannel spectral coding method for the coded aperture tunable filter spectral imager, Xi Wang, Yuhang Zhang, Chang Xu, Axin Fan, Yue Yu, Chenguang Pan, Jianhua Hao, Chen Huang, Tingfa Xu, Beijing Institute of Technology (China) [11353-43]

Compact time-resolved fluorescence spectrometer, Anas Gasser, Vrije Univ. Brussel (Belgium) and Anteryon B.V. (Netherlands); Thomas Lapauw, Hans Ingelberts, Vrije Univ. Brussel (Belgium); Willem Hoving, Anteryon B.V. (Netherlands); Maarten Kuijk, Vrije Univ. Brussel (Belgium) [11353-44]

Analysis and selection of evaluation metrics for infrared and visible image fusion, Xuelian Yu, Qian Chen, Weixian Qian, Guohua Gu, Nanjing Univ. of Science and Technology (China) [11353-45]

A compressive sensing-based hyperspectral ocean color imager for CubeSats, Michael S. Twardowski, Bing Ouyang, Ed Malkiel, Harbor Branch Oceanographic Institute (United States); Graham Sanborn, Naval Information Warfare Ctr. Pacific (United States) [11353-46]

Real-time adaptive coded aperture: application to compressive spectral imaging, Yuhang Zhang, Xi Wang, Chang Xu, Axin Fan, Yue Yu, Chenguang Pan, Jianhua Hao, Chen Huang, Tingfa Xu, Beijing Institute of Technology (China) [11353-47]

CONFERENCE 11354

Sunday–Thursday 29 March–2 April 2020 • Proceedings of SPIE Vol. 11354

Optical Sensing and Detection VI

Conference Chairs: **Francis Berghmans**, Vrije Univ. Brussel (Belgium); **Anna G. Mignani**, Istituto di Fisica Applicata Nello Carrara (Italy)

Programme Committee: **Francesco Chiavaioli**, Istituto di Fisica Applicata “Nello Carrara” (Italy); **Thomas Geernaert**, Vrije Univ. Brussel (Belgium); **Roger M. Groves**, Technische Univ. Delft (Netherlands); **Jane Hodgkinson**, Cranfield Univ. (United Kingdom); **Jiri Homola**, Institute of Photonics and Electronics of the ASCR, v.v.i. (Czech Republic); **Leszek Roman Jaroszewicz**, Military Univ. of Technology (Poland); **Walter Margulis**, RISE Acreo AB (Sweden); **Sinead O’Keefe**, Univ. of Limerick (Ireland); **Kate Sugden**, Aston Univ. (United Kingdom); **Luc Thevenaz**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Alessandro Tredicucci**, NEST (Italy); **Waclaw Urbanczyk**, Wrocław Univ. of Technology (Poland); **Jan Van Roosbroeck**, FBGS International (Belgium); **Libo Yuan**, Harbin Engineering Univ. (China)

SUNDAY 29 MARCH

SESSION 1..... SUN 14:00 TO 15:10

Detection for Visible Light Communication

Session Chair: **Francis Berghmans**, Vrije Univ. Brussel (Belgium)

Optical link for bidirectional communication based on visible light (*Invited Paper*), Paula Louro, ISEL-IPL (Portugal) and CTS-UNINOVA (Portugal); Manuela Vieira, ISEL-IPL (Portugal) and CTS-UNINOVA (Portugal) and DEE-FCI-UNL (Portugal); Manuel A. Vieira, ISEL-IPL (Portugal) and CTS-UNINOVA (Portugal). [11354-1]

Indoor wayfinding using visible light communication, Manuela Vieira, Manuel Augusto Vieira, Paula Louro, Alessandro Fantoni, Pedro Vieira, Instituto Superior de Engenharia de Lisboa (Portugal). [11354-2]

Redesign of the vehicle trajectory inside an intersection using visible light, Manuela Vieira, Instituto Superior de Engenharia de Lisboa (Portugal); Manuel Augusto Vieira, Paula Louro, UNINOVA Ctr. of Technology and Systems (Portugal) and Instituto Superior de Engenharia de Lisboa (Portugal); Pedro Vieira, Instituto Superior de Engenharia de Lisboa (Portugal). . . [11354-3]

SESSION 2..... SUN 15:40 TO 18:10

Detector Technologies

Session Chair: **Francis Berghmans**, Vrije Univ. Brussel (Belgium)

A multisampling lower-noise visible CMOS detector for aerospace applications (*Invited Paper*), Honghui Yuan, The Shanghai Institute of Technical Physics of the Chinese Academy of Sciences (China). [11354-4]

Real-time time correlated photon counters for photon number resolving detectors, Mala Sadik, Aston Univ. (United Kingdom); Xiao Ai, QLM Technology (United Kingdom); Yang Lu, Richard W. Nock, Aston Univ. (United Kingdom). [11354-5]

Design of performance test system for ultraviolet ICCD detector, YaFeng Qiu, JiaYi Deng, Nanjing Univ. of Science and Technology (China); YiTao Cao, Shanghai Institute of Mechanical & Electrical Engineering Co., Ltd. (China); YunZe Qiu, Ainsworth Game Technology, Ltd. (Australia). [11354-6]

Research of InGaAs photodetector array for far-distance laser facula, Rongguo Fu, Nanjing Univ. of Science and Technology (China). [11354-7]

High-performance waveguide untraveling carrier photodetector based on GaAs0.5Sb0.5/InP type-II heterojunction, Zhenjie Song, Zichen Feng, Chun Yang, Southeast Univ. (China). [11354-8]

Performance of silver-plated silicon photodetector in near-infrared band, Yu-Chieh Huang, National Taiwan Univ. (Taiwan); Vivek Parimi, Indian Institute of Technology Indore (India); Ching-Fuh Lin, National Taiwan Univ. (Taiwan). [11354-9]

Low-cost and portable active thermography using cellphone infrared cameras, Nakisa Samadi, Damber Thapa, Artur Parkhimchyk, Nima Tabatabaei, York Univ. (Canada). [11354-10]

MONDAY 30 MARCH

HOT TOPICS I..... MON 9:00 TO 11:00

Photonics Europe 2020: Hot Topics Session I

9:00 - 9:20 **SPiE Welcome and Award Presentation**
John E. Greivenkamp, Univ of Arizona, United States
SPiE President

Welcome

Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair

City of Strasbourg Welcome

9:25 - 9:30 **Introduction to Hot Topics**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair

9:30 - 10:15 **Naturally fast and low power electro-optic polymer optical devices are ideally positioned for the next-generation Internet photonics roadmap**
Michael Lebby, CEO Lightwave Logic, United Kingdom

10:15 - 11:00 **3D printed micro-optics: state of the art and future challenges**
Harald Giessen, University of Stuttgart, Germany

For additional details see pages 6-7

SESSION 3..... MON 11:30 TO 12:40

Optical Fiber Grating-based Sensors I

Session Chair: **Christophe Caucheteur**, Univ. de Mons (Belgium)

Immunoassays using tilted fiber Bragg gratings: an overview (*Invited Paper*), Médéric Loyez, Maxime Lobry, Christophe Caucheteur, Ruddy Wattiez, Univ. de Mons (Belgium). [11354-11]

Preliminary assessment on the detection of putrescine using long period fiber gratings coated with titanium dioxide and poly(ethylene-co-vinyl acetate), Jose M. Almeida, Univ. de Trás-os-Montes e Alto Douro (Portugal) and INESC TEC (Portugal); Helena Vasconcelos, Cristina Saraiva, Univ. de Trás-os-Montes e Alto Douro (Portugal); Duarte Viveiros, INESC TEC (Portugal); P.A.S. Jorge, Univ. do Porto (Portugal); Luis Coelho, INESC TEC (Portugal). [11354-12]

Femtosecond laser-written long period fibre gratings coated with titanium dioxide for improved sensitivity, Duarte Viveiros, INESC TEC (Portugal) and Univ. do Porto (Portugal); José M.M. de Almeida, Univ. de Trás-os-Montes e Alto Douro (Portugal) and INESC TEC (Portugal); Luis Coelho, INESC TEC (Portugal) and Univ. do Porto (Portugal); Helena Vasconcelos, INESC TEC (Portugal) and Univ. de Trás-os-Montes e Alto Douro (Portugal); João M. Maia, Vítor A. Amorim, INESC TEC (Portugal) and Univ. do Porto (Portugal); Pedro A.S. Jorge, Paulo V. S. Marques, Univ. do Porto (Portugal) and INESC TEC (Portugal). [11354-13]

Lunch Break Mon 12:40 to 13:50

SESSION 4..... MON 13:50 TO 15:00

Optical Fiber Grating-based Sensors II

Session Chair: **Christophe Caucheteur**, Univ. de Mons (Belgium)

Numerical and experimental study on narrowband cladding mode excitation in photonic crystal fibers with fiber Bragg gratings, Olga Rusyakina, Vrije Univ. Brussel (Belgium) and Univ. de Mons (Belgium); Tigran Baghdasaryan, Vrije Univ. Brussel (Belgium); Karima Chañ, Univ. de Mons (Belgium); Pawel Mergo, Krzysztof Poturaj, Maria Curie-Skłodowska Univ. (Poland); Hugo Thienpont, Vrije Univ. Brussel (Belgium); Christophe Caucheteur, Univ. de Mons (Belgium); Francis Berghmans, Thomas Geernaert, Vrije Univ. Brussel (Belgium). [11354-14]

CONFERENCE 11354

Smart bed for monitoring the condition of a patient exposed to MRI scanning. Mateusz Slowikowski, Andrzej Kazmierczak, Mateusz Bieniek, Sławomir Szostak, Warsaw Univ. of Technology (Poland); Mariusz Krej, Lukasz Dziuda, Military Institute of Aviation Medicine (Poland); Tomasz Osuch, Stanislaw Stopinski, Ryszard Piramidowicz, Warsaw Univ. of Technology (Poland)..... [11354-15]

Integrated photonics-based solutions for optical sensing applications (*Invited Paper*), Stanislaw Stopinski, Anna Jusza, Krzysztof Anders, Sławomir Szostak, Andrzej Kazmierczak, Mateusz Slowikowski, Ryszard Piramidowicz, Warsaw Univ. of Technology (Poland)..... [11354-16]

SESSION 5.....MON 15:30 TO 17:20

Optical Fiber Grating-based Sensors III

Session Chair: **Christophe Caucheteur**, Univ. de Mons (Belgium)

Barely visible impact damage detection and location on composite materials by surface-mounted and embedded aerospace-compatible optical fibre Bragg grating sensors (*Invited Paper*), Sidney Goossens, Thomas Geernaert, Vrije Univ. Brussel (Belgium); Zahra Sharif Khodaei, Imperial College London (United Kingdom); Evangelos Karachalios, Hellenic Aerospace Industry S.A. (Greece); Diego Saenz-Castillo, Fundación para la Investigación, Desarrollo y Aplicación de Materiales Compuestos (Spain); Francis Berghmans, Vrije Univ. Brussel (Belgium)..... [11354-17]

Multiparameter point sensing with the FBG-containing multicore optical fiber. Alexey Wolf, Kirill Bronnikov, Alexandr Dostovalov, Institute of Automation and Electrometry of the SB RAS (Russian Federation) and Novosibirsk State Univ. (Russian Federation); Victor Simonov, Vadim Terentyev, Institute of Automation and Electrometry of the SB RAS (Russian Federation); Sergey Babin, Institute of Automation and Electrometry of the SB RAS (Russian Federation) and Novosibirsk State Univ. (Russian Federation)..... [11354-18]

Highly dense FBG arrays for millimeter-scale thermal monitoring during nanoparticle-enhanced laser ablation. Sanzhar Korganbayev, Somayah Asadi, Politecnico di Milano (Italy); Iris Sonia Weitz, ORT Braude College (Israel); Alexey Wolf, Alexandr Dostovalov, Institute of Automation and Electrometry of the SB RAS (Russian Federation); Martina Zalteri, Emiliano Schena, Univ. Campus Bio-Medico di Roma (Italy); Haim Azhari, Technion-Israel Institute of Technology (Israel); Paola Saccomandi, Politecnico di Milano (Italy)..... [11354-19]

High-temperature resistance refractometric sensors based on regenerated TFGBs. Nazila Safari-Yazd, Christophe Caucheteur, Damien Kinet, Patrice Mégret, Karima Chah, Univ. de Mons (Belgium)..... [11354-20]

A compressed sensing approach to fibre Bragg grating interrogation. Srikanth Sugavanam, Adenowo Gbadebo, Kamalian Kopae, Aston Univ. (United Kingdom); Angshul Majumdar, Indraprastha Institute of Information Technology (India)..... [11354-21]

TUESDAY 31 MARCH

SESSION 6.....TUE 8:30 TO 10:20

Spectroscopy and Plasmonic Sensing

Session Chair: **Anna Grazia Mignani**, Istituto di Fisica Applicata "Nello Carrara" (Italy)

Plastic sorting based on MEMS FTIR spectral chemometrics sensing (*Invited Paper*), Mai Said, Mariam Amr, Yasser M. Sabry, Diaa A. Khalil, Ain Shams Univ. (Egypt)..... [11354-22]

All-dielectric optical interference coatings optimized for giant field enhancement and sensing applications. Dikai Niu, Institut Fresnel (France) and PSA Groupe (France); Myriam Zerrad, Aude Lereu, Institut Fresnel (France); Vincent Aubry, PSA Group (France); Juan Antonio Zapien, City Univ. of Hong Kong (Hong Kong, China); Ali Passian, Oak Ridge National Lab. (United States); Claude Amra, Institut Fresnel (France); Antonin Moreau, Institut Fresnel (France); Julien Lumeau, Institut Fresnel (France).... [11354-23]

Determination of heavy metal ions concentration in multicomponent aqueous solutions using adaptive data analysis methods. Olga E. Sarmanova, Kirill A. Laptinskiy, Sergey A. Burikov, M.V. Lomonosov Moscow State Univ. (Russian Federation); Igor V. Isaev, Skobeltsyn Institute of Nuclear Physics (Russian Federation); Nikita D. Trifonov, Tatiana A. Dolenko, M.V. Lomonosov Moscow State Univ. (Russian Federation); Sergey A. Dolenko, Skobeltsyn Institute of Nuclear Physics (Russian Federation)..... [11354-24]

Flexible remote SERS substrate. Prithu Roy, ITMO Univ. (Russian Federation); Alexey D. Bolshakov, St. Petersburg Academic Univ. (Russian Federation) and ITMO Univ. (Russian Federation); Ivan S. Mukhin, ITMO Univ. (Russian Federation) and ITMO University (Russian Federation).... [11354-25]

Vacuum- and transfer-free graphene Raman sensor using a nanoparticle-gap-film SERS structure. Di Zhang, Aya Taieb, Abdul Hai Alami, Kamilia Aokal, Hussain Alawadhi, Univ. of Sharjah (United Arab Emirates); Jihad Abed, Masdar Institute of Science & Technology (United Arab Emirates); Lougouman Bichara, Univ. of Sharjah (United Arab Emirates)..... [11354-26]

SESSION 7.....TUE 10:50 TO 12:40

Optical Fiber-based Sensors I

Session Chair: **Francis Berghmans**, Vrije Univ. Brussel (Belgium)

Laser absorption spectroscopy and gas sensing near 4.5 μm inside antiresonant hollow core fiber (*Invited Paper*), Michal Nikodem, Grzegorz Gomółka, Wrocław Univ. of Science and Technology (Poland); Mariusz Klimczak, Dariusz Pysz, Łukasiewicz Research Network, Institute of Electronic Materials Technology (Poland); Ryszard Buczyński, Łukasiewicz Research Network, Institute of Electronic Materials Technology (Poland), Univ. of Warsaw (Poland)..... [11354-27]

Raman spectroscopy of atmospheric gases using hollow core (photonic crystal) fibers. Christian Niklas, Simon Göllner, Fabian Müller, Hainer Wackerbarth, Georgios Ctistis, Laser-Lab. Göttingen e.V. (Germany)..... [11354-28]

Novel signal processing techniques for fiber optic distributed acoustic sensing. Ibrahim Olcer, TÜBİTAK BILGEM (Turkey); Ahmet Öncü, Bogaziçi Univ. (Turkey)..... [11354-29]

Significance of high extinction ratio laser pulse generation in coherent time domain reflectometry. Alireza Morsali, ICube, Univ. of Strasbourg (France) and OSMOS Group (France); Sylvain Lecler, Univ. of Strasbourg (France) and INSA Strasbourg (France); Patrice M. Pelletier, OSMOS Group (France); Pierre Pfeiffer, ICube, Univ. of Strasbourg (France)..... [11354-30]

Femtosecond laser micromachining of Fabry-Perot interferometers in SMF-28 fiber for pressure sensing. Duarte Viveiros, INESC TEC (Portugal) and Univ. do Porto (Portugal); José M.M.M. de Almeida, Univ. of Trás-os-Montes e Alto Douro (Portugal) and INESC TEC (Portugal); Luis Coelho, INESC TEC (Portugal) and Univ. do Porto (Portugal); João M. Maia, INESC TEC (Portugal) and Univ. do Porto (Portugal); Vítor A. Amorim, Univ. do Porto (Portugal); Helena Vasconcelos, INESC TEC (Portugal) and Univ. of Trás-os-Montes e Alto Douro (Portugal); Pedro A. S. Jorge, Paulo V. S. Marques, Univ. do Porto (Portugal) and INESC TEC (Portugal)..... [11354-31]

Lunch/Exhibition BreakTue 12:40 to 14:00

SESSION 8.....TUE 14:00 TO 15:50

Optical Fiber-based Sensors II

Session Chair: **Francis Berghmans**, Vrije Univ. Brussel (Belgium)

Fiber-based label-free D-dimer detection for early diagnosis of venous thromboembolism (*Invited Paper*), Pablo Zubiate, Aitor Urrutia, Univ. Pública de Navarra (Spain); Carlos R. Zamareño, Institute of Smart Cities, Univ. Pública de Navarra (Spain); Joaquín Fernández-Irigoyen, Navarrabiomed, Complejo Hospitalario de Navarra, Univ. Pública de Navarra (Spain); Ambra Giannetti, Francesco Baldini, Istituto di Fisica Applicata "Nello Carrara" (Italy); Silvia Díaz, Univ. Pública de Navarra (Spain); Ignacio R. Matias, Institute of Smart Cities, Univ. Pública de Navarra (Spain); Francisco J. Arregui, Univ. Pública de Navarra (Spain); Enrique Santamaría, Navarrabiomed, Complejo Hospitalario de Navarra, Univ. Pública de Navarra (Spain); Ignacio Del Villar, Institute of Smart Cities, Univ. Pública de Navarra (Spain); Francesco Chiavaioli, Istituto di Fisica Applicata "Nello Carrara" (Italy)..... [11354-32]

Energy dependence of novel inorganic scintillation-based optical fiber sensors. Majed Alharbi, National Univ. of Ireland, Galway (Ireland); Sinead O'Keeffe, Optical Fibre Sensors Research Ctr., Univ. of Limerick (Ireland); Pat McCavana, St. Luke's Hospital, Dublin Ireland (Ireland); Mark Foley, National Univ. of Ireland, Galway (Ireland)..... [11354-33]

Novel inorganic scintillating detectors and their applications in small animal irradiators: measurements and Monte Carlo simulations. Kevin Byrne, Majed Alharbi, National Univ. of Ireland, Galway (Ireland); Magdalena Bazalova-Carter, Univ. of Victoria (Canada); Sinead O'Keeffe, Univ. of Limerick (Ireland); Christoph Kleefeld, Mark Foley, National Univ. of Ireland, Galway (Ireland)..... [11354-34]

Light scattering and rheological effects in an optical fibre coupled nanoparticle suspension. Xiang Wang, Rinze Benedictus, Roger M. Groves, Technische Univ. Delft (Netherlands)..... [11354-35]

Electrical resistance-emission spectroscopy of metals by white light interferometry. Khaled J. Habib, Kuwait Institute for Scientific Research (Kuwait)..... [11354-36]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

- 16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair
- 16.35 to 17.20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States
- 17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

WEDNESDAY 1 APRIL

SESSION 9 WED 10:30 TO 12:00

Photonic Crystal and Waveguide-based Sensors

Session Chair: Francis Berghmans, Vrije Univ. Brussel (Belgium)

Photonic crystal-based sensor arrays for lensless point-of-care diagnostics (*Invited Paper*), Cécile Jamois, Institut National des Sciences Appliquées de Lyon (France); Nicolas Gaignebet, Lotfi Berguiga, Lydie Ferrier, Taha Benyattou, Institut des Nanotechnologies de Lyon (France); Thomas Gehin, Emmanuelle Laurenceau, Virginie Monnier, Yann Chevolut, Ecole Centrale de Lyon (France); Mathieu Dupoy, CEA-LETI (France); Maryse Fournier, CEA LETI (France); Laurent Duraffourg, CEA-LETI (France); Patrick Pouteau, Avalun SAS (France) [11354-37]

Integrated silicon photonic crystal sensor for pressure acoustics, Michael A. Zylstra, Brett Poulsen, Jayshri Sabarinathan, Western Univ. (Canada) [11354-38]

Enhanced magneto-optical response with a 1D resonant grating for sensing applications, Laure Bsawmail, Damien Jamon, Emilie Gamet, Lab. Hubert Curien (France); Sophie Neveu, Lab. PHENIX (France); Francois Royer, Lab. Hubert Curien (France) [11354-39]

Enhanced sensitivity of planar evanescent waveguide sensors: material and sensitivity study, Gregory Pandraud, Technische Univ. Delft (Netherlands); Yu Xin, Wenbo Zhao, Weiwei Song, State Key Lab. of NBC Protection for Civilian (China); Paddy French, Olindo Isabella, Technische Univ. Delft (Netherlands) [11354-40]

Lunch/Exhibition Break Wed 12:00 to 13:10

SESSION 10 WED 13:10 TO 15:00

Gas and Volatile Compound Sensing I

Session Chair: Anna Grazia Mignani, Istituto di Fisica Applicata "Nello Carrara" (Italy)

Volatile organic compound sensing using silicone-coated metallic flow-through nanohole arrays (*Invited Paper*), Juan Gomez-Cruz, Queen's Univ. (Canada) and Instituto de Ciencias Aplicadas y Tecnología, Univ. Nacional Autónoma de México (Mexico); Adam Pejic, Goethe-Universität Frankfurt am Main (Germany); Gabriel Ascanio, Instituto de Ciencias Aplicadas y Tecnología, Univ. Nacional Autónoma de México (Mexico); Hans-Peter Loock, Carlos Escobedo, Queen's Univ. (Canada) [11354-41]

Investigation of nanozeolite-doped holographic structures for sensing volatile organic compounds, Graceson Antony, Dervil Cody, School of Physics & Clinical & Optometric Sciences, TU Dublin (Ireland) and Ctr. for Industrial and Engineering Optics, TU Dublin (Ireland); Svetlana Mintova, Lab. Catalyse & Spectrochimie, Nationale Supérieure d'Ingenieurs de Caen et Ctr. de Recherche (France) and Univ. de Caen Basse-Normandie, CNRS (France); Izabela Naydenova, School of Physics & Clinical & Optometric Sciences, TU Dublin (Ireland) and Ctr. for Industrial and Engineering Optics, TU Dublin (Ireland) [11354-42]

Metal nanosurface-gas interaction studies using whispering gallery modes, Nima Bavili, Berna Morova, Koç Univ. (Turkey); Alper Kiraz, Koç Univ. (Turkey) [11354-43]

Optoelectronic nose: fundamental study on the effects of temperature and humidity, Jonathan S. Weerakkody, Charlotte Hurot, Sophie Brenet, Raphael Mathey, CEA (France); Cyril Herrier, Thierry Livache, Aryballe Technologies (France); Arnaud Buhot, Yanxia Hou, CEA (France) [11354-44]

Onsite gas sensing by surface-enhanced Raman scattering, Zhengjun Zhang, Tsinghua Univ. (China) [11354-45]

SESSION 11 WED 15:30 TO 17:50

Gas and Volatile Compound Sensing II

Session Chair: Anna Grazia Mignani, Istituto di Fisica Applicata "Nello Carrara" (Italy)

First clinical evaluation of quartz-enhanced photoacoustic CO sensor for human breath analysis (*Invited Paper*), Nicolas Maurin, Roman Rousseau, Wioletta Trzpił, Institut d'Electronique et des Systèmes, Univ. de Montpellier (France); Maurice Hayot, INSERM (France) and CNRS (France) and Montpellier de Univ. (France); Jacques Mercier, INSERM (France) and CNRS (France) and Montpellier de Univ. (France); Michael Bahriz, Institut d'Electronique et des Systèmes, Univ. de Montpellier (France) and CNRS (France); Fares Gouzi, INSERM (France) and CNRS (France) and Montpellier de Univ. (France); Aurore Vicet, Institut d'Electronique et des Systèmes, Univ. de Montpellier (France) and CNRS (France) [11354-46]

New optomechanical microresonator for photo-acoustic gas detection, Wioletta Trzpił, Roman Rousseau, Nicolas Maurin, Aurore Vicet, Michael Bahriz, Institut d'Electronique et des Systèmes, Univ. Montpellier (France) [11354-47]

Real time resonance tracking of a quartz tuning fork and its application for quartz-enhanced photo-acoustic spectroscopy, Roman Rousseau, CNRS (France) [11354-48]

A comparison of topologies used in an interferometric gas detection technique (*Invited Paper*), James Bremner, Jane Hodgkinson, Thomas Kissinger, Ralph Tatam, Cranfield Univ. (United Kingdom) [11354-49]

Diode-based Raman sensor for fuel gas analysis, Lorenzo Cocola, Giuseppe Tondello, Luca Poletto, CNR-Istituto di Fotonica e Nanotecnologie (Italy) [11354-50]

Sensing of gaseous analytes via Bloch surface waves, Michal Gryga, Dalibor Ciprian, Lucie Gembalova, Petr Hlubina, VŠB-Technical Univ. of Ostrava (Czech Republic) [11354-51]

POSTERS-WEDNESDAY WED 18:00 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Wednesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

A comparison of optomechanical choppers with cylindrical, spherical, and conical shafts, Eduard Sebastian Csukas, Univ. Politechnica Timisoara (Romania); Virgil-Florin Duma, Univ. "Aurel Vlaicu" din Arad (Romania) [11354-64]

Experimental validations of simulated exact scan patterns of rotational Risley prisms scanners, Alexandru-Lucian Dîmb, Univ. Politechnica Timisoara (Romania); Virgil-Florin Duma, Univ. "Aurel Vlaicu" din Arad (Romania) [11354-65]

Comparison of theoretical calculation and experimental testing of the sensitivity of a fiber Bragg grating strain sensor, Crystal Ma, California Academy of Mathematics and Science School (United States); Maurice Ma, RC Integrated Systems LLC (United States) [11354-66]

Radiotherapy dosimetry based on perfluorinated polymer optical fibers, Olugbenga Jeremiah Olusoji, Wern Kam, Sinead O'Keefe, Univ. of Limerick (Ireland) [11354-67]

A resolution-improved interferometric fiber-optic surface plasmon resonance sensor, Yi Duo, Chen Yuzhi, Geng Youfu, Xuejin Li, Xueming Hong, Shenzhen Univ. (China) [11354-68]

Long-range reconnaissance and surveillance system, Qingzeng Xue, Zhang Wenfeng, China North Vehicle Research Institute (China) [11354-69]

Methods of contactless optical spectroscopy in problems of multi-alternative automatic control of physical and physico-chemical processes, Mikhail A. Vaganov, Oleg D. Moskaletz, Saint-Petersburg State Univ. of Aerospace Instrumentation (Russian Federation) [11354-70]

Interpreting the output of an optical particle counter measuring monodispersed silver-coated particles immersed in lubricating oil, Kevin Krogsøe, Univ. of Southern Denmark (Denmark) and C.C. Jensen A/S (Denmark); René L. Eriksen, Univ. of Southern Denmark (Denmark); Morten Henneberg, C.C. Jensen A/S (Denmark) [11354-71]

Effects of thin-film manipulation on the performance of fluorescent sensor device for explosive detection, Jonathan Lai, The Univ. of Queensland (Australia) [11354-72]

Optical fiber measurement head with ZnO layer and nanocrystalline diamond sheet, Monika Kosowska, Paulina Listewnik, Marzena Hirsch, Mateusz Ficek, Daria Majchrowicz, Gdansk Univ. of Technology (Poland); Matthieu Weber, Mikhael Bechelany, Univ. de Montpellier (France); Malgorzata Szczerska, Gdansk Univ. of Technology (Poland) [11354-73]

Accurate and robust algorithm for high-resolution optical blade tip timing measurements, Rubén Fernández Bello, Josu Amorebieta, Univ. del País Vasco (Spain); Josu Beloki, Fundación Centro de Tecnologías Aeronáuticas (Spain); Iker García, Advanced Optical Technologies S.L. (Spain); Joseba Zubia, Gaizka Durana, Univ. del País Vasco (Spain) [11354-74]

FBGs temperature sensor for metal rod subject to high voltage and high-frequency current, Ramzi Ben Hassen, Univ. Libre de Bruxelles (Belgium); Christophe Caucheteur, Univ. de Mons (Belgium); Alain Delchambre, Univ. Libre de Bruxelles (Belgium) [11354-75]

Calculation technique of diffuse reflectance spectra using an ensemble of damped harmonic oscillators model for substances identification, Dmitriy R. Anfimov, Anastasiya S. Tabalina, Igor L. Fufurin, Igor S. Golyak, Bauman Moscow State Technical Univ. (Russian Federation) [11354-76]

Features of the formation of emission spectra excited by femtosecond radiation in aqueous aerosols, Yuliya S. Tolstonogova, Alexandr Mayor, Institute for Automation and Control Processes (Russian Federation); Sergey Golik, Far Eastern Federal Univ. (Russian Federation); Vladimir Lisitsa, Institute of Automation and Control Processes (Russian Federation) [11354-77]

Reading spectrometric information in the acousto-optic spectrum analyzers of radio signals and diffraction spectral devices of the optical range, Vasily I. Kazakov, Saint-Petersburg State Univ. of Aerospace Instrumentation (Russian Federation); Dmitry Moskaletz, Pavel Bondar, Saint Petersburg Electrotechnical Univ. "LETI" (Russian Federation); Oleg Moskaletz, Saint-Petersburg State Univ. of Aerospace Instrumentation (Russian Federation) [11354-78]

Design and application of distributed microresonator-based systems for biochemical sensing, Anton V. Saetchnikov, Ruhr-Univ. Bochum (Germany); Elina A. Tcherniavskaja, Vladimir A. Saetchnikov, Belarusian State Univ. (Belarus); Andreas Ostendorf, Ruhr-Univ. Bochum (Germany) [11354-79]

More than one photon detection using fore-layer thermoelectric single-photon detector, Astghik A. Kuzanyan, Armen S. Kuzanyan, Vahan R. Nikoghosyan, Institute for Physical Research, NAS RA (Armenia) [11354-80]

Multiparametric optimization of the amplitude diffraction grating topology for the spectrum analysis in higher diffraction orders, Vasily Kazakov, Saint-Petersburg State Univ. of Aerospace Instrumentation (Russian Federation) [11354-81]

Enhanced resolution MEMS spectrometer based on FTIR technique combined with reflection-type etalon, Amir K. Shaheen, Yasser M. Sabry, Diaa Khalil, Ain Shams Univ. (Egypt) and Si-Ware Systems (Egypt) . . [11354-82]

Tailored plasmonic nanostructures for highly sensitive LSPR-based sensing, Abhijit Das, Kamal Kumar, Anuj Dhawan, Indian Institute of Technology Delhi (India) [11354-83]

Silver nanoprisms-based fiber optic sensor for hydrogen peroxide detection, Jitendra Satija, Sangeeta Yadav, Vellore Institute of Technology (India) [11354-84]

Development of an optical nondestructive milk freshness measurement system using on-chip spectrometer and deep neural networks, Hao-Chiang Shao, Fu Jen Catholic Univ. (Taiwan); Yu-Ming Liang, National Taipei Univ. of Technology (Taiwan); Bill Choi, nanoLambda (Korea, Democratic Peoples Republic of); Cheng-chun Chang, National Taipei Univ. of Technology (Taiwan) [11354-85]

The open end of an optical fiber as the optical range antenna, Arthur S. Paraskun, Oleg D. Moskaletz, Vasily I. Kazakov, Mikhail A. Vaganov, Saint-Petersburg State Univ. of Aerospace Instrumentation (Russian Federation) [11354-86]

Simulation study on fluoride fiber SPR sensor with multilayer arrangements of graphene under thermal variation of radiation damping in NIR, Carlos F. Marques, Univ. de Aveiro (Portugal); Anuj Sharma, National Institute of Technology, Delhi (India) [11354-87]

Temporal Talbot effect using an intensity-modulating frequency-shifting loop, Hongzhi Yang, Qian Xuesen Lab. of Space Technology (China); Marc Brunel, Univ. Rennes, CNRS, Institut FOTON (France); Marc Vallet, Univ. Rennes, CNRS, Institut FOTON (France); Changming Zhao, School of Optics and Photonics, Beijing Institute of Technology (China); Haiyang Zhang, School of Optics and Photonics, Beijing Institute of Technology (China); Lei Wang, Qian Xuesen Lab. of Space Technology (China) [11354-88]

Surface plasmon resonance detection based on a phase method in the spatial domain, Roman Kanok, Dalibor Ciprian, Petr Hlubina, VŠB-Technical Univ. of Ostrava (Czech Republic) [11354-89]

Advances in optical sensing techniques application for simulation of space radiation effects in microelectronic devices using wavelength-tunable femtosecond laser, Oleg B. Mavritskii, Andrey N. Egorov, Dmitriy V. Savchenkov, Alexander A. Pechenkin, Dmitriy V. Boychenko, National Research Nuclear Univ. MEPhI (Russian Federation) [11354-90]

Radiation-induced spectral changes in femtosecond point-by-point written FBGs in metal and polyimide-coated fibers, Alexandr V. Dostovalov, Alexey A. Wolf, Victor A. Simonov, Institute of Automation and Electrometry of the SB RAS (Russian Federation); Mikhail V. Korobeynikov, Budker Institute of Nuclear Physics SB RAS (Russian Federation); Pavel F. Kashaykin, Fiber Optics Research Ctr. of the Russian Academy of Sciences (Russian Federation); Sergey A. Babin, Institute of Automation and Electrometry of the SB RAS (Russian Federation) . . [11354-91]

Optimisation of a plasmonic parallel waveguide sensor based on amorphous silicon compounds, João Costa, Instituto Superior de Engenharia de Lisboa (Portugal) and Ctr. of Technology and Systems, UNINOVA (Portugal); Alessandro Fantoni, Instituto Superior de Engenharia de Lisboa (Portugal); Paulo Lourenço, Ctr. of Technology and Systems, UNINOVA (Portugal); Manuela Vieira, Instituto Superior de Engenharia de Lisboa (Portugal) [11354-92]

PMMA birefringence-based optical sensor of load, Norbert Tarjány, Daniel Ká ik, Milan Uhrík, Peter Pal ek, Univ. of Žilina (Slovakia) . . [11354-93]

All-fiber interferometer to measure air pressure, Adalberto Pérez-Gumán, Julián M. Estudillo-Ayala, Javier Antonio Martín-Vela, Juan Manuel Sierra-Hernández, Daniel Jauregui-Vazquez, Univ. de Guanajuato (Mexico); Juan Carlos Hernandez-Garcia, Consejo Nacional de Ciencia y Tecnología (Mexico); Roberto Rojas-Laguna, Univ. de Guanajuato (Mexico) [11354-94]

Fundamental studies of graphene oxide quantum dots for plasmonic properties and microRNAs in sensing mechanism, Nan-Fu Chiu, Hao-Tang Yang, Ming-Jung Tai, National Taiwan Normal Univ. (Taiwan) [11354-95]

Modulation of surface plasmon resonance energy using graphene quantum dots on biosensors applications, Nan-Fu Chiu, Wei-Ren Wu, National Taiwan Normal Univ. (Taiwan) [11354-96]

Raman detector of carbon isotopes, Evgeny Popov, Anton Polishchuk, Konstantin Grigorenko, Ian Chubchenko, Vladimir Vitkin, ITMO Univ. (Russian Federation) [11354-97]

Spectral properties of carbon isotopes for ecological monitoring, Vladimir Vitkin, ITMO Univ. (Russian Federation); Andrey Zagrebín, Baltic State Technical Univ. "VOENMEH" named after D.F. Ustinov (Russian Federation) [11354-98]

Three types of sensitivity-enhanced SMS fiber sensors based on ultrafast laser-ablated microstructures, Yutang Dai, You Wang, Hongfeng Lin, Fufei Liu, Ke Jiang, Wuhan Univ. of Technology (China) [11354-99]

On implementation of highly sensitive evanescent field salinity sensor based on refractometric techniques, Yadvendra Singh, Ahana Sadhu, Sanjeev Kumar Raghuvanshi, Indian Institute of Technology (Indian School of Mines), Dhanbad (India) [11354-100]

Fuel adulteration detection system using etched clad based fiber Bragg grating (FBG) sensor, Yadvendra Singh, Tauseef Iqbal, Sanjeev K. Raghuvanshi, Indian Institute of Technology (Indian School of Mines), Dhanbad (India) [11354-101]

Temperature sensor based on selective liquid-filled twin-core photonic crystal fiber, Chenlu Wang, CNRS International - NTU - Thales Research Alliance (Singapore) and Nanyang Technological Univ. (Singapore) and Institute for Infocomm Research, A*STAR (Singapore); Shum Ping, CNRS International - NTU - Thales Research Alliance (Singapore) and Nanyang Technological Univ. (Singapore); Dora Juanjuan Hu, Institute for Infocomm Research (Singapore); Zhilin Xu, MOE Key Lab. of Fundamental Physical Quantities Measurement & Hubei Key Lab. of Gravitation and Quantum Physics (China); Yongwei Zhu, Institute for Infocomm Research (Singapore); Shuhui Liu, Hubei Key Lab. of Optical Information and Pattern Recognition, Wuhan Institute of Technology (China); Yu Zheng, CNRS International - NTU - Thales Research Alliance (Singapore) and Nanyang Technological Univ. (Singapore); Yang Chen, Yangtze Optical Fibre and Cable Joint Stock Ltd. Co. (China) and State Key Lab. of Optical Fibre and Cable Manufacturing Technology (China); Weijun Tong, Yangtze Optical Fibre and Cable Joint Stock Ltd. Co. (China) and The State Key Lab. of Optical Fibre and Cable Manufacture Technology (China); Yue Meng, Yangtze Optical Fibre and Cable Joint Stock Ltd. Co. (China) and The State Key Lab. of Optical Fibre and Cable Manufacture Technology (China); Georges Humbert, XLIM, Univ. de Limoges (France) [11354-102]

Spatial-temporal averaging algorithm improving vibration detection with low-cost phase-sensitive OTDR, Cesar López-Mercadoa, Ctr. de Investigación Científica y de Educación Superior de Ensenada B.C. (Mexico); Vasily Spirin, Ctr. de Investigación Científica y de Educación Superior de Ensenada (Mexico); José Luis Bueno Escobedo, Ctr. de Investigación en Materiales Avanzados, S.C. (Mexico); Dmitry Korobko, Igor Zolotovskii, Ulyanovsk State Univ. (Russian Federation); Andrei A. Fotiadi, Univ. de Mons (Belgium) [11354-103]

Refractometric sensing with plasmonic tilted Bragg gratings in different fiber types, Maxime Lobry, Karima Chah, Méric Loyez, Damien Kinet, Christophe Caucheteur, Univ. de Mons (Belgium) [11354-104]

Organic vapor optical fiber sensors based on silk fibroin transduction, Dimitra Skiani, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece); Maria Konstantaki, Foundation for Research and Technology-Hellas (Greece); Davide Vurro, CNR-IMEM (Italy); Annamaria Cucinotta, Stefano Selleri, Univ. degli Studi di Parma (Italy); Salvatore Iannotta, CNR-IMEM (Italy); Stavros Pissadakis, Foundation for Research and Technology-Hellas (Greece) [11354-105]

Raman spectroscopy and machine learning for nondestructive multi-analysis of olive oil, Leonardo Ciaccheri, Barbara Adinolfi, Andrea Azelio Mencaglia, Istituto di Fisica Applicata “Nello Carrara” (Italy); Clemente Pellegrini Strozzi, Fattoria Castel Ruggero Pellegrini (Italy); Carmela Marinelli, Univ. degli Studi di Siena (Italy); Anna Grazia Mignani, Istituto di Fisica Applicata “Nello Carrara” (Belgium) [11354-106]

Sequential heterodyne analysis of the spectrum of optical signals, Egor Suedov, Oleg D. Moskaletz, Mikhail A. Vaganov, Saint-Petersburg State Univ. of Aerospace Instrumentation (Russian Federation) [11354-107]

Analysis of optical spectra by a spectral device based on an acousto-optic tunable filter, Egor Suedov, Oleg D. Moskaletz, Mikhail A. Vaganov, Saint-Petersburg State Univ. of Aerospace Instrumentation (Russian Federation) [11354-108]

THURSDAY 2 APRIL

HOT TOPICS III THU 9:00 TO 10:35

Photonics Europe 2020: Hot Topics Session III

- 9.00 - 9.05 **Introduction**
Thierry Georges, Oxxius, France
2019 Symposium Chair
- 9.05 - 9.50 **Ultrafast solid-state lasers: a success story for the last 30 years with no end in sight**
Ursula Keller, ETH Zurich, Switzerland
- 9:50 - 10:35 **From inverse design to implementation of practical quantum photonics**
Jelena Vuckovic, Stanford Univ., United States

For additional details see page 9

SESSION 12. THU 11:00 TO 13:10

Application of Computational Methods and Machine Learning in Sensing

Session Chair: **Francesco Chiavaioli**, Istituto di Fisica Applicata “Nello Carrara” (Italy)

Dual oxygen and temperature sensing with single indicator using multitask learning neural networks (*Invited Paper*), Francesca Venturini, Zürcher Hochschule für Angewandte Wissenschaften (Switzerland) and TOELT LLC (Switzerland); Umberto Michelucci, TOELT LLC (Switzerland) . . . [11354-52]

Solution of the inverse problem of saturation luminescence of upconversion nanoparticles using adaptive data analysis methods, Olga E. Sarmanova, Sergey A. Burikov, Olga D. Kotova, Ekaterina A. Filippova, Tatiana A. Dolenko, M.V. Lomonosov Moscow State Univ. (Russian Federation) [11354-53]

Chaotic dynamics of coupled electro-optomechanical nanoresonators, Guilhem Madiot, Franck Correia, Sylvain Barbay, C2N-CNRS (France); Rémy Braive, C2N-CNRS (France) and Univ. de Paris (France) [11354-54]

Single-pixel imaging lidar using a deep learning basis, Steven Johnson, Catherine Higham, Roderick Murray-Smith, Miles Padgett, Univ. of Glasgow (United Kingdom) [11354-55]

Low-cost wavefront sensing using artificial intelligence (AI) with synthetic data, Gaston Baudat, Innovations Foresight, LLC (United States) [11354-56]

Using a PDV system to measure ejection debris velocity after a composite material impact, Chun-Hsiung Wang, Hsin Lee, National Taiwan Univ. (Taiwan); Shu-Sheng Lee, National Taiwan Ocean Univ. (Taiwan); Wen-Jong Wu, Chih-Kung Lee, National Taiwan Univ. (Taiwan) [11354-57]

Lunch BreakThu 13:10 to 14:20

SESSION 13. THU 14:20 TO 16:50

Sensing Techniques in Imaging and Calibration

Session Chair: **Francesco Chiavaioli**, Istituto di Fisica Applicata “Nello Carrara” (Italy)

Multiparametric 3D point spread function estimation in deep multiphoton microscopy with an original computational strategy (*Invited Paper*), Claire Lefort, XLIM Institut de Recherche (France); Emilie Chouzenoux, Ctr. de Vision Numérique, CentraleSupélec, INRIA Saclay, Univ. Paris-Saclay (France); Henri Massias, XLIM Institut de Recherche (France); Jean-Christophe Pesquet, Ctr. de Vision Numérique, CentraleSupélec, INRIA Saclay, Univ. Paris-Saclay (France) [11354-58]

Analysis of a SD-OCT-based hyperspectral system for spectral reflectance measurements, Michael Maria, Andrei Anisimov, Technische Univ. Delft (Netherlands); Maartje Stols-Witlox, Univ. of Amsterdam (Netherlands); Roger M. Groves, Technische Univ. Delft (Netherlands) [11354-59]

Scattering media-based high-resolution polarimeter, Qi Sun, Univ. of Southampton (United Kingdom); Xin Wang, Harbin Engineering Univ. (China); Timothy Lee, Univ. of Southampton (United Kingdom); Tom Vettenburg, Univ. of Dundee (United Kingdom); David Phillips, Univ. of Exeter (United Kingdom); Gilberto Brambilla, Martynas Beresna, Univ. of Southampton (United Kingdom) [11354-60]

Investigation of retroreflective materials for enhanced target detection in maritime search and rescue, Jane Hodgkinson, Cranfield Univ. (United Kingdom); Jim Nixon, Safety and Accident Investigation Ctr., Cranfield Univ. (United Kingdom); Christopher Bennett, National Flying Lab. Ctr., Cranfield Univ. (United Kingdom); Ralph P. Tatam, Cranfield Univ. (United Kingdom) [11354-61]

Shack-Hartmann wavefront sensor for mid-IR laser wavefront measurement, Huang Zhou, Jan Pilar, Martin Smrž, Tomas Mocek, HiLASE Ctr. (Czech Republic) [11354-62]

Design and evaluation of a large area infrared radiation source for radiometric calibration in-field experiment, Yonggang Qian, Shi Qiu, Kun Li, Academy of Opto-Electronics (China); Ning Wang, Academy of Opto-Electronics (China); Yaokai Liu, Academy of Opto-Electronics (China); Caixia Gao, Lingling Ma, Lingli Tang, Chuanrong Li, Academy of Opto-Electronics (China) [11354-63]

Micro-Structured and Specialty Optical Fibres VI

Conference Chairs: **Kyriacos Kalli**, Cyprus Univ. of Technology (Cyprus); **Pavel Peterka**, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic); **Christian-Alexander Bunge**, Hochschule für Telekommunikation Leipzig (Germany)

Programme Committee: **Ryszard Buczynski**, Institute of Electronic Materials Technology (Poland); **Jean-Luc Adam**, Univ. de Rennes 1 (France); **Jean-Louis Auguste**, XLIM Institut de Recherche (France); **Ole Bang**, Technical Univ. of Denmark (Denmark); **Neil G. R. Broderick**, The Univ. of Auckland (New Zealand); **Adrian L. Carter**, Nufem (United States); **Liang Dong**, Ctr. for Optical Materials Science + Engineering Technologies (United States); **Henry H. Du**, Stevens Institute of Technology (United States); **Sebastien Fevrier**, XLIM Institut de Recherche (France); **Karl-Friedrich Klein**, Technische Hochschule Mittelhessen (Germany); **Jonathan C. Knight**, Univ. of Bath (United Kingdom); **Michael Komodromos**, Frederick Univ. (Cyprus); **Walter Margulis**, Acreo Swedish ICT AB (Sweden); **Carlos F. Marques**, Univ. de Aveiro (Portugal); **Chengbo Mou**, Shanghai Univ. (China); **Saeed Rehman**, Fibrecore Ltd. (United Kingdom); **Valerio Romano**, Bern Univ. of Applied Sciences (Switzerland); **Kunimasa Saitoh**, Hokkaido Univ. (Japan); **Kay Schuster**, Institut für Photonische Technologien e.V. (Germany); **Sergei V. Semyonov**, Fiber Optics Research Ctr. (Russian Federation); **Radan Slavik**, Univ. of Southampton (United Kingdom); **Waclaw Urbanczyk**, Wrocław Univ. of Technology (Poland); **David J. Webb**, Aston Univ. (United Kingdom); **Alexei M. Zheltikov**, Lomonosov Moscow State Univ. (Russian Federation); **Hwa-Yaw Tam**, The Hong Kong Polytechnic Univ. (Hong Kong, China); **Antreas Theodosiou**, Lumoscribe Ltd. (Cyprus)

WEDNESDAY 1 APRIL

SESSION 1 WED 8:30 TO 10:10

Fiber Gratings and Polymer Optical Fibers

Session Chair: **Kyriacos Kalli**, Cyprus Univ. of Technology (Cyprus)

Femtosecond laser-written long period grating in a multimode CYTOP polymer fibre (*Invited Paper*), Antreas Theodosiou, Lumoscribe Ltd. (Cyprus); Kyriacos Kalli, Cyprus Univ. of Technology (Cyprus); Rui Min, Univ. Politècnica de València (Spain); Arnaldo Leal Jr., Univ. Federal do Espírito Santo (Brazil); Andreas Ioannou, Cyprus Univ. of Technology (Cyprus); Anselmo Frizzera-Neto, Maria Jose Pontes, Univ. Federal do Espírito Santo (Brazil); Carlos F. Marques, Univ. de Aveiro (Portugal) [11355-1]

Advanced concrete optical remote sensors: structural health monitoring of concrete buildings using polymer sensors, Antreas Theodosiou, Lumoscribe Ltd. (Cyprus); Kyriacos Kalli, Cyprus Univ. of Technology (Cyprus); Pericles Savva, Micael Petrou, Univ. of Cyprus (Cyprus) [11355-2]

Laser-induced degradation and damage morphology in polymer optical fibers, Kevin Kiedrowski, Institut für Quantenoptik, Leibniz Univ. Hannover (Germany); Florian Jakobs, Jana Kielhorn, Technische Univ. Braunschweig (Germany); Hans-Hermann Johannes, Wolfgang Kowalsky, Technische Univ. Braunschweig (Germany) and Cluster of Excellence PhoenixD (Germany); Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany) and Cluster of Excellence PhoenixD (Germany); Istvan Balasa, Laser Zentrum Hannover e.V. (Germany); Detlev Ristau, Institut für Quantenoptik, Leibniz Univ. Hannover (Germany) and Laser Zentrum Hannover e.V. (Germany) and Cluster of Excellence PhoenixD (Germany) [11355-3]

Graphene-oxide coated LPG and ex-TFG for humidity sensing applications, Namita Sahoo, Zhongyuan Sun, Kaiming Zhou, Lin Zhang, Aston Univ. (United Kingdom); Xianfeng Chen, Bangor Univ. (United Kingdom); Yidong Tan, Tsinghua Univ. (China) [11355-4]

Systematic investigation of a modified melt spinning manufacturing parameters on the structural properties of graded index polymer optical fibers, Jan Kallweit, RWTH Aachen Univ. (Germany); Christian-Alexander Bunge, Hochschule für Telekommunikation Leipzig (Germany); Thomas Vad, Thomas Gries, RWTH Aachen Univ. (Germany) [11355-5]

SESSION 2 WED 10:40 TO 12:20

Photonic Crystal Fibers and Hollow-Core Fibers

Session Chair: **Pavel Honzátko**, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic)

Hollow core optical fibers: design evolution and new trends (*Invited Paper*), Walter Belardi, Univ. de Lille (France) [11355-6]

Sensitivity of phase and propagation delay in hollow-core fibres (*Invited Paper*), Radan Slavik, Optoelectronics Research Ctr., Univ. of Southampton (United Kingdom); Eric R. Numkam Fokoua, Meng Ding, Yong Chen, Marco N. Petrovich, Thomas D. Bradley, Francesco Poletti, David J. Richardson, Optoelectronics Research Ctr. (United Kingdom) [11355-7]

Advanced development of IR fibers, hollow waveguides and microstructured fibers for promising applications in mid-IR range, Tatiana Sakharova, Alena Sergeeva, art photonics GmbH (Germany); Iskander Usenov, art photonics GmbH (Germany) and Technische Univ. Berlin (Germany); Olga A. Bibikova, art photonics GmbH (Germany); Alexander Novikov, Skolkovo Institute of Science and Technology (Russian Federation); Julia Skibina, SPE LLC "NGT" (Russian Federation); Dmitri Gorin, Skolkovo Institute of Science and Technology (Russian Federation); Viacheslav Artyushenko, art photonics GmbH (Germany) [11355-8]

Chirally coupled core fibers as tunable dispersion compensators, filters and sensors, Maciej Napiorkowski, Kinga Zolnacz, Wacław Urbanczyk, Wrocław Univ. of Science and Technology (Poland) [11355-9]

SESSION 3 WED 13:20 TO 15:40

2-micron Fiber Lasers

Session Chair: **Udo Klotzbach**, Fraunhofer-Institut für Werkstoff- und Strahltechnik IWS (Germany)

Joint Session between Conferences Micro-Structured and Specialty Optical Fibers (11355) and Fiber Lasers and Glass Photonics (11357)

NOTE: THIS SESSION RUNS IN 11357 CONFERENCE ROOM.

Power scaling of thulium fibre lasers in the ~1.7 micron and ~1.9 micron bands (*Invited Paper*), W. Andrew Clarkson, Peter C. Shardlow, Mark D. Burns, Matthew J. Barber, Optoelectronics Research Ctr. (United Kingdom) [11357-39]

Advances in two-micron lasers for nonlinear conversion into the mid-IR (*Invited Paper*), Patrick Forster, Karlsruher Institut für Technologie (Germany); Clement Romano, Fraunhofer Institute of Optonics, System Technologies and Image Exploitation IOSB (Germany); S. Güntert, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); M. Gross, Karlsruher Institut für Technologie (Germany); Christelle Kieleck, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); Marc Eichhorn, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany) and Karlsruher Institut für Technologie (Germany) [11355-10]

Ultrashort pulsed fiber-based lasers around 2.1 um and their applications (*Invited Paper*), Nikolai Tolstik, Norwegian Univ. of Science and Technology (Norway) and Atla Lasers AS (Norway); Roland Richter, Marius Skogen, Norwegian Univ. of Science and Technology (Norway); Ignas Astrauskas, Evgeni Sorokin, Technische Univ. Wien (Austria); Irina T. Sorokina, Norwegian Univ. of Science and Technology (Norway) and Atla Lasers AS (Norway) [11357-40]

Tunable fiber laser concepts in the 2µm spectral range for tunable dual wavelength emission (*Invited Paper*), Tobias Tiess, Alexander Hartung, Martin Becker, Manfred Rothhardt, Leibniz-Institut für Photonische Technologien e.V. (Germany); Romain Dauliat, Baptiste Leconte, Georges Humbert, Philippe Roy, XLIM (France); Matthias L. Jäger, Leibniz-Institut für Photonische Technologien e.V. (Germany) [11357-41]

nJ-class all-PM fiber tunable femtosecond laser from 1800 nm to 2050 nm via a highly efficient SSFS, Philippe Morin, Simon Boivin, Jean-Paul Yehouessi, ALPhANOV (France); Tiphaine Berberian, Frédéric Druon, Lab. Charles Fabry, Institut d'Optique Graduate School (France); Sébastien Vidal, Guillaume Machinet, ALPhANOV (France); Florent Guichard, Yoann Zaouter, Amplitude Laser Group (France); Johan Boulet, ALPhANOV (France) [11357-42]

SESSION 4 WED 16:10 TO 17:50

Active Fibers for 2-micron Fiber Lasers

Session Chair: **Pavel Peterka**, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic)

Joint Session between Conferences Micro-Structured and Specialty Optical Fibers (11355) and Fiber Lasers and Glass Photonics (11357)

NOTE: THIS SESSION RUNS IN 11357 CONFERENCE ROOM.

Cladding shaping of optical fiber preforms via CO₂ laser machining (*Invited Paper*), Peter C. Shardlow, Robert Standish, Martin N. Velazquez, Jayanta Sahu, Andy Clarkson, Optoelectronics Research Ctr. (United Kingdom). [11355-11]

Reduction of water penetration into optical fiber preforms for improving preform shaping based on CO₂ laser, Ali A. Jasim, Ondrej Podrazký, Pavel Peterka, Filip Todorov, Pavel Honzátko, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic) [11355-12]

Holmium-doped optical fibers for efficient fiber lasers, Michal Kamrádek, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic), Czech Technical Univ. in Prague (Czech Republic); Ivan Kašík, Jan Aubrecht, Jan Mrázek, Ondrej Podrazký, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic); Jakub Cajzl, Petr Varák, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic); Univ. of Chemistry and Technology Prague (Czech Republic); Václav Kube ek, Czech Technical Univ. in Prague (Czech Republic); Pavel Peterka, Pavel Honzátko, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic). [11355-13]

Progress in developing optically active fibers in Poland (*Invited Paper*), Pawel Bortnowski, Anna Jusza, Krzysztof Anders, Warsaw Univ. of Technology (Poland); Pawel Mergo, Maria Curie-Sklodowska Univ. (Poland); Ryszard Piramidowicz, Warsaw Univ. of Technology (Poland) [11357-43]

POSTERS-WEDNESDAY WED 18:00 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Wednesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

Laguerre-Gauss beams with polarization-OAM entanglement in a gradient index fiber, Nikolai I. Petrov, Scientific and Technological Ctr. of Unique Instrumentation (Russian Federation) [11355-35]

Silicon based integrated hollow waveguide for gas sensing applications, Alaa Fathy, ESIEE Paris (France) and Si-Ware Systems (Egypt); Yasser Sabry, Si-Ware Systems (Egypt) and Ain Shams Univ. (Egypt); Frédéric Marty, ESIEE Paris (France); Diaa Khalil, Si-Ware Systems (Egypt) and Ain Shams Univ. (Egypt); Tarik Bourouina, ESIEE Paris (France) and Si-Ware Systems (Egypt) [11355-29]

Interrogation of SMS for measuring of temperature and strain using half-etched FBG with enhanced sensitivity, Koustav Dey, National Institute of Technology, Warangal (India) [11355-36]

Adhesive assisted fabrication of chirped polymer optical fiber Bragg grating, Rui Min, Univ. Politècnica de València (Spain); Luís Pereira, Tiago Paixão, Univ. de Aveiro (Portugal); Getinet Woyessa, DTU Fotonik (Denmark); Paulo André, Univ. de Aveiro (Portugal); Ole Bang, DTU Fotonik (Denmark); Paulo Antunes, João Pinto, Univ. de Aveiro (Portugal); Zhaohui Li, Sun Yat-Sen Univ. (China); Beatriz Ortega, Univ. Politècnica de València (Spain); Carlos F. Marques, Univ. de Aveiro (Portugal) [11355-37]

FEM analysis of diffraction efficiency in multilayer dielectric diffraction gratings applied in spectral beam combining, Chien-Cheng Kuo, National Central Univ. (Taiwan) [11355-30]

Dynamics of the whispering gallery modes at the surface of the optical fiber near its facet, Dmitry Kudashkin, Ilya D. Vatik, Dmitry V. Churkin, Novosibirsk State Univ. (Russian Federation) [11355-31]

Silica microstructure-based optical fiber activated by YAG:Nd³⁺ nanocrystals, Aleksandra Matrosova, S. I. Vavilov State Optical Institute (Russian Federation) and ITMO Univ. (Russian Federation); Sergei Evstropiev, Saint-Petersburg State Institute of Technology (Russian Federation) and S. I. Vavilov State Optical Institute (Russian Federation); Vladimir Demidov, S. I. Vavilov State Optical Institute (Russian Federation); Nikolai Nikonorov, Vladimir A. Aseev, Natalia Kuzmenko, ITMO Univ. (Russian Federation); Konstantin Dukelskii, The Bonch-Bruевич Saint-Petersburg State Univ. of Telecommunications (Russian Federation) and S. I. Vavilov State Optical Institute (Russian Federation) and ITMO Univ. (Russian Federation); Aleksandr Komarov, S. I. Vavilov State Optical Institute (Russian Federation); Kseniia Oreshkina, ITMO Univ. (Russian Federation) [11355-32]

Phase-shifted Bragg grating inscription in photonic crystal fibers, Olga Rusyaykina, Vrije Univ. Brussel (Belgium) and Univ. de Mons (Belgium); Maria Konstantaki, Institute of Electronic Structure and Laser, Foundation for Research and Technology-Hellas (Greece); Stavros Pissadakis, Foundation for Research and Technology-Hellas (Greece); Pawel Mergo, Mariusz Makara, Maria Curie-Sklodowska Univ. (Poland); Tigran Baghdasaryan, Hugo Thienpont, Francis Berghmans, Thomas Geernaert, Vrije Univ. Brussel (Belgium) [11355-38]

Granulated silica method for highly Yb/Al doped microstructured fiber production, Dunia Blaser-Lopez, Berner Fachhochschule (Switzerland) and Univ. Bern (Switzerland); Sönke Pilz, Mozghan Hayati, Berner Fachhochschule (Switzerland); Martin Hochstrasser, Berner Fachhochschule (Switzerland) and ReseaChem GmbH (Switzerland); Valerio Romano, Berner Fachhochschule (Switzerland) and Univ. Bern (Switzerland) [11355-39]

Numerical modelling of pump absorption in coiled and twisted double-clad fiber: a prospect for tandem pumped fiber laser, Martin Grábner, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic); Kanagaraj Nithyanandan, Optoelectronics Research Ctr., Univ. of Southampton (United Kingdom); Pavel Peterka, Pavel Koška, Pavel Honzátko, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic) [11355-33]

Detection of water, oil and oil contamination in water using chirped fiber Bragg gratings inscribed in CYTOP fibers, Arnaldo Leal Jr., Federal Univ. do Espírito Santo (Brazil); Vinicius Campos, Univ. Federal do Espírito Santo (Brazil) and Univ. de Aveiro (Portugal); Antreas Theodosiou, Cyprus Univ. of Technology (Cyprus); Anselmo Frizera-Neto, Univ. Federal do Espírito Santo (Brazil); Kyriacos Kalli, Cyprus Univ. of Technology (Cyprus); Carlos F. Marques, Univ. de Aveiro (Portugal) [11355-40]

Modeling and optimization of the diamond grating, Shuwei Fan, Zhiqiang Song, Xi'an Jiaotong Univ. (China) [11355-41]

Multimode CYTOP fiber interferometric response to laser wavelength scanning, Ivan Chapalo, Saint-Petersburg State Polytechnical Univ. (Russian Federation); Antreas Theodosiou, Kyriacos Kalli, Cyprus Univ. of Technology (Cyprus); Oleg Kotov, Saint-Petersburg State Polytechnical Univ. (Russian Federation) [11355-34]

Compensation of macrobending loss oscillations in edge FBG shape sensors, Samaneh Manavi, Sara Freund, Azhar Zam, Georg Rauter, Univ. Basel (Switzerland); Wolfgang Schade, Fraunhofer-Institut für Nachrichtentechnik, Heinrich-Hertz-Institut, HHI (Germany); Philippe C. Cattin, Univ. Basel (Switzerland) [11355-42]

THURSDAY 2 APRIL

HOT TOPICS III THU 9:00 TO 10:35

Photonics Europe 2020: Hot Topics Session III

- 9.00 - 9.05 **Introduction**
Thierry Georges, Oxxius, France
2019 Symposium Chair
- 9.05 - 9.50 **Ultrafast solid-state lasers: a success story for the last 30 years with no end in sight**
Ursula Keller, ETH Zurich, Switzerland
- 9:50 - 10:35 **From inverse design to implementation of practical quantum photonics**
Jelena Vuckovic, Stanford Univ., United States

For additional details see page 9

SESSION 5 THU 11:00 TO 12:40

Modelling and Testing of Specialty Fibers and Components

Session Chair: **Kyriacos Kalli**, Cyprus Univ. of Technology (Cyprus)

Monte Carlo simulation influence factors such as the cooling rate, pressure and polymer chain length on the optical and mechanical properties during the production polymer optical fiber, Mohammed Al Hourri, Christian-Alexander Bunge, Hochschule für Telekommunikation Leipzig (Germany) [11355-14]

Benefit of large-mode area fiber for photonic nanojet sub-micron laser processing, Djamil Bouaziz, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France); Robin Pierron, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France) and Institut de Physique et de Chimie des Matériaux de Strasbourg (France); Grégoire Chabrol, ECAM Strasbourg-Europe (France); Assia Guessoum, Nacer Eddine Demagh, Univ. Ferhat Abbas Sétif 1 (Algeria); Jean-Paul Yehouessi, Lab. de Physique des Lasers, Atomes et Molécules, CNRS (France); Géraud Bouwmans, CNRS (France); Sylvain Lecler, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France) [11355-15]

CONFERENCE 11355

High frequency in-core acousto-optic modulation of a suspended core optical fibre, Ricardo E. da Silva, David J. Webb, Aston Univ. (United Kingdom) [11355-16]

Calculating photonic crystal fibre properties by using machine learning, Sunny Chugh, Aamir Gulistan, Souvik Ghosh, Sneha Verma, B. M. A. Rahman, City, Univ. of London (United Kingdom) [11355-17]

Spatially multiplexed multicore fiber communication to fuel the next information revolution, Jitendra Kumar Mishra, Indian Institute of Information Technology, Ranchi (India); Atul Kumar, Indian Institute of Information Technology, Design and Manufacturing Jabalpur (India); Prakash Pareek, Vaagdevi Engineering College (India); Vishnu Priye, Indian Institute of Technology (Indian School of Mines), Dhanbad (India) [11355-18]

Lunch Break Thu 12:40 to 13:50

SESSION 6 THU 13:50 TO 15:40

Optical Fibers for Biomedical Applications

Bioresorbable phosphate glass microstructured optical fiber for simultaneous light and drug delivery (*Invited Paper*), Diego Pugliese, Duccio Gallichi-Nottiani, Politecnico di Torino (Italy); Nadia Giovanna Boetti, Fondazione LINKS (Italy); Ondrej Podrazký, Pavel Peterka, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic); Daniel Milanese, Univ. degli Studi di Parma (Italy); Davide Luca Janner, Politecnico di Torino (Italy) [11355-19]

Microstructured electrodes on optical fibers for biomedical applications, Jelena Petrovic, Univ. Rostock (Germany) [11355-20]

Fabrication and characterization of step-index biocompatible and biodegradable polyesters based optical fiber, Agnieszka Gieraj, Vrije Univ. Brussel (Belgium) [11355-21]

Development of FBG-based 3D shape sensor for flexible endoscopes, Samaneh Manavi, Sara Freund, Azhar Zam, Georg Rauter, Philippe C. Cattin, Univ. Basel (Switzerland) [11355-22]

Femtosecond laser inscribed Mach-Zehnder Interferometer: a compound all-in-fiber versatile sensing device, Andreas Ioannou, Univ. de Mons (Belgium) and Cyprus Univ. of Technology (Cyprus); Antreas Theodosiou, Cyprus Univ. of Technology (Cyprus); Christophe Caucheteur, Univ. de Mons (Belgium); Kyriacos Kalli, Cyprus Univ. of Technology (Cyprus) [11355-23]

SESSION 7 THU 16:00 TO 17:50

Sensors and Telecommunication Devices Based on Optical Fibers

Session Chair: **Christian-Alexander Bunge**,
Hochschule für Telekommunikation Leipzig (Germany)

Micro-structured optical multi-mode fibers for sensing applications (*Invited Paper*), Kort Bremer, Hannoversches Zentrum für Optische Technologien (Germany); Lourdes Shanika M. Alwis, Edinburgh Napier Univ. (United Kingdom); Bernhard Roth, Hannoversches Zentrum für Optische Technologien (Germany) [11355-24]

Scope and application of bidirectional EDFA for long-distance optical transmissions, Sarbojeet Bhowmick, Josef Vojtech, Radek Velc, CESNET z.s.p.o. (Czech Republic) [11355-25]

Bismuth-doped power amplifier in the spectral region between 1650 nm and 1700 nm, Grzegorz Gomólka, Wrocław Univ. of Science and Technology (Poland); Aleksandr Khagai, Fiber Optics Research Ctr. (Russian Federation); Aleksey Lobanov, Vladimir Khopin, G. G. Devyatikh Institute of Chemistry of High-Purity Substances (Russian Federation); Sergei Firstov, Fiber Optics Research Ctr. (Russian Federation); Michal Nikodem, Wrocław Univ. of Science and Technology (Poland) [11355-26]

Few-mode optical fibers for application in future telecommunication networks, Krzysztof Anders, Pawel Komorowski, Pawel Bortnowski, Marek Gusowski, Anna Jusza, Jaroslaw P. Turkiewicz, Warsaw Univ. of Technology (Poland); Pawel Mergo, Maria Curie-Sklodowska Univ. (Poland); Krzysztof Markiewicz, Tomasz Nasilowski, InPhoTech (Poland); Ryszard Piramidowicz, Warsaw Univ. of Technology (Poland) [11355-27]

Selective liquid filling of photonic crystal fibers using two-photon polymerization lithography without post-exposure development, Olga Rusyakina, Tigran Baghdasaryan, Vrije Univ. Brussel (Belgium); Pawel Mergo, Krzysztof Poturaj, Maria Curie-Sklodowska Univ. (Poland); Hugo Thienpont, Francis Berghmans, Thomas Geernaert, Vrije Univ. Brussel (Belgium) [11355-28]

CONFERENCE 11356

Monday–Wednesday 30 March–1 April 2020 • Proceedings of SPIE Vol. 11356

Semiconductor Lasers and Laser Dynamics IX

Conference Chairs: **Marc Sciamanna**, CentraleSupélec (France); **Rainer Michalzik**, Univ. Ulm (Germany); **Krassimir Panajotov**, Vrije Univ. Brussel (Belgium); **Sven Höfling**, Julius-Maximilians-Univ. Würzburg (Germany)

Programme Committee: **Erwin A.J.M. Bente**, Technische Univ. Eindhoven (Netherlands); **Dieter Bimberg**, Technische Univ. Berlin (Germany); **Stefan Breuer**, Technische Univ. Darmstadt (Germany); **Weng W. Chow**, Sandia National Labs. (United States); **Kent D. Choquette**, Univ. of Illinois at Urbana-Champaign (United States); **Tomasz G. Czyszanowski**, Lodz Univ. of Technology (Poland); **Gadi Eisenstein**, Technion-Israel Institute of Technology (Israel); **Frédéric Grillot**, École Nationale Supérieure des Télécommunications (France); **Hitoshi Kawaguchi**, Nara Institute of Science and Technology (Japan); **Fumio Koyama**, Tokyo Institute of Technology (Japan); **Michael Kneissl**, Technische Univ. Berlin (Germany); **Anders G. Larsson**, Chalmers Univ. of Technology (Sweden); **Fan-Yi Lin**, National Tsing Hua Univ. (Taiwan); **Cristina Masoller**, Univ. Politècnica de Catalunya (Spain); **Luke J. Mawst**, Univ. of Wisconsin-Madison (United States); **Jesper Mørk**, Technical Univ. of Denmark (Denmark); **Johann Peter Reithmaier**, Univ. Kassel (Germany); **Carlo Sirtori**, Univ. Paris 7-Denis Diderot (France); **Peter M. Smowton**, Cardiff Univ. (United Kingdom)

MONDAY 30 MARCH

HOT TOPICS I MON 9:00 TO 11:00

Photonics Europe 2020: Hot Topics Session I

- 9:00 - 9:20 **SPiE Welcome and Award Presentation**
John E. Greivenkamp, Univ of Arizona, United States
SPiE President
- Welcome**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- City of Strasbourg Welcome**
- 9:25 - 9:30 **Introduction to Hot Topics**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- 9:30 - 10:15 **Naturally fast and low power electro-optic polymer optical devices are ideally positioned for the next-generation Internet photonics roadmap**
Michael Leiby, CEO Lightwave Logic, United Kingdom
- 10:15 - 11:00 **3D printed micro-optics: state of the art and future challenges**
Harald Giessen, University of Stuttgart, Germany

For additional details see pages 6-7

SESSION 1 MON 11:30 TO 12:20

Nanolaser

Session Chair: **Marc Sciamanna**, CentraleSupélec (France)

Progress in quantum dot lasers for telecom and silicon photonics (*Invited Paper*), **Yasuhiko Arakawa**, The Univ. of Tokyo (Japan) [11356-1]

Optical feedback effects in semiconductor nanolasers, **Thorsten S. Rasmussen**, **Jesper Mørk**, Technical Univ. of Denmark (Denmark) [11356-2]

Lunch Break Mon 12:20 to 13:50

SESSION 2 MON 13:50 TO 15:20

Laser Integration

Session Chair: **Rainer Michalzik**, Univ. Ulm (Germany)

Advanced InP laser technologies for 400G and beyond hyperscale interconnections (*Invited Paper*), **Kazuhiko Naoe**, Lumentum (Japan) [11356-3]

Integration of 53 nm tunable lasers based on sampled gratings onto an InP generic foundry platform, **Moon-Hyeok Lee**, Francisco Soares, **Moritz Baier**, **Martin Möhrle**, **Martin Schell**, Fraunhofer-Institut für Nachrichtentechnik, Heinrich-Hertz-Institut, HHI (Germany) [11356-4]

Photonic integrated transmitters for high-speed optical access systems, **Aleksandra Pasnikowska**, **Stanislaw Stopinski**, **Andrzej Kazmierczak**, **Ryszard Piramidowicz**, Warsaw Univ. of Technology (Poland) [11356-5]

Control of dual-wavelength laser using monolithically integrated phase-controlled optical feedback, **Robert Pawlus**, **Robbe de Mey**, Vrije Univ. Brussel (Belgium); **Stefan Breuer**, Technische Univ. Darmstadt (Germany); **Martin Virte**, Vrije Univ. Brussel (Belgium) [11356-6]

SESSION 3 MON 15:50 TO 17:20

Quantum Dot Lasers

Session Chair: **Yasuhiko Arakawa**, The Univ. of Tokyo (Japan)

Mutal coupling and synchronization of high- β microlasers (*Invited Paper*), **Stephan Reitzenstein**, Technische Univ. Berlin (Germany) [11356-7]

Small-signal modulation and 10 Gb/s data transmission by microdisk lasers based on InGaAs/GaAs quantum well-dots, **Natalia V. Kryzhanovskaya**, **Eduard Moiseev**, **Fedor Zubov**, **Mikhail Maximov**, **Sergey Blokhin**, St. Petersburg Academic Univ. (Russian Federation); **Nikolay Kalyuzhnyy**, **Sergey Mintairov**, **Marina Kulagina**, Ioffe Institute (Russian Federation); **Nikolay Ledentsov**, **Nikolay Ledentsov**, VI Systems GmbH (Germany); **Alexey Zhukov**, St. Petersburg Academic Univ. (Russian Federation) [11356-8]

Systematic investigation of the influencing parameters of an external cavity laser with a quantum dot gain chip, **Jannik F. Ehlert**, EXFO Optics (France) and Télécom Paristech, Institut Polytechnique de Paris (France); **Gang He**, EXFO Inc. (Canada); **Frédéric Grillot**, Télécom Paristech, Institut Polytechnique de Paris (France) and The Univ. of New Mexico (United States) [11356-9]

Highly efficient edge-emitting and microdisk lasers based on quantum well-dots, **Mikhail Maximov**, **Alexey Nadochiy**, St. Petersburg Academic Univ. (Russian Federation); **Alexey Payusov**, Ioffe Institute (Russian Federation); **Gregory Kornyshev**, St. Petersburg Academic Univ. (Russian Federation); **Artyom Serin**, **Nikita Gordeev**, **Yurii Shernyakov**, **Sergey Mintairov**, **Nikolay Kalyuzhnyy**, Ioffe Institute (Russian Federation); **Eduard Moiseev**, **Natalia V. Kryzhanovskaya**, **Fedor Zubov**, St. Petersburg Academic Univ. (Russian Federation); **Marina Kulagina**, **Yurii Zadiranov**, Ioffe Institute (Russian Federation); **Alexey Zhukov**, St. Petersburg Academic Univ. (Russian Federation) [11356-10]

TUESDAY 31 MARCH

SESSION 4 TUE 8:30 TO 10:10

Silicon Laser

Session Chair: **Sven Höfling**, Julius-Maximilians-Univ. Würzburg (Germany)

Monolithic III-V microdisk lasers on silicon by template-assisted selective epitaxy (*Invited Paper*), **Kirsten Moselund**, **Svenja Mauthe**, **Noelia Vico Triviño**, **Marilayne Sousa**, **Yannick Baumgartner**, **Philipp Staudinger**, **Preksha Tiwari**, **Markus Scherrer**, **Daniele Caimi**, **Heinz Schmid**, IBM Research - Zürich (Switzerland) [11356-11]

Defect engineering for 1.55 μ m lasers monolithically grown on silicon (*Invited Paper*), **Bei Shi**, **Jonathan Klamkin**, Univ. of California, Santa Barbara (United States) [11356-12]

Optical feedback dynamics of 1.3- μ m epitaxial quantum dot lasers on silicon operating in the short delay regime, **Bozhang Dong**, Télécom Paris (France); **Jun-Da Chen**, **Han-Ling Tsay**, National Tsing Hua Univ. (Taiwan); **Heming Huang**, **Jianan Duan**, Télécom Paris (France); **Justin C. Norman**, **John E. Bowers**, Univ. of California, Santa Barbara (United States); **Fan-Yi Lin**, National Tsing Hua Univ. (Taiwan); **Frédéric Grillot**, Télécom Paris (France) and The Univ. of New Mexico (United States) [11356-13]

Self-injection locking of semiconductor laser diodes to integrated high-Q microresonators, **Andrey S. Voloshin**, Russian Quantum Ctr. (Russian Federation); **Sofya E. Agafonova**, Russian Quantum Ctr. (Russian Federation) and Moscow Institute of Physics and Technology (Russian Federation); **Nikita M. Kondratiev**, Russian Quantum Ctr. (Russian Federation); **Sergey Koptyaev**, SAMSUNG R&D Institute Russia (Russian Federation) and SAMSUNG Advanced Institute of Technology (Russian Federation); **Igor A. Bilenko**, Russian Quantum Ctr. (Russian Federation) and M.V. Lomonosov Moscow State Univ. (Russian Federation) [11356-14]

CONFERENCE 11356

SESSION 5 TUE 10:40 TO 12:40

Multimode Dynamics

Session Chair: **Uwe Bandelow**, Weierstrass-Institut für Angewandte Analysis und Stochastik (Germany)

Experimental and numerical analysis of optical frequency comb generation in gain-switched semiconductor lasers subject to optical injection, Alejandro Rosado, Escuela Tecnica Superior de Ingenieros de Telecomunicacion, Univ. Politécnica de Madrid (Spain); Jaime Díez, Instituto de Física de Cantabria, Univ. de Cantabria (Spain) and Consejo Superior de Investigaciones Científicas (Spain); Antonio Pérez-Serrano, Jose Manuel G. Tijero, Escuela Tecnica Superior de Ingenieros de Telecomunicacion, Univ. Politécnica de Madrid (Spain); Angel Valle, Luis Pesquera, Instituto de Física de Cantabria, Univ. de Cantabria (Spain) and Consejo Superior de Investigaciones Científicas (Spain); Ignacio Esquivias, Escuela Tecnica Superior de Ingenieros de Telecomunicacion, Univ. Politécnica de Madrid (Spain) [11356-15]

Microwave comb generation through strong optoelectronic feedback in a semiconductor laser diode, Md Shariful Islam, Georgia Tech-Lorraine (France); Grégoire Coget, Georgia Tech - CNRS (France); Anton V. Kovalev, Evgeny A. Viktorov, ITMO Univ. (Russian Federation); David S. Citrin, Georgia Institute of Technology (United States); Alexandre Locquet, Georgia Tech - CNRS (France) [11356-16]

Frequency comb customization by controlling the optical injection dynamics, Yaya Doumbia, Tushar Malica, Delphine Wolfersberger, Chaire Photonique, CentraleSupélec (France); Krassimir Panajotov, Vrije Univ. Brussel (Belgium); Marc Sciamanna, Chaire Photonique, CentraleSupélec (France) [11356-17]

Self-mode-locking and chirp compensation in an external cavity diode laser at 1550 nm, Mohammad Ali Alloush, Amer Bassal, Carsten Brenner, Ruhr-Univ. Bochum (Germany); Catherine Fortin, Karim Mekhazni, Piero Gamarra, Cosimo Calo, III-V Lab. (France); Martin R. Hofmann, Ruhr-Univ. Bochum (Germany) [11356-18]

Dynamic properties of wavelength switching in a widely tunable semiconductor laser for optical coherence tomography, Rastko Pajkovic, Daniel Garbi, Kevin Williams, Erwin Bente, Technische Univ. Eindhoven (Netherlands) [11356-19]

Characterization and wavelength control of DBR-based dual-wavelength lasers, Robbe de Mey, Robert Pawlus, Vrije Univ. Brussel (Belgium); Stefan Breuer, Technische Univ. Darmstadt (Germany); Martin Virte, Vrije Univ. Brussel (Belgium) [11356-20]

Lunch/Exhibition Break Tue 12:40 to 14:00

SESSION 6 TUE 14:00 TO 15:30

VCSEL

Session Chair: **Marc Sciamanna**, CentraleSupélec (France)

VCSELS with monolithic high-contrast gratings (Invited Paper), Tomasz G. Czystanowski, Marcin Gebski, Magdalena Marciniak, Sandra Grzempa, Adam K. Sokół, Lodz Univ. of Technology (Poland); James A. Lott, Technische Univ. Berlin (Germany) [11356-21]

Integrated surface gratings in VCSELS for high birefringence splitting, Tobias Pusch, Univ. Ulm (Germany); Pierluigi Debernardi, Consiglio Nazionale delle Ricerche (Italy); Markus Lindemann, Natalie Jung, Nils C. Gerhardt, Martin R. Hofmann, Ruhr-Univ. Bochum (Germany); Rainer Michalzik, Univ. Ulm (Germany) [11356-22]

Investigation of the polarization state in spin-VCSELS with thermally tuned birefringence, Natalie Jung, Markus Lindemann, Pascal Stadler, Ruhr-Univ. Bochum (Germany); Tobias Pusch, Rainer Michalzik, Univ. Ulm (Germany); Martin R. Hofmann, Nils C. Gerhardt, Ruhr-Univ. Bochum (Germany) [11356-23]

3D transmission electron microscope method development for failure analysis in VCSEL arrays, Xiaoyan Wang, Jefferson Abrenica, Patrick Koh, ams Sensors Asia Pte. Ltd. (Singapore) [11356-24]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair

16:35 to 17:20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States

17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

WEDNESDAY 1 APRIL

SESSION 7 WED 8:30 TO 10:20

Nonlinear and Ultrafast Dynamics I

Session Chair: **John C. Travers**, Heriot-Watt Univ. (United Kingdom)

Joint Session between Nonlinear Optics and its Applications Conference (11358) and Semiconductor Lasers and Laser Dynamics Conference (11356)

Emerging nonlinear optical approaches for mid-infrared ultrafast pulse generation (Invited Paper), Jeffrey Moses, Cornell Univ. (United States) [11358-28]

Forecasting the amplitude of high-intensity chaotic laser pulses, Cristina Masoller, Univ. Politécnica de Catalunya (Spain); Miguel C. Cornelles-Soriano, Instituto de Física Interdisciplinar y Sistemas Complejos (Spain); Pablo Amil, Univ. Politécnica de Catalunya (Spain) [11358-29]

The limits of sustained self-excitation: the Yamada model subject to delayed optical feedback, Stefan Ruschel, Bernd Krauskopf, Neil G. R. Broderick, The Univ. of Auckland (New Zealand) [11358-30]

Multistable equidistant pulsing of an excitable laser with optical feedback, Bernd Krauskopf, Soizic Terrien, Neil G. R. Broderick, The Univ. of Auckland (New Zealand); Anirudh Pammi, Sylvain Barbay, Ctr. de Nanosciences et de Nanotechnologies (France) [11358-31]

Photonic coherent reservoir computer based on fiber-ring with distributed nonlinearity, Jael Pauwels, Vrije Univ. Brussel (Belgium) and Univ. Libre de Bruxelles (Belgium); Guy Verschaffelt, Vrije Univ. Brussel (Belgium); Serge Massar, Univ. Libre de Bruxelles (Belgium); Guy Van der Sande, Vrije Univ. Brussel (Belgium) [11356-25]

SESSION 8 WED 10:50 TO 12:20

Photonic Crystal Laser

Session Chair: **Tomasz G. Czystanowski**, Lodz Univ. of Technology (Poland)

Taming of random lasers via photonic band-tail states in compositionally disordered two-dimensional photonic crystal platform (Invited Paper), Heonsu Jeon, Seoul National Univ. (Korea, Republic of) [11356-26]

Relaxation oscillations suppression and undamping in a hybrid photonic crystal laser, Anton V. Kovalev, ITMO Univ. (Russian Federation); Sharon M. Butler, Andrei P. Bakoz, Stephen P. Hegarty, Ctr. for Advanced Photonics & Process Analysis, Cork Institute of Technology (Ireland) and Tyndall National Institute (Ireland); Liam O'Faolain, Ctr. for Advanced Photonics & Process Analysis, Cork Institute of Technology (Ireland) and Tyndall National Institute (Ireland) and Scottish Universities Physics Alliance (United Kingdom); Evgeny A. Viktorov, ITMO Univ. (Russian Federation) [11356-27]

Impact of slow-light on the lasing threshold of photonic crystal Fano lasers, Marco Saldutti, Politecnico di Torino (Italy); Thorsten S. Rasmussen, Jesper Mørk, Technical Univ. of Denmark (Denmark); Mariangela Gioannini, Politecnico di Torino (Italy) [11356-28]

Spatial filtering in broad area semiconductor laser using photonic crystal, Sandeep Babu Gawali, Univ. Politécnica de Catalunya (Spain); Darius Gailevicius, Vytautas Purlys, Femtika UAB (Lithuania) and Vilnius Univ. (Lithuania); Jose Trull, Crina Cojocaru, Univ. Politécnica de Catalunya (Spain); Kestutis Staliunas, Institució Catalana de Recerca i Estudis Avançats (Spain) and Univ. Politécnica de Catalunya (Spain) [11356-29]

Lunch/Exhibition Break Wed 12:20 to 13:50

SESSION 9. WED 13:50 TO 15:10

Neuro-inspired Photonic Computing

Session Chair: **Marc Sciamanna**, CentraleSupélec (France)

Stable nonequidistant pulsing patterns in an excitable microlaser with delayed optical feedback, Soizic Terrien, The Dodd-Walls Ctr. for Photonic and Quantum Technologies, The Univ. of Auckland (New Zealand); Venkata Anirudh Pammi, Ctr. de Nanosciences et de Nanotechnologies, CNRS (France) and Univ. Paris-Sud (France) and Univ. Paris-Saclay (France); Neil G. R. Broderick, Bernd Krauskopf, The Dodd-Walls Ctr. for Photonic and Quantum Technologies, The Univ. of Auckland (New Zealand); Sylvain Barbay, Ctr. de Nanosciences et de Nanotechnologies, CNRS (France) and Univ. Paris-Sud (France) and Univ. Paris-Saclay (France) [11356-30]

Experimental study of the neuron-like dynamics of a semiconductor laser with optical feedback and current modulation, Cristina Masoller, Jordi Tiana, Carlos Quintero, Univ. Politècnica de Catalunya (Spain) [11356-31]

Predicting chaotic time series using optoelectronic feedback laser, Pavel S. Dmitriev, Anton V. Kovalev, ITMO Univ. (Russian Federation); Alexandre Locquet, David S. Citrin, Georgia Tech-Lorraine (France) and Georgia Institute of Technology (United States); Evgeny A. Viktorov, ITMO Univ. (Russian Federation); Damien Rontani, CentraleSupélec (France) and Univ. de Lorraine (France) [11356-32]

Associative memory in regenerative spiking micropillar lasers, Venkata Anirudh Pammi, Ctr. de Nanosciences et de Nanotechnologies (France); Soizic Terrien, Neil G. R. Broderick, The Dodd-Walls Ctr. for Photonic and Quantum Technologies (New Zealand); Rémy Braive, Grégoire Beaudoin, Isabelle Sagnes, Ctr. de Nanosciences et de Nanotechnologies (France); Bernd Krauskopf, The Dodd-Walls Ctr. for Photonic and Quantum Technologies (New Zealand); Sylvain Barbay, Ctr. de Nanosciences et de Nanotechnologies (France) [11356-33]

SESSION 10. WED 15:40 TO 17:30

Spatio-temporal Laser Dynamics

Session Chair: **Krassimir Panajotov**, Vrije Univ. Brussel (Belgium)

Dynamics of high-power diode lasers (Invited Paper), Uwe Bandelow, Mindaugas Radziunas, Weierstrass-Institut für Angewandte Analysis und Stochastik (Germany); Anissa Zeghuzi, Ferdinand-Braun-Institut (Germany); Hans-Jürgen Wünsche, Weierstrass-Institut für Angewandte Analysis und Stochastik (Germany) and Ferdinand-Braun-Institut (Germany); Hans Wenzel, Ferdinand-Braun-Institut (Germany) [11356-34]

Passive coherent beam combining in an interferometric semiconductor laser cavity, Sara Piccione, Lorenzo Pavesi, Univ. degli Studi di Trento (Italy) [11356-35]

Manipulating the chaos bandwidth of a semiconductor laser subjected to phase-conjugate feedback, Guillaume Bouchez, Tushar Malica, Delphine Wolfersberger, Marc Sciamanna, CentraleSupélec (France)[11356-36]

Evolution of the spatiotemporal complexity in a phase-conjugate feedback laser system, Tushar Malica, Guillaume Bouchez, Delphine Wolfersberger, Marc Sciamanna, Chaire Photonique, CentraleSupélec (France) [11356-37]

Spatiotemporal stabilization of PT-symmetric BAS lasers, Judith Medina Pardell, Ramon Herrero Simon, Muriel Botey Cumella, Kestutis Staliunas, Univ. Politècnica de Catalunya (Spain) [11356-38]

POSTERS-WEDNESDAY WED 18:00 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Wednesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

Adjustable polymer lasers based on cavity coupling, Shuai Zhang, Tianrui Zhai, Beijing Univ. of Technology (China) [11356-39]

Characteristics of period-one oscillation generated by nonlinear dynamics of semiconductor lasers under optical injection and optoelectronic feedback, Andy Wang, Yuan Ze Univ. (Taiwan) [11356-40]

Blue external-cavity diode laser for NO₂ gas detection, Khaled Gasmí, Abdulaziz Al-Jalal, Watheq Al-Basheer, King Fahd Univ. of Petroleum & Minerals (Saudi Arabia) [11356-41]

Laser diode pulse modulation in sensing and materials processing, Martin Berendt, Hugo Barbosa, Job Tomé, Miguel Melo, MWTechnologies, Lda (Portugal) [11356-42]

Lasing in carbothermal-grown ZnO microtetrapods, Andrey P. Tarasov, Charus M. Briskina, Valery M. Markushev, Kotelnikov Institute of Radio Engineering and Electronics (Russian Federation); Ludmila A. Zadorozhnaya, Alexander S. Lavrikov, Federal Research Ctr. "Crystallography and Photonics" (Russian Federation) [11356-43]

Mode-resolved modulation response and the Impact of mode intensity nonuniformity on VCSELs dynamics, Wissam Hamad, Technische Univ. Berlin (Germany); Marwan Bou Sanayeh, Notre Dame Univ., Louaize (Lebanon); Mohammad Radi, Technische Univ. Berlin (Germany); Joseph Y. Maroun, Elie J. Zoghbi, Maya Al Ajami, American Univ. of Beirut (Lebanon); Pascal Nasr, Notre Dame Univ., Louaize (Lebanon); Werner Hofmann, Technische Univ. Berlin (Germany) [11356-44]

Device physical parameters extraction of high-speed VCSELs, Marwan Bou Sanayeh, Notre Dame Univ., Louaize (Lebanon); Wissam Hamad, Technische Univ. Berlin (Germany); Mariane Mansour, American Univ. of Beirut (Lebanon); Reem Al Fata, Elsie Nakhle, Anthony Youssef, Mustapha Hamad, Semaan Georges, Notre Dame Univ., Louaize (Lebanon); Werner Hofmann, Technische Univ. Berlin (Germany) [11356-45]

Active stabilization of the DFB laser injection-locked to an external fiber-optic ring resonator, Vasily V. Spirin, Ctr. de Investigación Científica y de Educación Superior de Ensenada (Mexico); José Luis Bueno Escobedo, Ctr. de Investigación en Materiales Avanzados, S.C. (Mexico); Dmitry Korobko, Ulyanovsk State Univ. (Russian Federation); Andrei A. Fotiadi, Univ. de Mons (Belgium) and Ulyanovsk State Univ. (Russian Federation) and Ioffe Institute (Russian Federation) [11356-46]

Design of integrated photonic transmitter for mode division multiplexing, Aleksandra Pasnikowska, Krzysztof Anders, Stanislaw Stopinski, Ryszard Pyramidowicz, Warsaw Univ. of Technology (Poland) [11356-47]

Implementations and optimisations of optical Conv2D networks designs, Philip M. Birch, Navid Rahimi, Peter Overbury, Rupert Young, Chris Chatwin, Univ. of Sussex (United Kingdom) [11356-48]

Photoconductive neuromorphic elements with synaptic memory effect based on semiconductor metal oxides, Igor S. Balashov, Alexander A. Chezhegov, Artem S. Chizhov, Andrey A. Grunin, Andrey A. Fedyanin, M.V. Lomonosov Moscow State Univ. (Russian Federation) [11356-49]

Fiber Lasers and Glass Photonics: Materials through Applications II

Conference Chairs: **Maurizio Ferrari**, CNR-Istituto di Fotonica e Nanotecnologie (Italy); **Jacob I. Mackenzie**, Univ. of Southampton (United Kingdom); **Stefano Taccheo**, Politecnico di Torino (Italy), Swansea Univ. (United Kingdom)

Programme Committee: **Rolindes Balda**, Univ. del País Vasco (Spain); **John M. Ballato**, Clemson Univ. (United States); **Wilfried Blanc**, Lab. de physique de la matière condensée (France); **Patrice Camy**, Ctr. de Recherche sur les Ions, les Matériaux et la Photonique (France); **Yanne K. K. Chembo**, Univ. of Maryland, College Park (United States); **Amol Choudhary**, Indian Institute of Technology Delhi (India); **Cosimo D’Andrea**, Politecnico di Milano (Italy); **Miroslav Dramicanin**, Univ. of Belgrade (Serbia); **Ulrich Hefter**, ROFIN-SINAR Laser GmbH (Germany); **Shibin Jiang**, AdValue Photonics, Inc. (United States); **Udo Klotzbach**, Fraunhofer IWS Dresden (Germany); **Antti Lassila**, MIKES Mittateknikan keskus (Finland); **Antonio Lucianetti**, HiLASE Ctr. (Czech Republic); **Anna Luiza Lukowiak**, Institute of Low Temperature and Structure Research (Poland); **Virginie Nazabal**, Univ. de Rennes 1 (France); **Nasser N. Peyghambarian**, College of Optical Sciences, The Univ. of Arizona (United States); **Francesco Prudenzeno**, Politecnico di Bari (Italy); **Alexander Quandt**, Univ. of the Witwatersrand (South Africa); **Gediminas Račiukaitis**, Ctr. for Physical Sciences and Technology (Lithuania); **Angela B. Seddon**, The Univ. of Nottingham (United Kingdom); **Akira Shirakawa**, The Univ. of Electro-Communications (Japan); **Irina T. Sorokina**, Norwegian Univ. of Science and Technology (Norway)

MONDAY 30 MARCH

HOT TOPICS I MON 9:00 TO 11:00

Photonics Europe 2020: Hot Topics Session I

- 9:00 - 9:20 **SPIE Welcome and Award Presentation**
John E. Greivenkamp, Univ of Arizona, United States
 SPIE President
- Welcome**
Paul Montgomery, Univ. of Strasbourg, France
 2019 Symposium Chair
- City of Strasbourg Welcome**
- 9:25 - 9:30 **Introduction to Hot Topics**
Paul Montgomery, Univ. of Strasbourg, France
 2019 Symposium Chair
- 9:30 - 10:15 **Naturally fast and low power electro-optic polymer optical devices are ideally positioned for the next-generation Internet photonics roadmap**
Michael Lebby, CEO Lightwave Logic, United Kingdom
- 10:15 - 11:00 **3D printed micro-optics: state of the art and future challenges**
Harald Giessen, University of Stuttgart, Germany

For additional details see pages 6-7

SESSION 1 MON 11:30 TO 12:55

Flexible Photonics

Session Chair: **Claudia Wickleder**, Univ. Siegen (Germany)

- Early career investigators and women researchers: reliable scientific career** (*Invited Paper*), Anna Lukowiak, Polish Academy of Sciences (Poland); Justyna Krzak, Wroclaw Univ. of Science and Technology (Poland) . . . [11357-1]
- Conformable optical coatings with epsilon near zero response** (*Invited Paper*), Andrea Di Falco, Univ. of St. Andrews (United Kingdom) . . . [11357-2]
- Flexible photonics: RF-sputtering fabrication of glass-based systems operating under mechanical deformation conditions**, Alessandro Chiasera, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Fondazione Bruno Kessler (Italy); Osman Sayginer, Univ. degli Studi di Trento (Italy) and CNR-Istituto di Fotonica e Nanotecnologie (Italy); Erica Iacob, Fondazione Bruno Kessler (Italy); Anna Szczurek, Wroclaw Univ. of Science and Technology (Poland); Stefano Varas, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Fondazione Bruno Kessler (Italy); Justyna Krzak, Wroclaw Univ. of Science and Technology (Poland); Oreste S. Bursi, Univ. degli Studi di Trento (Italy) and CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Fondazione Bruno Kessler (Italy); Daniele Zonta, Univ. degli Studi di Trento (Italy) and CNR-Istituto di Fotonica e Nanotecnologie, Fondazione Bruno Kessler (Italy) and Univ. of Strathclyde (United Kingdom); Anna Lukowiak, Institute of Low Temperature and Structure Research PAN (Poland); Giancarlo C. Righini, Museo Storico della Fisica e Ctr. Studi e Ricerche “Enrico Fermi” (Italy) and Istituto di Fisica Applicata “Nello Carrara” (Italy); Maurizio Ferrari, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Fondazione Bruno Kessler (Italy) and Museo Storico della Fisica e Ctr. Studi e Ricerche “Enrico Fermi” (Italy) . . . [11357-3]

Flexible sol-gel coatings on polymeric materials, Anna Szczurek, Wroclaw Univ. of Science and Technology (Poland) and CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Fondazione Bruno Kessler (Italy); Alessandro Chiasera, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Fondazione Bruno Kessler (Italy); Maurizio Ferrari, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Fondazione Bruno Kessler (Italy) and Museo Storico della Fisica e Ctr. Studi e Ricerche “Enrico Fermi” (Italy); Justyna Krzak, Wroclaw Univ. of Science and Technology (Poland); Anna Lukowiak, Institute of Low Temperature and Structure Research PAN (Poland) . . . [11357-4]

Lunch Break Mon 12:55 to 14:00

SESSION 2 MON 14:00 TO 15:30

Glass Ceramics

Session Chair: **Maurizio Ferrari**, CNR-Istituto di Fotonica e Nanotecnologie (Italy)

- Optimization of polycrystalline ceramic phosphors for applications by laser excitation and blue-light light-emitting diodes** (*Invited Paper*), Isabel Kinski, Fraunhofer-Institut für Keramische Technologien und Systeme IKTS (Germany); Michael Kunzer, Fraunhofer-Institut für Angewandte Festkörperphysik IAF (Germany); Michael Arnold, Paul Gierth, Fraunhofer-Institut für Keramische Technologien und Systeme IKTS (Germany) . . [11357-5]
- Transparent Yb- and Er-doped glass ceramics**, Laeticia Petit, Alexander Veber, Mikko Hongisto, Nirajan Ojha, Iuliia Dmitrieva, Tampere Univ. (Finland) [11357-6]
- Design of active devices based on rare-earth-doped glass/glass ceramic: from the material characterization to the device refinement**, Mario Christian Falconi, Antonella Loconsole, Dario Laneve, Politecnico di Bari (Italy); Lam Thi Ngoc Tran, HCMC Univ. of Technology and Education (Viet Nam); Lidia Zur, Alessandro Chiasera, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Fondazione Bruno Kessler (Italy); Rolindes B. Balda, Univ. del País Vasco (Spain); Joaquín Fernández, Donostia International Physics Ctr. (Spain); Pawel Gluchowski, Anna Lukowiak, Institute of Low Temperature and Structure Research PAN (Poland); Maurizio Ferrari, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Fondazione Bruno Kessler (Italy); Francesco Prudenzeno, Politecnico di Bari (Italy) [11357-7]
- Luminescent properties of chromium-doped borate glass-ceramics for red radiation sources**, Anastasiia N. Babkina, ITMO Univ. (Russian Federation); Damir Valiev, National Research Tomsk Polytechnic Univ. (Russian Federation); Ksenia Zyryanova, ITMO Univ. (Russian Federation); Anastasiia Osipova, National Research Tomsk Polytechnic Univ. (Russian Federation); Vladimir A. Aseev, ITMO Univ. (Russian Federation) [11357-8]

SESSION 3. MON 16:00 TO 18:00

Glass Ceramics and Short-range Ordered Materials

Session Chair: **Wieslaw Strek**, Institute of Low Temperature and Structure Research PAN (Poland)

Tunable upconversion emission in NaLuF₄-glass-ceramic fibers doped with Er³⁺ and Yb³⁺ (*Invited Paper*), G. Gorni, Instituto de Cerámica y Vidrio, Consejo Superior de Investigaciones Científicas (Spain); J. J. Velázquez, Alexander Dubcek Univ. of Trencin (Slovakia); Marcin Kochanowicz, Bialystok Univ. of Technology (Poland); Dominik Dorosz, AGH Univ. of Science and Technology (Poland); Rolindes B. Balda, Univ. del País Vasco (Spain); Joaquín Fernández, Donostia International Physics Ctr. (Spain); A. Durán, María Jesús Pascual, Instituto de Cerámica y Vidrio, Consejo Superior de Investigaciones Científicas (Spain) [11357-9]

Coherent light sources with improved and novel functionalities at the nanoscale (*Invited Paper*), Mariola O. Ramirez, Pablo Molina, Sol Carretero-Palacios, Luisa E. Bausa, Univ. Autónoma de Madrid (Spain) [11357-10]

Light transport and emission using photonic structures with short-range order, Rajesh Nair, Sudhir K. Saini, Priya Priya, Indian Institute of Technology Ropar (India) [11357-11]

Microstructure, doping and optical properties of Co²⁺:ZnAl₂O₄ transparent ceramics: effect of sintering additive, Liza Basyrova, ITMO Univ. (Russian Federation); Alexander Belyaev, G. G. Devyatikh Institute of Chemistry of High-Purity Substances (Russian Federation); Maksim Lelet, Lobachevsky State Univ. of Nizhny Novgorod (Russian Federation); Stanislav Balabanov, G. G. Devyatikh Institute of Chemistry of High-Purity Substances (Russian Federation); Mikhail Baranov, ITMO Univ. (Russian Federation); Olga Dymshits, S.I. Vavilov State Optical Institute (Russian Federation); Pavel Loiko, ITMO Univ. (Russian Federation) [11357-12]

Generation of narrow modes within incoherent radiation of random distributed feedback fiber laser, Dmitry V. Churkin, Novosibirsk State Univ. (Russian Federation); Srikanth Sugavanam, Aston Univ. (United Kingdom); Ilya Vatrik, Novosibirsk State Univ. (Russian Federation) [11357-13]

TUESDAY 31 MARCH

SESSION 4. TUE 8:30 TO 10:30

RE-doped Material Lasers and Fibers

Session Chair: **Anna Lukowiak**, Institute of Low Temperature and Structure Research PAN (Poland)

High-efficiency single-frequency laser using Er:YLuAG ceramic, Lei Wang, Yefei Mao, Hongzhi Yang, Yuan Gao, Qian Xuesen Lab. of Space Technology, China Academy of Space Technology (China) [11357-14]

Spectroscopy and laser operation of Tm³⁺:YAlO₃ crystal on the 3H₄ to 3H₅ transition, Lauren Guillemot, Pavel Loiko, Alain Braud, Jean-Louis Doualan, Ctr. de Recherche sur les Ions, les Matériaux et la Photonique, Univ. de Caen Basse-Normandie (France); Ammar Hideur, Complexe de Recherche Interprofessionnel en Aérothermochimie, Univ. de Rouen (France); Michal Koselja, Institute of Physics of the CAS, v.v.i. (Czech Republic); Richard Moncorgé, Patrice Camy, Ctr. de Recherche sur les Ions, les Matériaux et la Photonique, Univ. de Caen Basse-Normandie (France) [11357-15]

Compensation of thermal lenses induced by pumping a 0.5%Nd:5%Lu:CaF₂ crystal to improve repetition rate in Laser Mégajoule front-end, Cyril Bernerd, Margaux Chanal, Elodie Boursier, Jacques Luce, Cedric Maunier, Nicolas Belon, CEA-Cesta (France); Alain Braud, Cesare Meroni, Patrice Camy, Ctr. de Recherche sur les Ions, les Matériaux et la Photonique (France); Sébastien Montant, CEA-Cesta (France) ... [11357-16]

Neodymium and ytterbium-erbium laser based on photo-thermo-refractive glass, Vladimir A. Aseev, Sergey Ivanov, Nikolay Nikonov, Alexander Ignatiev, Khaldoon Nasser, ITMO Univ. (Russian Federation) [11357-17]

Modeling mode-locked Bismuth laser switchable for soliton and similariton operations, Marina Zajnulina, Aston Univ. (United Kingdom); Dmitry A. Korobko, Ulyanovsk State Univ. (Russian Federation) and Technological Ctr. Moscow (Russian Federation); Andrei A. Fotiadi, Ulyanovsk State Univ. (Russian Federation) and Technological Ctr. Moscow (Russian Federation) and Univ. de Mons (Belgium) [11357-18]

Optimization of the laser-assisted creation of subsurface modifications in ZnS and ZnSe, Roland Richter, Nikolai Tolstik, Norwegian Univ. of Science and Technology (Norway); Andrey Okhrimchuk, D. Mendeleev Univ. of Chemical Technology (Russian Federation); Evgeni Sorokin, Technische Univ. Wien (Austria); Vladislav Likhov, Mikhail Smayev, D. Mendeleev Univ. of Chemical Technology (Russian Federation); Irina T. Sorokina, Norwegian Univ. of Science and Technology (Norway) [11357-19]

SESSION 5. TUE 11:00 TO 13:10

RE-doped Material Spectroscopy: Glasses and Crystal

Session Chair: **Maria Rita Cicconi**, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany)

Spectral and time-resolved analysis of rare earth-doped SnO₂ emission (*Invited Paper*), Joaquín Fernández, Donostia International Physics Ctr. (Spain); Rolindes B. Balda, Univ. del País Vasco (Spain); Concepcion Cascales, Instituto de Ciencia de Materiales de Madrid (Spain); Francesco Prudeniano, Politecnico di Bari (Italy); Anna Lukowiak, Institute of Low Temperature and Structure Research PAN (Poland); Maurizio Ferrari, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Fondazione Bruno Kessler (Italy); Lam Thi Ngoc Tran, HCMC Univ. of Technology and Education (Italy); Lidia Zur, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Fondazione Bruno Kessler (Italy) [11357-20]

Luminescence of Bi₃TeBO₃ microcrystals doped with Ho³⁺, Tm³⁺ or Yb³⁺ ions, Dobrosława Kasprowicz, T. Zhezhera, Poznan Univ. of Technology (Poland); A. Majchrowski, Wojskowa Akademia Techniczna im. Jaroslawa Dabrowskiego (Poland); Pawel Gluchowski, Institute of Low Temperature and Structure Research PAN (Poland); M. Chrunik, Wojskowa Akademia Techniczna im. Jaroslawa Dabrowskiego (Poland) [11357-21]

Ultraviolet and visible luminescence in holmium doped ZBLAN glasses, Pawel Komorowski, Anna Jusza, Ryszard Piramidowicz, Warsaw Univ. of Technology (Poland) [11357-22]

Cross-relaxation and ion clustering in Tm³⁺:CaF₂ crystals, Pavel Loiko, Lauren Guillemot, Alain Braud, Jean-Louis Doualan, Abdelmjid Benayad, Patrice Camy, Ctr. de Recherche sur les Ions, les Matériaux et la Photonique, Univ. de Caen Basse-Normandie (France) [11357-23]

Investigation of an Yb:Er:Tm:Ho four-doped germanate glass for ultrabroadband amplification and multiwavelength lasing, Marcin Kochanowicz, Jean Zmojda, Peter Miluski, Bialystok Univ. of Technology (Poland); Dominik Dorosz, AGH Univ. of Science and Technology (Poland); Stefano Taccheo, Swansea Univ. (United Kingdom) and Politecnico di Torino (Italy) [11357-24]

Thermal stability of bismuth-doped high-GeO₂ fiber-lasers, Sergey Alyshev, Alexander Kharakhordin, Elena Firstova, Aleksandr Khagai, Mikhail Melkumov, Fiber Optics Research Ctr. (Russian Federation); Vladimir Khopin, Aleksey Lobanov, Aleksey Guryanov, G. G. Devyatikh Institute of Chemistry of High-Purity Substances (Russian Federation); Sergei Firstov, Fiber Optics Research Ctr. (Russian Federation) [11357-25]

Lunch/Exhibition Break Tue 13:10 to 14:10

SESSION 6. TUE 14:10 TO 16:00

Nonlinear Phenomena in Fibres and Lasers

Session Chair: **Francesco Prudeniano**, Politecnico di Bari (Italy)

Rare earth elements-doped silica fibers: structure-property relationships (*Invited Paper*), Maria Rita Cicconi, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [11357-26]

Brillouin light scattering characterization of optical materials, Patrice Salzenstein, Institut Franche-Comte Electronique Mecanique Thermique et Optique, CNRS (France) [11357-27]

Optical frequency combs generation with collinear acousto-optic interaction, Sergey N. Mantsevich, M.V. Lomonosov Moscow State Univ. (Russian Federation); Konstantin Yushkov, National Univ. of Science and Technology MISIS (Russian Federation); Andrey Voloshin, Russian Quantum Ctr. (Russian Federation) [11357-28]

Chirped pulse compression in all-glass Yb-doped hybrid fiber with anomalous dispersion in 1 um spectral range, Svetlana S. Aleshkina, Fiber Optics Research Ctr. (Russian Federation); Denis Lipatov, Mikhail Salganskii, G. G. Devyatikh Institute of Chemistry of High-Purity Substances (Russian Federation); Anton Tausenev, Denis Shepelev, Avesta Ltd. (Russian Federation); Mikhail Bubnov, Fiber Optics Research Ctr. of the Russian Academy of Sciences (Russian Federation); Aleksey Guryanov, G. G. Devyatikh Institute of Chemistry of High-Purity Substances (Russian Federation); Mikhail Likhachev, Fiber Optics Research Ctr. of the Russian Academy of Sciences (Russian Federation) [11357-29]

Elaboration of multimaterials optical fibers combining tellurite glass and metal for electro-optical applications, Anthony Maldonado, Lab. Interdisciplinaire Carnot de Bourgogne (France) and Ctr. d'optique, photonique et laser (Canada); Arnaud Lemièrre, Frédéric Désévéday, Jean-Charles Jules, Lab. Interdisciplinaire Carnot de Bourgogne (France); Wagner Correr, Yannick Ledemi, Younés Messaddeq, Ctr. d'optique, photonique et laser (Canada); Clément Strutyński, Sylvain Danto, Thierry Cardinal, Institut de Chimie de la Matière Condensée de Bordeaux (France); Frédéric Smektala, Lab. Interdisciplinaire Carnot de Bourgogne (France) [11357-30]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

- 16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
 2019 Symposium Chair
- 16.35 to 17.20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States
- 17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

POSTERS-TUESDAY TUE 18:05 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Tuesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

Glassy 2-(1-benzyl-2-(styryl)-6-methylpyridin-4(1H)-ylidene) fragment derivatives with light-emitting and amplified spontaneous emission properties, Elmars Zarins, Riga Technical Univ. (Latvia); Julija Pervenecka, Institute of Solid State Physics, Univ. of Latvia (Latvia); Elina Misina, Kristine Lazdovica, Karlis Balodis, Riga Technical Univ. (Latvia); Aivars Vembris, Institute of Solid State Physics, Univ. of Latvia (Latvia); Valdis Kokars, Riga Technical Univ. (Latvia). [11357-55]

Transverse mode characterization of directional edge emitting random lasers subject to external optical feedback, Antonio Consoli, Univ. Rey Juan Carlos (Spain); Niccolo Caselli, Ceferino Lopez, Consejo Superior de Investigaciones Científicas (Spain) [11357-62]

Whispering gallery and waveguide modes of a polymer coated tapered optical fiber, Sugata Sen, Jadavpur Univ. (India); Shivakiran Bhaktha B. N., Priyanka S. Choubey, Indian Institute of Technology Kharagpur (India). [11357-63]

Channel waveguide lasers in bulk Tm:LiYF₄ crystal produced by deep diamond saw dicing, Pavel Loiko, Lauren Guillemot, Ctr. de Recherche sur les Ions, les Matériaux et la Photonique, Univ. de Caen Basse-Normandie (France); Ludovic Gauthier-Manuel, Institut Franche-Comte Electronique Mecanique Thermique et Optique (France); Alain Braud, Gurvan Brasse, Abdelmjid Benayad, Patrice Camy, Ctr. de Recherche sur les Ions, les Matériaux et la Photonique, Univ. de Caen Basse-Normandie (France). [11357-56]

Method for determining the gain coefficient of the stimulated Brillouin scattering in the active optical fibers and study of the influence of thermal and mechanical effects on it, Mariya G. Slobozhanina, Anton N. Slobozhanin, Alexander V. Bochkov, All-Russian Scientific Research Institute of Technical Physics (Russian Federation) [11357-64]

Design and fabrication of multilayer-driven optomechanical device for force and vibration sensing, Osman Sayginer, Univ. degli Studi di Trento (Italy) and CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Fondazione Bruno Kessler (Italy); Alessandro Chiasera, Stefano Varas, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Fondazione Bruno Kessler (Italy); Maurizio Ferrari, CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Fondazione Bruno Kessler (Italy) and Museo Storico della Fisica e Ctr. Studi e Ricerche "Enrico Fermi" (Italy); Oreste S. Bursi, Univ. degli Studi di Trento (Italy). [11357-65]

Efficient laser operation in cleaved single-crystal plates of Yb:KY(MoO₄)₂: a novel molybdate compound, Anna Volokitina, Pavel Loiko, ITMO Univ. (Russian Federation); Josep Maria Serres, Sami Slimi, Univ. Rovira i Virgili (Spain); Ezzedine Ben Salem, Institut Préparatoire aux Etudes d'Ingénieurs de Monastir (Tunisia); Rosa Maria Solé, Xavier Mateos, Univ. Rovira i Virgili (Spain); Uwe Griebner, Valentin Petrov, Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie (Germany); Magdalena Aguiló, Francesc Diaz, Univ. Rovira i Virgili (Spain); Anatoly Pavlyuk, Institute of Inorganic Chemistry A. V. Nikolaev (Russian Federation). [11357-66]

Application of femtosecond laser in quartz tuning device microprocessing, Ting She, AVIC Beijing Chang Cheng Aeronautical Measurement and Control Technology Research Institute (China); You Wang, Yutang Dai, Xun Mao, Wuhan Univ. of Technology (China); Defeng Liu, AVIC Beijing Chang Cheng Aeronautical Measurement and Control Technology Research Institute (China) [11357-67]

Effect of phosphates content on the spectroscopic properties of the fluorophosphate glasses doped with Nd³⁺ ions, Elena Kolobkova, Ahmed Alkhlef, Nikolay Nikonorov, ITMO Univ. (Russian Federation) [11357-68]

Recursive calculation of exact electric-field and intensity distributions in Bragg grating mirrors and distributed-feedback laser structures, Jerry Yeung, Markus Pollnau, Univ. of Surrey (United Kingdom) [11357-57]

Towards the development of femtosecond laser-fabricated Mach Zehnder-based high-speed optical modulators in X-cut LiNbO₃ electro-optic material, Amar S. Ghar, Sanyogita Singh, Utpal Das, Pradipta Kumar Panigrahi, Indian Institute of Technology Kanpur (India) [11357-69]

Toward the fabrication of directly extruded microstructured bioresorbable phosphate glass optical fibre preforms, Duccio Gallichi-Nottiani, Diego Pugliese, Politecnico di Torino (Italy) and Consorzio Interuniversitario Nazionale per la Scienza e Tecnologia dei Materiali (Italy); Nadia G. Boetti, Fondazione LINKS (Italy); Daniel Milanese, Univ. degli Studi di Parma (Italy) and Consorzio Interuniversitario Nazionale per la Scienza e Tecnologia dei Materiali (Italy); Davide Janner, Politecnico di Torino (Italy) and Consorzio Interuniversitario Nazionale per la Scienza e Tecnologia dei Materiali (Italy). [11357-58]

Toward a high concentration Yb-Er phosphate glass optical amplifier for eye-safe compact lidar, Nadia G. Boetti, Fondazione LINKS (Italy); Amiel Ishaaya, Ben-Gurion Univ. of the Negev (Israel); Diego Pugliese, Politecnico di Torino (Italy); Omri Moschovits, Ben-Gurion Univ. of the Negev (Israel); Davide Janner, Politecnico di Torino (Italy); Daniel Milanese, Univ. degli Studi di Parma (Italy) [11357-59]

Transparent glass-ceramics based on Co²⁺, Ga³⁺-codoped ZnO nanocrystals: a promising nonlinear optical material, Vladimir Vitkin, Pavel Loiko, Anton Polishchuk, ITMO Univ. (Russian Federation); Irina Alekseeva, Olga Dymshits, Daria Shemchuk, Marina Tsentser, S.I. Vavilov State Optical Institute (Russian Federation); Anna Volokitina, ITMO Univ. (Russian Federation); Josep Maria Serres, Xavier Mateos, Univ. Rovira i Virgili (Spain); Alexander Zhilin, S.I. Vavilov State Optical Institute (Russian Federation) [11357-70]

TeO₂-ZnO-La₂O₃ glass composition for mid-infrared wavelengths generation and transmission in optical fibers, Joris Lousteau, Politecnico di Milano (Italy); Walter Belardi, Univ. de Lille (France); Diego Pugliese, Politecnico di Torino (Italy); Nadia G. Boetti, Fondazione LINKS (Italy); Daniel Milanese, Univ. degli Studi di Parma (Italy) [11357-72]

Optimization of fiber to resonator coupling, Patrice Salzenstein, Institut Franche-Comte Electronique Mecanique Thermique et Optique, CNRS (France); David Bassir, Univ. de Technologie de Belfort-Montbéliard (France) and Ctr. de mathématiques et de leurs applications (France) [11357-60]

Accuracy of the determination of propagation velocities of phononic waves in the material, Patrice Salzenstein, Institut Franche-Comte Electronique Mecanique Thermique et Optique, CNRS (France). . . . [11357-71]

Narrow linewidth random laser based on short Er-doped artifice Rayleigh fiber, Sergei Popov, Kotelnikov Institute of Radio Engineering and Electronics (Russian Federation); Oleg Butov, Kotelnikov Institute of Radio Engineering and Electronics of RAS (Russian Federation); Alexey Bazakutsa, Mikhail Vyatkin, Yuri Chamorovskiy, Kotelnikov Institute of Radio Engineering and Electronics (Russian Federation); Andrei A. Fotiadi, Univ. de Mons (Belgium) and Ulyanovsk State Univ. (Russian Federation) and Ioffe Institute (Russian Federation). [11357-61]

M(AlCl₄)₂:Eu²⁺ (M=Ca, Sr, Ba): novel host lattices for Eu²⁺ ions, Julian Weiss, Claudia Wickleder, Univ. Siegen (Germany) [11357-73]

Green synthesis of fluoride-based nanophosphors using ionic liquids as solvent: the first presentation of Yb²⁺ nanoparticles, Lucas Zimmermann, Claudia Wickleder, Univ. Siegen (Germany) [11357-74]

Real-time online distributed temperature measurement of fiber core in hundred-watt all-fiber oscillator employing OFDR, Zhaokai Lou, Kai Han, National Univ. of Defense Technology (China) [11357-75]

WEDNESDAY 1 APRIL

SESSION 7 WED 8:30 TO 10:10

Waveguide Devices and Fibers

Session Chair: **Jacob I. Mackenzie**,
Univ. of Southampton (United Kingdom)

Simulations in glass photonics (*Invited Paper*), Alexander Quandt, Univ. of the Witwatersrand, Johannesburg (South Africa); Robert Warmbier, Univ. of Johannesburg (South Africa) [11357-31]

Thermo-optic effects in multicore fibers for high-power lasers (*Invited Paper*), Lorenzo Rosa, Univ. degli Studi di Modena e Reggio Emilia (Italy); S Mckee, Univ. degli Studi di Parma (Italy); Luca Vincetti, Univ. degli Studi di Modena e Reggio Emilia (Italy); Federica Poli, Stefano Selleri, Annamaria Cucinotta, Univ. degli Studi di Parma (Italy) [11357-32]

Carbon ion microbeam fabrication of channel waveguide in tellurite glass, Stefano Pelli, Istituto di Fisica Applicata "Nello Carrara", Consiglio Nazionale delle Ricerche (Italy); István Bányász, Edit Szilágyi, Wigner Research Ctr. for Physics of the H.A.S. (Hungary); Istvan Rajta, Gyula U. L. Nagy, Institute for Nuclear Research (Hungary); Gualtiero Nunzi Conti, Simone Berneschi, Istituto di Fisica Applicata "Nello Carrara", Consiglio Nazionale delle Ricerche (Italy); Vladimir Havránek, Vaclav Vosecek, Nuclear Physics Institute of the CAS, v.v.i. (Czech Republic); Norbert Nagy, Zoltan Szabó, Institute of Technical Physics and Materials Science (Hungary); Miklos Veres, Wigner Research Ctr. for Physics (Hungary); Adolfo Speghini, Univ. degli Studi di Verona (Italy); Giancarlo C. Righini, Istituto di Fisica Applicata "Nello Carrara", Consiglio Nazionale delle Ricerche (Italy) [11357-33]

Integrated fiber components based on chirally coupled core fibers for all-fiber amplifier, Sven Hochheim, Elke Brockmüller, Peter Wessels, Michael Steinke, Laser Zentrum Hannover e.V. (Germany); Joona Koponen, nLIGHT, Inc., Lohja (Finland); Tyson Lowder, nLIGHT, Inc. (United States); Steffen Novotny, nLIGHT, Inc., Lohja (Finland); Jörg Neumann, Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany) [11357-34]

SESSION 8 WED 10:40 TO 12:20

Fiber Lasers: from IR to MIR

Session Chair: **Nikolai Tolstik**, Atla Lasers AS (Norway)

Mid-IR supercontinuum in optical fibers drawn from low phonon energy glasses (*Invited Paper*), Frédéric Smektala, Arnaud Lemièrre, Anthony Maldonado, Frédéric Désévéday, Bertrand Kibler, Lab. Interdisciplinaire Carnot de Bourgogne (France) [11357-35]

Luminescent solar-concentrator-pumped fibre laser (*Invited Paper*), Bryce S. Richards, Karlsruhe Institut für Technologie (Germany) . . . [11357-36]

All-fiber mode-locked laser at 977 nm, Svetlana S. Aleshkina, Fiber Optics Research Ctr. (Russian Federation); Denis Lipatov, G. G. Devyatikh Institute of Chemistry of High-Purity Substances (Russian Federation); Vladimir Velmiskin, Tatyana Kochergina, Fiber Optics Research Ctr. (Russian Federation); Andrei Fedotov, Regina Gumenyuk, Tampere Univ. (Finland); Leonid Kotov, Valery Temyanko, Wyant College of Optical Sciences, The Univ. of Arizona (United States); Mikhail Bubnov, Fiber Optics Research Ctr. of the Russian Academy of Sciences (Russian Federation); Aleksey Guryanov, G. G. Devyatikh Institute of Chemistry of High-Purity Substances (Russian Federation); Mikhail Likhachev, Fiber Optics Research Ctr. of the Russian Academy of Sciences (Russian Federation) [11357-37]

Thermal cycling experiments of a mode-locked fiber laser for applications in space, Sijia Wang, Peng Qin, Lei Wang, Lei Zhang, China Academy of Space Technology (China) [11357-38]

Lunch/Exhibition Break Wed 12:20 to 13:20

SESSION 9 WED 13:20 TO 15:40

2-micron Fiber Lasers

Session Chair: **Udo Klotzbach**,
Fraunhofer-Institut für Werkstoff- und Strahltechnik IWS (Germany)

Joint Session between Conferences Micro-Structured and Specialty Optical Fibers (11355) and Fiber Lasers and Glass Photonics (11357)

NOTE: THIS SESSION RUNS IN 11357 CONFERENCE ROOM.

Power scaling of thulium fibre lasers in the ~1.7 micron and ~1.9 micron bands (*Invited Paper*), W. Andrew Clarkson, Peter C. Shardlow, Mark D. Burns, Matthew J. Barber, Optoelectronics Research Ctr. (United Kingdom) [11357-39]

Advances in two-micron lasers for nonlinear conversion into the mid-IR (*Invited Paper*), Patrick Forster, Karlsruher Institut für Technologie (Germany); Clement Romano, Fraunhofer Institute of Optronics, System Technologies and Image Exploitation IOSB (Germany); S. Güntert, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); M. Gross, Karlsruher Institut für Technologie (Germany); Christelle Kieleck, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany); Marc Eichhorn, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung IOSB (Germany) and Karlsruher Institut für Technologie (Germany) [11355-10]

Ultrashort pulsed fiber-based lasers around 2.1 µm and their applications (*Invited Paper*), Nikolai Tolstik, Norwegian Univ. of Science and Technology (Norway) and Atla Lasers AS (Norway); Roland Richter, Marius Skogen, Norwegian Univ. of Science and Technology (Norway); Ignas Astrauskas, Evgeni Sorokin, Technische Univ. Wien (Austria); Irina T. Sorokina, Norwegian Univ. of Science and Technology (Norway) and Atla Lasers AS (Norway) [11357-40]

Tunable fiber laser concepts in the 2µm spectral range for tunable dual wavelength emission (*Invited Paper*), Tobias Tiess, Alexander Hartung, Martin Becker, Manfred Rothardt, Leibniz-Institut für Photonische Technologien e.V. (Germany); Romain Dauliat, Baptiste Leconte, Georges Humbert, Philippe Roy, XLIM (France); Matthias L. Jäger, Leibniz-Institut für Photonische Technologien e.V. (Germany) [11357-41]

nJ-class all-PM fiber tunable femtosecond laser from 1800 nm to 2050 nm via a highly efficient SSFS, Philippe Morin, Simon Boivin, Jean-Paul Yehouessi, ALPhANOV (France); Tiphaine Berberian, Frédéric Druon, Lab. Charles Fabry, Institut d'Optique Graduate School (France); Sébastien Vidal, Guillaume Machinet, ALPhANOV (France); Florent Guichard, Yoann Zaouter, Amplitude Laser Group (France); Johan Bouillet, ALPhANOV (France)[11357-42]

SESSION 10 WED 16:10 TO 17:50

Active Fibers for 2-micron Fiber Lasers

Session Chair: **Pavel Peterka**, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic)

Joint Session between Conferences Micro-Structured and Specialty Optical Fibers (11355) and Fiber Lasers and Glass Photonics (11357)

NOTE: THIS SESSION RUNS IN 11357 CONFERENCE ROOM.

Cladding shaping of optical fiber preforms via CO₂ laser machining (*Invited Paper*), Peter C. Shardlow, Robert Standish, Martin N. Velazquez, Jayanta Sahu, Andy Clarkson, Optoelectronics Research Ctr. (United Kingdom) [11355-11]

Reduction of water penetration into optical fiber preforms for improving preform shaping based on CO₂ laser, Ali A. Jasim, Ondrej Podrazký, Pavel Peterka, Filip Todorov, Pavel Honzátko, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic) [11355-12]

Holmium-doped optical fibers for efficient fiber lasers, Michal Kamrádek, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic), Czech Technical Univ. in Prague (Czech Republic); Ivan Kašík, Jan Aubrecht, Jan Mrázek, Ondrej Podrazký, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic); Jakub Cajzl, Petr Varák, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic), Univ. of Chemistry and Technology Prague (Czech Republic); Václav Kube ek, Czech Technical Univ. in Prague (Czech Republic); Pavel Peterka, Pavel Honzátko, Institute of Photonics and Electronics of the CAS, v.v.i. (Czech Republic) [11355-13]

Progress in developing optically active fibers in Poland (*Invited Paper*), Pawel Bortnowski, Anna Jusza, Krzysztof Anders, Warsaw Univ. of Technology (Poland); Pawel Mergo, Maria Curie-Skłodowska Univ. (Poland); Ryszard Piramidowicz, Warsaw Univ. of Technology (Poland) [11357-43]

HOT TOPICS III THU 9:00 TO 10:35

Photonics Europe 2020: Hot Topics Session III

- 9.00 - 9.05 **Introduction**
Thierry Georges, Oxxius, France
 2019 Symposium Chair
- 9.05 - 9.50 **Ultrafast solid-state lasers: a success story for the last 30 years with no end in sight**
Ursula Keller, ETH Zurich, Switzerland
- 9:50 - 10:35 **From inverse design to implementation of practical quantum photonics**
Jelena Vuckovic, Stanford Univ., United States
- For additional details see page 9*

SESSION 11 THU 11:00 TO 12:20

Applications and Processes

Session Chair: **Isabel Kinski**, Fraunhofer-Institut für Keramische Technologien und Systeme IKTS (Germany)

- Biomedical applications of functionalized optical fibre long period grating sensors** (*Invited Paper*), Sergiy Korposh, The Univ. of Nottingham (United Kingdom) [11357-44]
- Simultaneous OFDR spatial multiplexing by means of nanoparticle doped optical fibers, theory and sensing applications** (*Invited Paper*), Carlo Molardi, Nazarbayev Univ. (Kazakhstan); Wilfried Blanc, Institut de Physique de Nice, Univ. Côte d'Azur, CNRS (France); Daniele Tosi, Nazarbayev Univ. (Kazakhstan) [11357-45]
- FLY-spec prototype: UV-VIS-NIR reflectometry and laser-induced breakdown spectroscopy**, Paola Zuppella, Vania Da Deppo, CNR-Istituto di Fotonica e Nanotecnologie (Italy); Syedah Sadaf Zehra, Univ. degli Studi di Padova (Italy); Paolo Chioetto, Alessandra Slemmer, Massimo Fedel, CNR-Istituto di Fotonica e Nanotecnologie (Italy); Piergiorgio Nicolosi, Sabrina Ferrari, Christine Meyzen, Jacopo Nava, Fabrizio Nestola, Matteo Massironi, Univ. degli Studi di Padova (Italy) [11357-46]
- Lunch Break Thu 12:20 to 13:20

SESSION 12 THU 13:20 TO 15:10

Materials and Fibers: Characterization, Fabrication and Applications

Session Chair: **Mariola O. Ramirez**, Univ. Autónoma de Madrid (Spain)

- Electromodulated hollow core optical waveguides** (*Invited Paper*), Pier J. A. Sazio, Adam H. Lewis, Francesco De Lucia, Univ. of Southampton (United Kingdom); Walter Belardi, Univ. de Lille (France); Chung-Che Huang, John R. Hayes, Francesco Poletti, Dan Hewak, Univ. of Southampton (United Kingdom) [11357-47]
- Optical fibers under irradiation: quantitative assessment of the energy distribution of radiation-induced trapped states** (*Invited Paper*), Franck Mady, Angela Guttilla, Mourad Benabdesselam, Wilfried Blanc, Univ. Côte d'Azur, CNRS (France); Antonino Alessi, Sylvain Girard, Youcef Ouerdane, Aziz Boukenter, Univ. Jean Monnet Saint-Etienne (France) and Univ. de Lyon (France); Hortense Desjonqueres, Céline Monsanglant-Louvet, Institut de Radioprotection et de Sureté Nucleaire (France) . [11357-48]
- Characterization and afterglow of SrAl₂O₄:Eu,Dy for various phosphor applications** (*Invited Paper*), Markus Pollnau, Univ. of Surrey (United Kingdom); Isabel Kinski, Fraunhofer-Institut für Keramische Technologien und Systeme IKTS (Germany); Jacob Bierwagen, Teresa Delgado, Univ. de Genève (Switzerland); Nando Gartmann, Bernhard Walfort, LumiNova AG Switzerland (Switzerland); Hans Hagemann, Univ. de Genève (Switzerland) [11357-49]
- Shaping effects of the fiber-drawing on particle-rich silica optical fibers, numerical and experimental study**, Manuel Vermillac, Ecole Centrale de Nantes (France); Zhuorui Lu, Institut de Physique de Nice (France); Louis Douteau, Nesrine Aïssa, Yahya Khoder, Hugues Dignonnet, Luisa Rocha Da Silva, Ecole Centrale de Nantes (France); Wilfried Blanc, Institut de Physique de Nice (France) [11357-50]

SESSION 13 THU 15:30 TO 17:30

Novel Materials and Devices

Session Chair: **Stefano Taccheo**, Politecnico di Torino (Italy)

- Less material-more energy: novel nanophosphors** (*Invited Paper*), Claudia Wickleder, Huayna Terraschke, Jakub Olchowka, Univ. Siegen (Germany) [11357-51]
- Laser stimulated lighting of graphene materials** (*Invited Paper*), Wieslaw Strek, Robert Tomala, Institute of Low Temperature and Structure Research PAN (Poland); Przemyslaw Wiewiórski, Wrocław Univ. of Science and Technology (Poland); Mateusz Oleszko, Friedrich-Schiller-Univ. Jena (Germany); Taras Hanulia, Shinshu Univ. (Japan) [11357-52]
- Ultrafast photochromism and bacteriochromism in one dimensional hybrid plasmonic photonic structures** (*Invited Paper*), Francesco Scotognella, Politecnico di Milano (Italy); Giuseppe M. Paternò, Ilka Kriegel, Silvio Bonfadini, Istituto Italiano di Tecnologia (Italy); Liliana Moscardi, Politecnico di Milano (Italy); Luigino Criante, Stefano Donini, Istituto Italiano di Tecnologia (Italy); Davide Ariodanti, Maurizio Zani, Politecnico di Milano (Italy); Emilio Parisini, Guglielmo Lanzani, Istituto Italiano di Tecnologia (Italy) [11357-53]
- Graphene oxide coatings for optical fibre based sensor devices** (*Invited Paper*), Paulo A. Ribeiro, Maria Raposo, Univ. Nova de Lisboa (Portugal); Catarina Monteiro, Orlando Frazão, INESC Porto (Portugal) and Univ. do Porto (Portugal) [11357-54]

CONFERENCE 11358

Monday–Wednesday 30 March–1 April 2020 • Proceedings of SPIE Vol. 11358

Nonlinear Optics and its Applications 2020

Conference Chairs: **Neil G. R. Broderick**, The Univ. of Auckland (New Zealand); **John M. Dudley**, Institut Franche-Comte Electronique Mecanique Thermique et Optique (France); **Anna C. Peacock**, Univ. of Southampton (United Kingdom)

Programme Committee: **Ole Bang**, Technical Univ. of Denmark (Denmark); **Fabio Biancalana**, Heriot-Watt Univ. (United Kingdom); **Camille Brès**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Zhigang Chen**, Nankai Univ. (China); **Benjamin J. Eggleton**, The Univ. of Sydney (Australia); **Mark Foster**, Johns Hopkins Univ. (United States); **Moti Fridman**, Bar-Ilan Univ. (Israel); **Goëry Genty**, Tampere Univ. of Technology (Finland); **Rachel Grange**, ETH Zurich (Switzerland); **Kathy Lüdge**, Technische Univ. Berlin (Germany); **Cristina Masoller**, Univ. Politècnica de Catalunya (Spain); **Arnaud Mussot**, Lab de Physique des Lasers, Atomes et Molécules (France); **Michelle Y. Sander**, Boston Univ. (United States); **Dawn T. H. Tan**, Singapore Univ. of Technology & Design (Singapore); **Giovanna Tissoni**, Institut de Physique de Nice (France)

MONDAY 30 MARCH

HOT TOPICS I MON 9:00 TO 11:00

Photonics Europe 2020: Hot Topics Session I

- 9:00 - 9:20 **SPiE Welcome and Award Presentation**
John E. Greivenkamp, Univ of Arizona, United States
SPiE President
- Welcome**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- City of Strasbourg Welcome**
- 9:25 - 9:30 **Introduction to Hot Topics**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- 9:30 - 10:15 **Naturally fast and low power electro-optic polymer optical devices are ideally positioned for the next-generation Internet photonics roadmap**
Michael Lebbby, CEO Lightwave Logic, United Kingdom
- 10:15 - 11:00 **3D printed micro-optics: state of the art and future challenges**
Harald Giessen, University of Stuttgart, Germany

For additional details see pages 6-7

SESSION 1 MON 11:30 TO 12:40

Applications of Nonlinear Photonics

Session Chair: **Anna C. Peacock**,
Univ. of Southampton (United Kingdom)

- Nonlinear biophotonics (Invited Paper)**, Frédérique Vanholsbeeck, The Univ. of Auckland (New Zealand) [11358-1]
- Single nanoparticle detection in the far field by nonlinear optical method**, EunHee Jeang, SAMSUNG Electronics Co., Ltd. (Korea, Republic of); Boris I. Afinogenov, SAMSUNG Advanced Institute of Technology (Russian Federation); Sangwoo Bae, TaeHyun Kim, Ingi Kim, Kyunghun Han, Akinori Ohkubo, SangMin Lee, Minhwan Seo, Seulgi Lee, Won Don Joo, SAMSUNG Electronics Co., Ltd. (Korea, Republic of); Anton Medvedev, Aleksandr Shorokhov, Anton Sofronov, Maksim Riabkob, SAMSUNG Advanced Institute of Technology (Russian Federation); Vladimir O. Bessonov, Ilya Antropov, M.V. Lomonosov Moscow State Univ. (Russian Federation) [11358-2]
- Evanescence Kerr effect in nonlinear liquid-immersed optical nanofiber**, Gil Fanjoux, Jacques Chrétien, Adrien Godet, Jean-Charles Beugnot, Kien Phan Huy, Thibaut Sylvestre, Institut Franche-Comte Electronique Mecanique Thermique et Optique (France) [11358-3]
- Lunch Break Mon 12:40 to 13:50

SESSION 2 MON 13:50 TO 15:20

Nonlinear Dynamics and Instabilities

Session Chair: **Bernd Krauskopf**,
The Univ. of Auckland (New Zealand)

- Non-Hermitian photonics and exceptional points (Invited Paper)**, Stefan Rotter, Technische Univ. Wien (Austria) [11358-4]
- Multimode time-lens**, Moti Fridman, Bar-Ilan Univ. (Israel) [11358-5]
- Optical bistability and frequency combing in silicon edge defect photonic crystals**, Brett Poulsen, Michael Zylstra, Jayshri Sabarinathan, Western Univ. (Canada) [11358-6]
- Simultaneous transition from continuous to pulsed and from PT-symmetric to PT-broken generation in coupled fiber lasers**, Dmitry V. Churkin, Sergey Smirnov, Novosibirsk State Univ. (Russian Federation) [11358-7]

SESSION 3 MON 15:50 TO 17:40

Quantum and Cavity Dynamics

Session Chair: **Neil G. R. Broderick**,
The Univ. of Auckland (New Zealand)

- Mesoscopic physics and nanophotonics (Keynote Presentation)**, Hui Cao, Yale Univ. (United States) [11358-8]

- Quantum systems, semiclassical approximation and two-coupled photonic nanocavities**, Andrus Giraldo, Bernd Krauskopf, Neil G. R. Broderick, The Univ. of Auckland (New Zealand); Alejandro Yacomotti, Ariel Levenson, Ctr. de Nanosciences et de Nanotechnologies, Univ. Paris-Sud, Univ. Paris-Saclay (France) [11358-9]
- Symmetry breaking in coherently driven-dissipative coupled nanocavities**, Bruno Garbin, Ctr. de Nanosciences et de Nanotechnologies, Univ. Paris-Sud, Univ. Paris-Saclay, CNRS (France); Fabrice Raineri, Ctr. de Nanosciences et de Nanotechnologies (France) and Univ. Paris Diderot (France); Mathias Marconi, Institut de Physique de Nice, Côte d'Azur, CNRS (France); Ariel Levenson, Alejandro Yacomotti, Ctr. de Nanosciences et de Nanotechnologies (France) [11358-10]
- Quantum states of light for quantum metrology, computing and communication (Invited Paper)**, Lucia Caspani, Univ. of Strathclyde (United Kingdom) [11358-11]

TUESDAY 31 MARCH

SESSION 4 TUE 8:30 TO 10:20

Nonlinear Semiconductor Photonics

Session Chair: **Birgit Stiller**,
Max-Planck-Institut für die Physik des Lichts (Germany)

- Nonlinear photonics in amorphous silicon (Invited Paper)**, Amy C. Foster, Johns Hopkins Univ. (United States) [11358-12]
- Optical push broom in a silicon waveguide**, Mahmoud A. A. Gaafar, Technische Univ. Hamburg-Harburg (Germany); He Li, Xinlun Cai, Juntao Li, Sun Yat-Sen Univ. (China); Manfred Eich, Alexander Petrov, Technische Univ. Hamburg-Harburg (Germany) [11358-13]
- Designing silicon-core fiber tapers for efficient mid-IR supercontinuum generation**, Joseph Campling, Anna C. Peacock, Peter Horak, Univ. of Southampton (United Kingdom) [11358-14]
- Generation of damped sinusoidal and ultra-wideband microwave waveforms based on an optoelectronic approach**, Rohan Katti, Shanthi Prince, SRM Institute of Science and Technology (India) ... [11358-15]
- High conversion efficiency broadband FWM by III V nanowaveguide**, Kang Li, Univ. of South Wales (United Kingdom) and Foshan Huikang Optoelectronics Ltd. (China); Yongkang Gong, Cardiff Univ. (United Kingdom); Jin Wen, Dun Qiao, Bethan Copner, Nigel J. Copner, The Univ. of South Wales (United Kingdom) [11358-16]

CONFERENCE 11358

SESSION 5 TUE 10:50 TO 12:40

Nonlinear Material Systems

Session Chair: **Frédérique Vanholsbeeck**,
The Univ. of Auckland (New Zealand)

Coherently refreshing acoustic phonons for light storage (*Invited Paper*), Birgit Stiller, Max-Planck-Institut für die Physik des Lichts (Germany)[11358-17]

Slow light using photorefractive nonlinear optics, Nacera Bouldja, Marc Sciamanna, Delphine Wolfersberger, CentraleSupélec (France)[11358-18]

Predicting optical rogue solitons in supercontinuum generation using machine learning, Lauri Salmela, Tampere Univ. (Finland); Coraline Lapre, John M. Dudley, Institut Franche-Comte Electronique Mecanique Thermique et Optique, Univ. Bourgogne Franche-Comté, CNRS (France); Goery Genty, Tampere Univ. (Finland) [11358-19]

Giant and tunable optical nonlinearity in single-crystalline 2D perovskites due to excitonic and plasma effects, Paul Dichtl, Ibrahim Abdelwahab, Imperial College London (United Kingdom); Gustavo Grinblat, Univ. de Buenos Aires (Argentina); Kai Leng, Xiao Chi, In-Hyeok Park, National Univ. of Singapore (Singapore); Michael P. Nielsen, The Univ. of New South Wales (Australia); Rupert F. Oulton, Imperial College London (United Kingdom); Kian Ping Loh, National Univ. of Singapore (Singapore); Stefan A. Maier, Ludwig-Maximilians-Univ. München (Germany) and Imperial College London (United Kingdom) [11358-20]

Efficient optical frequency conversion in Si, GaAs, GaP semiconductor nanowire gratings at visible and UV wavelengths, Michael Scalora, U.S. Army Combat Capabilities Development Command (United States); Crina Cojocaru, Jose Trull, Univ. Politècnica de Catalunya (Spain); Maria Antonietta Vincenti, Univ. degli Studi di Brescia (Italy); Domenico de Ceglia, Univ. degli Studi di Padova (Italy); Neset Akozbek, The AEGIS Technologies Group, Inc. (United States); Luca Carletti, Univ. degli Studi di Padova (Italy); Costantino De Angelis, Univ. degli Studi di Brescia (Italy) [11358-21]

Lunch/Exhibition Break Tue 12:40 to 13:50

SESSION 6 TUE 13:50 TO 16:00

Ultrafast Measurement and Characterization

Session Chair: **John M. Dudley**, Institut Franche-Comte Electronique Mecanique Thermique et Optique (France)

Laser cavity-soliton microcombs (*Invited Paper*), Alessia Pasquazi, Univ. of Sussex (United Kingdom) [11358-22]

Characterization of randomly shaped femtosecond pulses by FROG technique, Jiri Junek, Petra Horodyska, Institute of Plasma Physics of the CAS, v.v.i. (Czech Republic); Jan Hrebicek, Institute of Physics of the CAS, v.v.i. (Czech Republic); Miroslav Krus, Karel Zidek, Institute of Plasma Physics of the CAS, v.v.i. (Czech Republic) [11358-23]

Numerical modelling of WGM microresonator Kerr frequency combs in self-injection locking regime, Nikita M. Kondratiev, Andrey Voloshin, Valery Lobanov, Igor A. Bilenko, Russian Quantum Ctr. (Russian Federation) [11358-24]

Real-time measurement of soliton-similariton explosions and intermittence instabilities in a mode-locked fibre laser, Coraline Lapre, Cyril Billet, Fanchao Meng, Institut Franche-Comte Electronique Mecanique Thermique et Optique, Univ. Bourgogne Franche-Comté, CNRS (France); Piotr Ryczkowski, Tampere Univ. (Finland); Thibaut Sylvestre, Institut Franche-Comte Electronique Mecanique Thermique et Optique, Univ. Bourgogne Franche-Comté, CNRS (France); Christophe Finot, Lab. Interdisciplinaire Carnot de Bourgogne, Univ. Bourgogne Franche-Comté, CNRS (France); Goery Genty, Tampere Univ. (Finland); John M. Dudley, Institut Franche-Comte Electronique Mecanique Thermique et Optique, Univ. Bourgogne Franche-Comté, CNRS (France) [11358-25]

Dissipative Kerr soliton generated in a ring resonator with optical feedback, Aslam Ahmed Syed, José M. Chavez-Boggio, Daniel Bodenmüller, Adnan Baig, Martin Roth, Leibniz-Institut für Astrophysik Potsdam (Germany) [11358-26]

The state of polarization of twin-peak rogue waves, Moti Fridman, Bar-Ilan Univ. (Israel) [11358-27]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair

16:35 to 17:20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States

17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

POSTERS-TUESDAY TUE 18:05 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Tuesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

An insight into strong many-body interactions in ultrathin anisotropic tin (II) monosulfide, Aamir Mushtaq, Indian Institute of Technology Mandi (India) [11358-42]

Nonlinear optics of three-dimensional Dirac semimetals, Kelvin J. A. Ooi, Xiamen Univ. Malaysia (Malaysia) [11358-43]

Nonlinear optical properties of mirror-image configurations of chiral limonene molecule, Watheq Al-Basheer, King Fahd Univ. of Petroleum & Minerals (Saudi Arabia); Said M. Azar, Ontario Academy (Jordan) .. [11358-64]

SOA-assisted photonic 42-90 GHz signal generation for hybrid fibre and FSO 5G transmission links, Luis Vallejo, Beatriz Ortega, Univ. Politècnica de València (Spain); Stanislav Zvánovec, Jan Bohata, Czech Technical Univ. in Prague (Czech Republic); Vicens Almenar, Univ. Politècnica de València (Spain) [11358-65]

Highly-resolved (2+1) nonlinear resonantly-enhanced multiphoton ionization of supersonically jet-cooled H₂O and D₂O molecules, Watheq Al-Basheer, King Fahd Univ. of Petroleum & Minerals (Saudi Arabia) [11358-66]

Propagation and topological structure of fractional optical vortex beams in self-focusing Kerr media, Youngbin Na, Do-Kyeong Ko, Gwangju Institute of Science and Technology (Korea, Republic of) [11358-44]

THz generation by optical rectification for a novel shot-to-shot synchronization system between electron bunches and femtosecond laser pulses in a plasma wakefield accelerator, Stefano Mattiello, Andreas Penirschke, Technische Hochschule Mittelhessen (Germany); Holger Schlarb, Deutsches Elektronen-Synchrotron (Germany) . . . [11358-45]

Recent advances in the problem of transverse-magnetic wave propagation in a plane waveguide filled with anisotropic Kerr medium, Dmitry Valovik, Penza State Univ. (Russian Federation) [11358-67]

Monitoring of photopolymerization-induced changes of self-written waveguides, Ra'ed Malallah, Ali Q. Abdullah, Univ. of Basrah (Iraq); Derek J. Cassidy, John T. Sheridan, Univ. College Dublin (Ireland) .. [11358-68]

Passive suppression of relative intensity noise induced by pump power fluctuation in mode-locked fiber lasers, Peng Qin, Sijia Wang, China Academy of Space Technology (China); Minglie Hu, Youjian Song, Tianjin Univ. (China) [11358-69]

Modelling pulse propagation along an optical fibre with higher-order dispersion: do such solitons exist?, Ravindra Bandara, Andrus Giraldo, Bernd Krauskopf, Neil G. R. Broderick, The Univ. of Auckland (New Zealand) [11358-70]

Triangular spectral phase tailoring for the generation of high-quality picosecond pulse trains, Christophe Finot, Ugo Andral, Lab. Interdisciplinaire Carnot de Bourgogne (France) [11358-46]

Intraband FWM effect and its impacts in an ultralong single-span 10Gbps SDH system, Xiaobo Zhu, Wuxi Taclink Optoelectronics Technology Co., Ltd. (China); Xiang Jia, Mingxi Han, Wenhua Gu, Nanjing Univ. of Science and Technology (China) [11358-47]

Characterization of coherent structures in dissipative systems using nonlinear Fourier transform, Igor Chekhovskoy, Olga Shtyrina, Mikhail P. Fedoruk, Novosibirsk State Univ. (Russian Federation) and Institute of Computational Technologies (Russian Federation); Sergey Medvedev, Institute of Computational Technologies (Russian Federation) and Novosibirsk State Univ. (Russian Federation); Sergei Turitsyn, Novosibirsk State Univ. (Russian Federation) and Aston Univ. (United Kingdom) [11358-48]

Femtosecond third-order nonlinear optical properties of a novel chalcogen derivative by Z-scan and degenerate four wave mixing technique, Shivaraj R. Maidur, Parutagouda Shankaragouda Patil, KLE Institute of Technology, Hubballi (India); Krishnakanth K. N., Venugopal Rao Soma, Advanced Ctr. of Research in High Energy Materials, Univ. of Hyderabad (India) [11358-49]

Ultrafast magnetoplasmonics of profile-tailored all-nickel nanogratings, Ilya Novikov, Nurgalieva Polina, Maxim Kiryanov, Aleksandr Y. Frolov, Vladimir Popov, Tatyana V. Dolgova, Andrey A. Fedyanin, M.V. Lomonosov Moscow State Univ. (Russian Federation) [11358-50]

Stabilizing optical vortex bullets by absorption at quadratic nonlinearity, Aleksei A. Kalinovich, Maria V. Komissarova, Dmitry Yu. Zagursky, Irina G. Zakharova, M.V. Lomonosov Moscow State Univ. (Russian Federation) [11358-71]

Spatio-temporal localization of the intense pulses in the multiphoton ionization regime, Vyacheslav A. Khalyapin, Kaliningrad State Technical Univ. (Russian Federation) and M.V. Lomonosov Moscow State Univ. (Russian Federation) [11358-51]

Method of information productivity increasing for efficient acousto-optic processors of spectral type, Boris S. Gurevich, Kirill Zaichenko, Institute for Analytical Instrumentation (Russian Federation) [11358-72]

Comparative analysis of the efficiency of fixing methods of metal-doped silica nanoparticles by laser-induced breakdown spectroscopy, Jhamal Ibrahim Salazar Martinez, Vincent Piscitelli, Univ. Central de Venezuela (Venezuela) [11358-52]

Generation and control of diffractive resonant radiation in chirped waveguide arrays, Anuj P. Lara, Samudra Roy, Indian Institute of Technology Kharagpur (India) [11358-73]

Study of temperature and hydrostatic pressure effect on nonlinear optical properties associated with the excitonic system in InAs quantum dot, Suman Dahiya, Rinku Sharma, Delhi Technological Univ. (India); Siddhartha Lahon, Univ. of Delhi (India) [11358-53]

Front-induced transitions: refractive index fronts in dispersive waveguides, Mahmoud A. A. Gaafar, Hagen Renner, Technische Univ. Hamburg-Harburg (Germany); Toshihiko Baba, Yokohama National Univ. (Japan); Manfred Eich, Alexander Petrov, Technische Univ. Hamburg-Harburg (Germany) [11358-54]

Two-color platicons in quadratically nonlinear optical microresonators, Valery Lobanov, Nikita M. Kondratiev, Igor A. Bilenko, Russian Quantum Ctr. (Russian Federation) [11358-55]

Interface-driven effects in optical second harmonic generation from planar Co-based nanostructures, Tatiana V. Murzina, Irina A. Kolmychek, M.V. Lomonosov Moscow State Univ. (Russian Federation); Nikita S. Gusev, Institute for Physics of Microstructures (Russian Federation) [11358-56]

Second harmonic generation in epsilon-near-zero hyperbolic metamaterials, Irina A. Kolmychek, Vladimir B. Novikov, Irina V. Malysheva, Tatiana V. Murzina, M.V. Lomonosov Moscow State Univ. (Russian Federation) [11358-57]

Visualization of nonlinear beam propagation effects inside transparent materials for focused ultrashort laser pulses, Christian Kalupka, Fraunhofer-Institut für Lasertechnik ILT (Germany); Martin Schmalstieg, RWTH Aachen Univ. (Germany) [11358-74]

Quadratic chirped optical soliton at the concurrency of the dispersion of different orders, Aleksei A. Kalinovich, Maria V. Komissarova, Tatiana M. Lysak, Irina G. Zakharova, M.V. Lomonosov Moscow State Univ. (Russian Federation) [11358-75]

Double-blind ultrafast pulse characterisation by mixed frequency generation in a gold antenna, Sylvain D. Gennaro, Sandia National Labs. (United States); Paul Dichtl, Imperial College London (United Kingdom); Yi Li, Stefan A. Maier, Ludwig-Maximilians-Univ. München (Germany); Rupert F. Oulton, Imperial College London (United Kingdom) [11358-58]

Optical rectification at second-order dispersion close to zero, Aleksei A. Kalinovich, Sergey V. Sazonov, Maria V. Komissarova, Irina G. Zakharova, M.V. Lomonosov Moscow State Univ. (Russian Federation) [11358-76]

Optical bullets in media with quadratic nonlinearity at the competition of second- and third-order dispersions, Aleksei A. Kalinovich, Sergey V. Sazonov, Maria V. Komissarova, Irina G. Zakharova, M.V. Lomonosov Moscow State Univ. (Russian Federation) [11358-77]

Jitter suppression in passive harmonic mode-locking fiber ring laser, Dmitry A. Korobko, Igor Zolotovskii, Andrei A. Fotiadi, Ulyanovsk State Univ. (Russian Federation); Regina Gumenyuk, Ulyanovsk State Univ. (Russian Federation) and Tampere Univ. (Finland) [11358-78]

High-power, femtosecond, coherent yellow source using two-stage second harmonic generation of Cr²⁺:ZnS laser, Deepika Yadav, Anirban Ghosh, Ravi Kiran Saripalli, Goutam K. Samanta, Physical Research Lab. (India) [11358-79]

Control of a Brillouin microresonator laser due to detuning effects, Dmitry A. Korobko, Ulyanovsk State Univ. (Russian Federation); Igor Zolotovskii, Andrei A. Fotiadi, Andrei Zhukov, Christina V. Borisova, Alexandr N. Fomin, Ulyanovsk State Univ. (Russian Federation) and Scientific-Production Complex "Technological Ctr." (Russian Federation) [11358-80]

Passive harmonic mode-locking in Er-doped fiber laser with linear cavity, Dmitry A. Korobko, Dmitry Stoliarov, Ulyanovsk State Univ. (Russian Federation); Andrei A. Fotiadi, Ulyanovsk State Univ. (Russian Federation) and Univ. de Mons (Belgium); Pavel Itrin, Valerya Ribenek, Ulyanovsk State Univ. (Russian Federation) [11358-59]

Overlapping time-lens array, Moti Fridman, Bar-Ilan Univ. (Israel) . [11358-60]

CW time-lens, Moti Fridman, Bar-Ilan Univ. (Israel); Michelle Sander, Boston Univ. (United States) [11358-61]

One dimensional SiN/Air defect multilayer based nonlinear optical sensor, Sapna Dinodia, Government Women Polytechnic College, Bikaner (India) [11358-62]

Third order nonlinear optical susceptibility of yttria-stabilized zirconia waveguides, Alicia Ruiz-Caridad, Guillaume Marcaud, Ctr. de Nanosciences et de Nanotechnologies (France); Samuel Serna, Massachusetts Institute of Technology (United States); Panagiotis Karamanis, Univ. de Pau et des Pays de l'Adour (France); Christian Lafforgue, Carlos A. Alonso-Ramos, Xavier Le Roux, Mathias Berciano, Ctr. de Nanosciences et de Nanotechnologies (France); Joan Manel Ramirez, III-V Lab. (France); Thomas Maroutian, Guillaume Agnus, Pascal Aubert, Arnaud Jollivet, Ludovic Largeau, Nathalie Isac, Eric Cassan, Sylvia Matzen, Delphine Marris-Morini, Philippe Lecoeur, Ctr. de Nanosciences et de Nanotechnologies (France); Nicolas Dubreuil, Institut d'Optique Graduate School (France); Michel Rérat, Univ. de Pau et des Pays de l'Adour (France); Laurent Vivien, Ctr. de Nanosciences et de Nanotechnologies (France) [11358-63]

WEDNESDAY 1 APRIL

SESSION 7 WED 8:30 TO 10:20

Nonlinear and Ultrafast Dynamics I

Session Chair: **John C. Travers**, Heriot-Watt Univ. (United Kingdom)

Joint Session between Nonlinear Optics and its Applications Conference (11358) and Semiconductor Lasers and Laser Dynamics Conference (11356)

Emerging nonlinear optical approaches for mid-infrared ultrafast pulse generation (Invited Paper), Jeffrey Moses, Cornell Univ. (United States) [11358-28]

Forecasting the amplitude of high-intensity chaotic laser pulses, Cristina Masoller, Univ. Politècnica de Catalunya (Spain); Miguel C. Cornelles-Soriano, Instituto de Física Interdisciplinar y Sistemas Complejos (Spain); Pablo Amil, Univ. Politècnica de Catalunya (Spain) [11358-29]

The limits of sustained self-excitation: the Yamada model subject to delayed optical feedback, Stefan Ruschel, Bernd Krauskopf, Neil G. R. Broderick, The Univ. of Auckland (New Zealand) [11358-30]

Multistable equidistant pulsing of an excitable laser with optical feedback, Bernd Krauskopf, Soizic Terrien, Neil G. R. Broderick, The Univ. of Auckland (New Zealand); Anirudh Pammi, Sylvain Barbay, Ctr. de Nanosciences et de Nanotechnologies (France) [11358-31]

Photonic coherent reservoir computer based on fiber-ring with distributed nonlinearity, Jael Pauwels, Vrije Univ. Brussel (Belgium) and Univ. Libre de Bruxelles (Belgium); Guy Verschaffelt, Vrije Univ. Brussel (Belgium); Serge Massar, Univ. Libre de Bruxelles (Belgium); Guy Van der Sande, Vrije Univ. Brussel (Belgium) [11356-25]

CONFERENCE 11358

SESSION 8..... WED 10:50 TO 12:40

Nonlinear and Ultrafast Dynamics II

Session Chair: **Jeffrey Moses**, Cornell Univ. (United States)

Frequency microcombs for nonclassical applications (*Invited Paper*), Roberto Morandotti, Institut National de la Recherche Scientifique (Canada) [11358-32]

Explosion and intermittence dynamics in a dissipative soliton-similariton model using a scalar iterative map, Fanchao Meng, Coraline Lapre, Cyril Billet, Institut Franche-Comte Electronique Mecanique Thermique et Optique (France); Goery Genty, Tampere Univ. (Finland); John M. Dudley, Institut Franche-Comte Electronique Mecanique Thermique et Optique (France) [11358-33]

Optical frequency combs in doubly resonant second harmonic generation, Iolanda Ricciardi, Simona Mosca, Maria Parisi, Pasquale Maddaloni, Paolo De Natale, Istituto Nazionale di Ottica, Consiglio Nazionale delle Ricerche (Italy); Miro Erkintalo, The Univ. of Auckland (New Zealand); François Leo, Univ. Libre de Bruxelles (Belgium); Tobias Hansson, Linköping Univ. (Sweden); Ady Arie, Tel Aviv Univ. (Israel); Stefan Wabnitz, Sapienza Univ. di Roma (Italy); Maurizio De Rosa, Istituto Nazionale di Ottica, Consiglio Nazionale delle Ricerche (Italy) [11358-34]

Temporal Arago spot in optical fibers, Christophe Finot, Lab. Interdisciplinaire Carnot de Bourgogne (France); Hervé Rigneault, Aix-Marseille Univ., Ecole Centrale de Marseille, Institut Fresnel, CNRS (France) [11358-35]

Correlation of solitons in bidirectional mode-locked fibre laser, Igor S. Kudelin, Srikanth Sugavanam, Aston Univ. (United Kingdom); Maria Chernysheva, Leibniz-Institut für Photonische Technologien e.V. (Germany) [11358-36]

Lunch/Exhibition Break Wed 12:40 to 13:50

SESSION 9..... WED 13:50 TO 15:40

Nonlinear and Ultrafast Dynamics III

Session Chair: **Roberto Morandotti**, Institut National de la Recherche Scientifique (Canada)

Soliton dynamics in hollow capillary fibres (*Invited Paper*), John C. Travers, Heriot-Watt Univ. (United Kingdom) [11358-37]

Broadband supercontinuum generation in nitrogen-rich silicon nitride waveguides, Christian Lafforgue, Ctr. de Nanosciences et de Nanotechnologies (France); Sylvain Guerber, STMicroelectronics S.A. (France); Joan Manel Ramirez, III-V Lab. (France); Guillaume Marcaud, Yale Univ. (United States); Carlos A. Alonso-Ramos, Xavier Le Roux, Delphine Marris-Morini, Eric Cassan, Ctr. de Nanosciences et de Nanotechnologies (France); Charles Baudot, Frederic Boeuf, Sébastien Cremer, Stephane Monfray, STMicroelectronics S.A. (France); Laurent Vivien, Ctr. de Nanosciences et de Nanotechnologies (France) [11358-38]

Low noise mid-infrared supercontinuum generation in multimode chalcogenide fiber, Zahra Eslami, Piotr Ryczkowski, Lauri Salmela, Goery Genty, Tampere Univ. (Finland) [11358-39]

Anomalous phase matching of high-harmonic generation through an inter subcycle interference, Georgiy Shoulga, Alon Bahabad, Tel Aviv Univ. (Israel) [11358-40]

Numerical modelling of pump-wavelength dependence of high harmonic generation efficiency, Samuel M. Senior, William S. Brocklesby, Peter Horak, Univ. of Southampton (United Kingdom) [11358-41]

CONFERENCE 11359

Monday–Wednesday 30 March–1 April 2020 • Proceedings of SPIE Vol. 11359

Biomedical Spectroscopy, Microscopy, and Imaging

Conference Chairs: Jürgen Popp, Leibniz-Institut für Photonische Technologien e.V. (Germany); Csilla Gergely, Lab. Charles Coulomb (France)

Programme Committee: Peter E. Andersen, Technical Univ. of Denmark (Denmark); James M. Brewer, Univ. of Glasgow (United Kingdom); Arthur E. T. Chiou, National Yang-Ming Univ. (Taiwan); Jürgen W. Czarske, TU Dresden (Germany); Johannes F. de Boer, Vrije Univ. Amsterdam (Netherlands); Kishan Dholakia, Univ. of St. Andrews (United Kingdom); Dror Fixler, Bar-Ilan Univ. (Israel); Sylvain Gioux, Univ. de Strasbourg (France); Kirill V. Larin, Univ. of Houston (United States); Qingming Luo, Hainan Univ. (China); Thomas G. Mayerhöfer, Leibniz-Institut für Photonische Technologien e.V. (Germany); Vasilis Ntziachristos, Helmholtz Zentrum München GmbH (Germany); David D. Sampson, The Univ. of Western Australia (Australia); Ernst H. K. Stelzer, Johann Wolfgang Goethe-Univ. Frankfurt am Main (Germany); Hugo Thienpont, Vrije Univ. Brussel (Belgium); Siva Umapathy, Indian Institute of Science (India); I. Alex Vitkin, Ontario Cancer Institute (Canada); Gert von Bally, Ctr. for Biomedical Optics and Photonics (Germany); Brian C. Wilson, Princess Margaret Hospital (Canada)

MONDAY 30 MARCH

HOT TOPICS I MON 9:00 TO 11:00

Photonics Europe 2020: Hot Topics Session I

- 9:00 - 9:20 **SPIE Welcome and Award Presentation**
John E. Greivenkamp, Univ of Arizona, United States
SPIE President
- Welcome**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- City of Strasbourg Welcome**
- 9:25 - 9:30 **Introduction to Hot Topics**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- 9:30 - 10:15 **Naturally fast and low power electro-optic polymer optical devices are ideally positioned for the next-generation Internet photonics roadmap**
Michael Leiby, CEO Lightwave Logic, United Kingdom
- 10:15 - 11:00 **3D printed micro-optics: state of the art and future challenges**
Harald Giessen, University of Stuttgart, Germany

For additional details see pages 6-7

SESSION 1 MON 11:30 TO 12:40

Raman Spectroscopy Imaging I

Session Chair: **Jürgen Popp**,
Leibniz-Institut für Photonische Technologien e.V. (Germany)

- Prognosis, diagnosis and the influence of inhibitors: Raman spectroscopic study of radioresistant brain cancer stem-like cells** (*Invited Paper*), Srividya Kumar, Abhirami Visvanathan, Indian Institute of Science, Bengaluru (India); A. Arivazhagan, Vani Santhosh, National Institute of Mental Health and Neuro Sciences (India); Kumaravel Somasundaram, Siva Umapathy, Indian Institute of Science, Bengaluru (India) [11359-1]
- Analysis of anticancer drug efficiency on tumor spheroids with dual Brillouin/Raman microspectroscopy**, Erwan Capitaine, Lab. Physiologie Cellulaire & Végétale, Institut de recherche interdisciplinaire de Grenoble, CEA-DRF (France); Jean-Charles Baritoux, CEA-LETI (France); Odile Filhol-Cochet, Irinka Seraudie, CEA (France) [11359-2]
- Potential and challenges of pathogen detection using Raman spectroscopy**, Sanchita Sil, Defence Bioengineering and Electromedical Lab. (India); Ria Mukherjee, Indian Institute of Science, Bengaluru (India); N. S. Kumar, Defence Bioengineering and Electromedical Lab. (India); Siva Umapathy, Indian Institute of Science, Bengaluru (India) [11359-3]
- Lunch Break Mon 12:40 to 13:50

SESSION 2 MON 13:50 TO 15:30

Raman Spectroscopy Imaging II

Session Chair: **Siva Umapathy**,
Indian Institute of Science, Bengaluru (India)

- Fast measurement of mechanical properties with impulsive stimulated Brillouin microscopy** (*Invited Paper*), Jürgen W. Czarske, Benedikt Krug, Nektarios Koukourakis, TU Dresden (Germany) [11359-4]
- Comparison testing of machine learning algorithms separability on Raman spectra of skin cancer**, Vladislav A. Neyman, Togliatti State Univ. (Russian Federation); Oleg O. Myakinin, Samara Univ. (Russian Federation); Mariya G. Lisovskaya, Togliatti State Univ. (Russian Federation) and Samara Univ. (Russian Federation); Ivan A. Bratchenko, Samara Univ. (Russian Federation); Alexander A. Moryatov, Sergey V. Kozlov, Samara State Medical Univ. (Russian Federation); Valery P. Zakharov, Samara Univ. (Russian Federation) [11359-5]
- Coherent anti-Stokes Raman scattering microscopy through a multimode fiber endoscope**, Johanna Trägårdh, Tomáš Pikálek, Mojmír Šerý, Institute of Scientific Instruments of the CAS, v.v.i. (Czech Republic); Denis Akimov, Tobias Meyer, Jürgen Popp, Leibniz-Institut für Photonische Technologien e.V. (Germany); Tomáš Čizmár, Institute of Scientific Instruments of the CAS, v.v.i. (Czech Republic) [11359-6]
- Corneal collagen morpho-mechanics characterized by correlative optical microscopies** (*Invited Paper*), Raffaella Mercatelli, Sara Mattana, Istituto Nazionale di Ottica, Consiglio Nazionale delle Ricerche (Italy); Laura Capozzoli, Istituto di Chimica dei Composti OrganoMetallici, Consiglio Nazionale delle Ricerche (Italy); Fulvio Ratto, Istituto di Fisica Applicata "Nello Carrara", Consiglio Nazionale delle Ricerche (Italy); Francesca Rossi, Roberto Pini, Istituto di Fisica Applicata "Nello Carrara" (Italy); Daniele Fioretto, Univ. degli Studi di Perugia (Italy); Francesco S. Pavone, Univ. degli Studi di Firenze (Italy) and LENS - Lab. Europeo di Spettroscopie Non-Linearari (Italy); Silvia Caponi, Istituto Officina dei Materiali, Consiglio Nazionale delle Ricerche (Italy); Riccardo Cicchi, Istituto Nazionale di Ottica, Consiglio Nazionale delle Ricerche (Italy) and LENS - Lab. Europeo di Spettroscopie Non-Linearari (Italy) [11359-7]

SESSION 3 MON 16:00 TO 18:00

IR Spectroscopy and Imaging

Session Chair: **Thomas G. Mayerhöfer**, Leibniz-Institut für Photonische Technologien e.V. (Germany)

- Modelling the wavelength-dependent response of SHG excitation efficiency** (*Invited Paper*), Stephen J. Matcher, Lichuan Li, The Univ. of Sheffield (United Kingdom) [11359-8]
- Signal enhancement in microstructured silicon attenuated total reflectance elements for quantum cascade laser-based spectroscopy**, Ine L. Jernelv, Dag R. Hjelle, Astrid Aksnes, Norwegian Univ. of Science and Technology (Norway) [11359-9]
- Mid-infrared multispectral lensless imaging for wide-field and label-free microbial identification**, Joel Legaludec, Mathieu Dupoy, Pierre Marcoux, CEA-Grenoble (France) [11359-10]
- Does chaotic scattering affect the extinction efficiency in quasi-spherical scatterers?** Maren Anna Brandsrud, Eivind Seim, Johanne Heitmann Solheim, Eirik Almklov Magnussen, Norwegian Univ. of Life Sciences (Norway); Reinhold Blümel, Wesleyan Univ. (United States); Achim Kohler, Norwegian Univ. of Life Sciences (Norway) [11359-11]

CONFERENCE 11359

Fiber photonics solutions for tissue analysis for fast biomedical diagnostics (*Invited Paper*), Olga Bibikova, Alena Sergeeva, art photonics GmbH (Germany); Stanislav Perevoschikov, Skolkovo Institute of Science and Technology (Russian Federation); Raushania Gaynullina, Moscow Institute of Physics and Technology (Russian Federation); Iskander Usenov, art photonics GmbH (Germany); Valeria Belikova, Anastasya Melenteva, Samara State Technical Univ. (Russian Federation); Alexey Bocharnikov, Tatiana Sakharova, art photonics GmbH (Germany); Evgeny Shirshin, M.V. Lomonosov Moscow State Univ. (Russian Federation); Alexander Tonevitsky, National Research Univ. Higher School of Economics (Russian Federation); Viacheslav Artyushenko, art photonics GmbH (Germany) [11359-12]

TUESDAY 31 MARCH

SESSION 4 TUE 8:30 TO 10:20

Optical Coherence Tomography I

Session Chair: **Zhenyang Ding**, Tianjin Univ. (China)

Compressional optical coherence elastography as a tool for feasible in vivo histology-like morphological segmentation of cancer-tissue constituents (*Invited Paper*), Vladimir Y. Zaitsev, Institute of Applied Physics (Russian Federation); Anton Plekhanov, Marina Sirotkina, Privolzhsky Research Medical Univ. (Russian Federation); Alexander A. Sovetsky, Institute of Applied Physics (Russian Federation); Ekaterina V. Gubarkova, Privolzhsky Research Medical Univ. (Russian Federation); Alexander L. Matveyev, Lev A. Matveyev, Institute of Applied Physics (Russian Federation); Elena V. Zagaynova, Natalia D. Gladkova, Privolzhsky Research Medical Univ. (Russian Federation) [11359-13]

Line-field confocal optical coherence tomography: technology and application in dermatology, Jonas Ogien, Olivier Leveq, Hicham Azimani, David Siret, DAMAE Medical (France); Jean-Luc Perrot, Ctr. Hospitalier Univ. de Saint-Étienne (France); Arnaud Dubois, Lab. Charles Fabry (France) [11359-14]

Optical coherence elastography for characterization of natural interstitial gaps and laser-irradiation-produced porosity in corneal and cartilaginous samples, Lev A. Matveyev, Alexander A. Sovetsky, Alexander L. Matveyev, Institute of Applied Physics (Russian Federation); Olga Baum, Institute of Photonic Technologies (Russian Federation) and Federal Research Ctr. "Crystallography and Photonics" (Russian Federation); Alexander Omelchenko, Alexey Yuzhakov, Institute of Photonic Technologies (Russian Federation); Emil Sobol, IPG Medical Corp. (United States); Vladimir Y. Zaitsev, Institute of Applied Physics (Russian Federation) [11359-15]

Characterization of elastic nonlinear properties of the tissues using compressional optical coherence elastography, Alexander A. Sovetsky, Lev A. Matveyev, Institute of Applied Physics (Russian Federation); Ekaterina V. Gubarkova, Privolzhsky Research Medical Univ. (Russian Federation); Alexander L. Matveyev, Institute of Applied Physics (Russian Federation); Natalia D. Gladkova, Privolzhsky Research Medical Univ. (Russian Federation); Vladimir Y. Zaitsev, Institute of Applied Physics (Russian Federation) [11359-16]

Microstructured glass probe for endoscopic OCT and OCT-A, Gerardo E. González-Cerdas, Caglar Ataman, Hans Zappe, Univ. of Freiburg (Germany) [11359-17]

SESSION 5 TUE 10:50 TO 12:50

Optical Coherence Tomography II

Session Chair: **Vladimir Y. Zaitsev**, Institute of Applied Physics of the RAS (Russian Federation)

Catheter-based polarization sensitive optical coherence tomography using Mueller matrix method with real domain averaging (*Invited Paper*), Zhenyang Ding, Tianduo Lai, Kuiyuan Tao, Huishuo Zhao, Yanan Zhu, Peidong Hua, Tiegeng Liu, Tianjin Univ. (China) [11359-18]

Imaging photothermal-induced expansion of bone during laserosteotomy by phase-sensitive OCT: preliminary results, Arsham Hamidi, Yakub A. Bayhaqi, Ferda Canbaz, Alexander Navarini, Philippe C. Cattin, Azhar Zam, Univ. Basel (Switzerland) [11359-19]

Texture analysis in OCT imaging of skin cancer, Oleg O. Myakinin, Dmitry S. Raupov, Ivan A. Bratchenko, Samara Univ. (Russian Federation); Alexander A. Moryatov, Sergey V. Kozlov, Samara State Medical Univ. (Russian Federation); Valery P. Zakharov, Samara Univ. (Russian Federation); Alexander G. Khramov, Samara Univ. (Russian Federation) and Image Processing Systems Institute (Russian Federation) [11359-20]

A model for full-field optical coherence tomography in scattering media, Ugo Tricoli, ONERA (France); Rémi Carminati, Institut Langevin Ondes et Images (France) [11359-21]

Deep learning enabled intraoperative cancer margin assessment (*Invited Paper*), Vishal Srivastava, Thapar Institute of Engineering and Technology (India) [11359-22]

Lunch/Exhibition Break Tue 12:50 to 14:00

SESSION 6 TUE 14:00 TO 16:00

Optical Coherence Tomography III

Session Chair: **Vishal Srivastava**, Thapar Institute of Engineering and Technology (India)

Feasibility of detecting lipid in biological tissues at high resolution with photothermal optical coherence tomography (*Invited Paper*), Mohammad Hossein Salimi, York Univ. (Canada); Martin Villiger, Harvard Medical School (United States); Nima Tabatabaei, York Univ. (Canada) [11359-23]

Methods for reducing relative intensity noise in swept-source mid-infrared OCT, Wai-Ching Lin, Stephen J. Matcher, The Univ. of Sheffield (United Kingdom) [11359-24]

Blood flow rate estimation in optic disc capillaries and vessels using Doppler optical coherence tomography, Ewelina Pijewska, Marcin Sylwestrzak, Iwona Gorczynska, Szymon Tamborski, Nicolaus Copernicus Univ. (Poland); Mikolaj Pawlak, Poznan Univ. of Medical Sciences (Poland); Maciej Szkulmowski, Nicolaus Copernicus Univ. (Poland) [11359-25]

Bimodal bench-top imaging system for coregistered and concurrent optical coherence tomography and ultra-broadband single fiber reflectance spectroscopy, Xavier Attendu, Polytechnique Montréal (Canada) and Amsterdam UMC (Netherlands); Paul R. Bloemen, Daniel M. De Bruin, Dirk J. Faber, Amsterdam UMC (Netherlands); Caroline Boudoux, Polytechnique Montréal (Canada); Ton Van Leeuwen, Amsterdam UMC (Netherlands) [11359-26]

New algorithms to characterize and classify ophthalmic images (*Invited Paper*), Cristina Masoller, Pablo Amil, Univ. Politècnica de Catalunya (Spain) [11359-27]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

- 16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair
- 16:35 to 17:20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States
- 17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

POSTERS-TUESDAY TUE 18:05 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Tuesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

Laser speckle time-series correlation analysis for bacteria activity detection, Ilya Balmages, Univ. of Latvia (Latvia); Dmitrijs Bliznuks, Riga Technical Univ. (Latvia); Janis Liepins, Stivens Zolins, Alexey Lihachev, Univ. of Latvia (Latvia) [11359-48]

A combination of imaging techniques for dental medicine: from X-rays to micro-CT and OCT, Ralph-Alexandru Erdelyi, Univ. Politehnica Timisoara (Romania); Virgil-Florin Duma, Univ. "Aurel Vlaicu" din Arad (Romania) [11359-49]

Calibration routine for incoherent optical fiber bundles to support medical ultrahigh spatial resolution fiber spectroscopy, Moritz Späth, Hendrik Epp, Florian Klämpfl, Michael Schmidt, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [11359-50]

The effects of nox4 on kidney metabolic state of Dahl salt-sensitive rats post-uninephrectomy using optical imaging, Farnaz Foomani, Shima Mehrvar, Soudeh Mostaghimi, Univ. of Wisconsin-Milwaukee (United States); Allen Cowley, Univ. of Wisconsin-Milwaukee (United States) and Medical College of Wisconsin (United States); Mahsa Ranji, Univ. of Wisconsin-Milwaukee (United States) [11359-51]

Refractive index determination of cancer melanoma skin cells using optical reflectance spectroscopy, Afshan Shirkevand, Laser and Plasma Research Institute (Iran, Islamic Republic of) and Medical Laser Research Ctr. (Iran, Islamic Republic of); Ezeddin Mohajerani, Laser and Plasma Research Institute, Shahid Beheshti Univ. (Iran, Islamic Republic of); Leila Ataie-Fashtami, Royan Institute for Stem Cell Biology & Technology (Iran, Islamic Republic of); Shirin Farivar, Mohammad Hosein Ghazimoradi, Shahid Beheshti Univ. (Iran, Islamic Republic of) [11359-52]

Semi-analytical full-wave model of OCT-scan formation for various degrees of OCT-beam focusing with implication of motion of scatterers, Alexander L. Matveyev, Lev A. Matveev, Alexander A. Moiseev, Alexander A. Sovetsky, Alexey A. Zykov, Grigory V. Gelikonov, Vladimir Y. Zaitsev, Institute of Applied Physics (Russian Federation) [11359-53]

Portable skin spectrum measurement device: on-chip spectrometer and artificial neural networks, Cheng-chun Chang, Yi-Wei Yu, National Taipei Univ. of Technology (Taiwan); Kuan-Fu Chen, Clinical Informatics and Medical Statistics Research Ctr., Chang Gung Univ. (Taiwan); Bill Choi, nanoLambda (Korea, Republic of); Hao-Chiang Shao, Fu Jen Catholic Univ. (Taiwan) [11359-54]

Infrared quantum cascade laser spectroscopy as noninvasive diagnostic tests for human diseases, Anastasiya S. Tabalina, Dmitriy R. Anfimov, Igor S. Golyak, Igor L. Fufurin, Bauman Moscow State Technical Univ. (Russian Federation) [11359-55]

Multivariate analysis of Raman spectra for monitoring polyphenol treatment effects on X-rays exposed human neuroblastoma cells, Ines Delfino, Univ. degli Studi della Toscana (Italy); Valerio Ricciardi, Univ. degli Studi della Campania Luigi Vanvitelli (Italy) and Istituto Nazionale di Fisica Nucleare (Italy); Giuseppe Perna, Univ. degli Studi di Foggia (Italy) and Istituto Nazionale di Fisica Nucleare (Italy); Maria Lasalvia, Univ. degli Studi di Foggia (Italy) and Istituto Nazionale Fisica Nucleare (Italy); Lorenzo Manti, Univ. degli Studi di Napoli Federico II (Italy); Simona Piccolella, Severina Pacifico, Univ. degli Studi della Campania Luigi Vanvitelli (Italy); Vito Capozzi, Univ. degli Studi di Foggia (Italy) and Istituto Nazionale Fisica Nucleare (Italy); Maria Lepore, Univ. degli Studi della Campania Luigi Vanvitelli (Italy) [11359-56]

Quantum sensing technology for early detection of cancer through the acquisition of optically detected magnetic resonance, Junaid Ahmad, Simon J. Levett, Joshua C. Price, Valentin Radu, Thomas D. Bateman-Price, The Univ. of Nottingham (United Kingdom); Philippe B. Wilson, De Montfort Univ. (United Kingdom); Melissa L. Mather, The Univ. of Nottingham (United Kingdom) [11359-57]

Study of the interaction of biopolymer scaffolds with the recipient body by optical techniques, Vadim Elagin, Daria Kuznetsova, Privolzhsky Research Medical Univ. (Russian Federation); Ekaterina Grebenik, I. M. Sechenov First Moscow State Medical Univ. (Russian Federation); Maria M. Karabut, Privolzhsky Research Medical Univ. (Russian Federation); Svetlana Rodimova, Privolzhsky Research Medical Univ. (Russian Federation) and Lobachevsky State Univ. of Nizhny Novgorod (Russian Federation); Elena V. Zagaynova, Privolzhsky Research Medical Univ. (Russian Federation); Peter Timashev, I. M. Sechenov First Moscow State Medical Univ. (Russian Federation) and Federal Research Ctr. "Crystallography and Photonics" (Russian Federation) and Semenov Institute of Chemical Physics (Russian Federation) [11359-58]

A photoacoustic model of sickle cell disease using extended Navier-Stokes equations, Medine Tuna Inanc, Bogaziçi Univ. (Turkey) [11359-59]

Design and characterisation of a new luminescence lifetime macro-imager based on Tpx3Cam optical camera, Rajannya Sen, Univ. College Cork (Ireland); Liisa M. Hirvonen, King's College London (United Kingdom); Alexander Zhdanov, Univ. College Cork (Ireland); Peter Svihra, Czech Technical Univ. in Prague (Czech Republic); Stefan Andersson-Engels, Irish Photonic Integration Ctr. (IPI), Tyndall National Institute (Ireland); Andrei Nomerotski, Brookhaven National Lab. (United States); Dmitri Papkovsky, Univ. College Cork (Ireland) [11359-60]

Quantitative assessment of the breast tumor stroma using cross-polarization OCT and multiphoton tomography, Ekaterina V. Gubarkova, Vadim Elagin, Varvara Dudenkova, Marina Sirotkina, Privolzhsky Research Medical Univ. (Russian Federation); Alexander A. Moiseev, Institute of Applied Physics (Russian Federation); Elena Kiseleva, Sergei Kuznetsov, Privolzhsky Research Medical Univ. (Russian Federation); Dmitry Vorontsov, Alexey Vorontsov, Nizhny Novgorod Regional Oncologic Hospital (Russian Federation); Elena V. Zagaynova, Natalia D. Gladkova, Privolzhsky Research Medical Univ. (Russian Federation) [11359-61]

Characterization of auto-fluorescence urine crystals from gout patients using confocal microscopy and micro-Raman system for urolithiasis prediction, Zih-Ting Chen, National Yang-Ming Univ. (Taiwan) [11359-62]

Use of colorfulness metric in differentiation of skin lesion images, Emilija Vija Plorina, Ilona Kuzmina, Marta Lange, Ilze Oshina, Univ. of Latvia (Latvia) [11359-63]

New approach to the study of cell cytotoxicity using high-resolution coherence phase-interference microscopy, Irina Vasilenko, A.N. Kosygin Russian State Univ. (Russian Federation) and M.F. Vladimirsky Moscow Regional Clinical and Research Institute (Russian Federation); Vladislav Metelin, A.N. Kosygin Russian State Univ. (Russian Federation) and M.F. Vladimirsky Moscow Regional Clinical and Research Institute (Russian Federation); Roman Lifenko, Mineralovodskaya Interdistrict Maternity Hospital (Russian Federation); Vladislav Zverzhzhovskiy, Moscow State Technical Univ. of Information Technologies, Radio Engineering, and Electronics (Russian Federation); Nina Shikhina, A.N. Kosygin Russian State Univ. (Russian Federation) [11359-64]

Determination of the diffusion coefficient of rivanol in dentin of a human tooth in vitro, Alexey Selifonov, Valery Tuchin, Saratov State Univ. (Russian Federation) [11359-65]

Raman-based high-resolution detection of 13 CO₂ isotopes in human breath, Anton Polishchuk, Konstantin Grigorenko, Evgeny Popov, ITMO Univ. (Russian Federation) [11359-66]

Daily monitoring of blood flow by speckle correlation sensor, Ekaterina A. Savchenko, Elena Velichko, Saint-Petersburg State Polytechnical Univ. (Russian Federation) [11359-67]

Phantom tissues from membrane biopolymer composite materials for terahertz applications, Anna V. Vozianova, Anna Kuzikova, Ravshanjon Nazarov, Maria I. Fokina, Petr S. Demchenko, Maria V. Zakharova, Aleksandr V. Podshivalov, Maya V. Uspenskaya, Mikhail K. Khodzitsky, ITMO Univ. (Russian Federation) [11359-68]

A plastic optical fiber probe based confocal endoscopy for biomedical applications, Kiri Lee, Hyeon Jin Bang, Byungjun Park, Byungyeon Kim, Seungrag Lee, Osong Medical Innovation Foundation (Korea, Republic of) [11359-69]

Keratoconus apex positions impact on visual acuity and contrast sensitivity, Sanita Liduma, Dr. Lukins Eye Clinic (Latvia); Artis Lugužis, Gunta Krumina, Univ. of Latvia (Latvia) [11359-70]

WEDNESDAY 1 APRIL

SESSION 7 WED 8:30 TO 10:20

Advanced Spectroscopy and Imaging I

Session Chair: Csilla Gergely, Lab. Charles Coulomb (France)

Advanced biomedical multiphoton fluorescence microscopy with a large band excitation system (Invited Paper), Thomas Hortholary, XLIM (France) and CEA-Paris-Saclay (France); Claire Carrion, Univ. de Limoges (France); Claire Lefort, XLIM (France) [11359-33]

Study of calcium signaling dynamics in single platelets using optical activation methods, Darya Spiriyova, Novosibirsk State Univ. (Russian Federation); Alexei Yu Vorob'ev, Novosibirsk State Univ. (Russian Federation) and N. N. Vorozhtsov Novosibirsk Institute of Organic Chemistry (Russian Federation); Alexander E. Moskalensky, Novosibirsk State Univ. (Russian Federation) and Voevodsky Institute of Chemical Kinetics and Combustion (Russian Federation) [11359-34]

Phototoxic effects of a genetically-encoded photosensitizer miniSOG in tumor spheroids induced by continuous wave or pulsed laser irradiation, Diana V. Yuzhakova, Marina V. Shirmanova, Maria M. Lukina, Alena J. Gavrina, Anna V. Izosimova, Elena V. Zagaynova, Privolzhsky Research Medical Univ. (Russian Federation); Vladislav A. Kamensky, Institute of Applied Physics (Russian Federation) [11359-35]

Needle-size lensless fiber endoscope for optical stretching and 3D imaging with cellular resolution, Elias Scharf, Robert Kuschmierz, Jürgen W. Czarske, TU Dresden (Germany) [11359-36]

Structured illumination microscopy and near-field mapping on a low-loss metal-dielectric waveguide, Fanfei Meng, Aiping Yang, Peng Shi, Luping Du, Xiaocong Yuan, Shenzhen Univ. (China) [11359-37]

CONFERENCE 11359

SESSION 8. WED 10:50 TO 12:20

Advanced Spectroscopy and Imaging II

Session Chair: **Cristina Masoller**,
Univ. Politècnica de Catalunya (Spain)

On-chip cell imaging flow cytometry by high-speed multicolor optoacoustic microscopy (*Invited Paper*), Lei Xi, Southern Univ. of Science and Technology of China (China) [11359-38]

Hyperspectral imaging for the analysis of urticaria-affected skin structures, Alexander Machikhin, Scientific and Technological Ctr. of Unique Instrumentation (Russian Federation) and National Research Univ. "MPEI" (Russian Federation); Olga V. Polschikova, Scientific and Technological Ctr. of Unique Instrumentation (Russian Federation); Ekaterina Lovchikova, Bauman Moscow State Technical Univ. (Russian Federation) and Scientific and Technological Ctr. of Unique Instrumentation (Russian Federation); Artem Borbat, Burnasyan Federal Medical Biophysical Ctr. of Federal Medical Biological Agency (Russian Federation); Mikhail Danilychev, Kotelnikov Institute of Radio Engineering and Electronics (Russian Federation); Artem Borbat, Burnasyan Federal Medical Biophysical Ctr. of Federal Medical Biological Agency (Russian Federation); Sergei Shirokov, Scientific and Technological Ctr. of Unique Instrumentation (Russian Federation); Oleg O. Myakinin, Ivan A. Bratchenko, Samara Univ. (Russian Federation) [11359-39]

Tight focal spots using azimuthally polarised light from a Fresnel cone, Ryan D. Hawley, Rachel Offer, Neal Radwell, Sonja Franke-Arnold, Univ. of Glasgow (United Kingdom) [11359-40]

Multi-focus random-access pump-probe microscopy based on compressive sensing, Bingxu Chen, Wanping Lu, Wenqi Ouyang, Ximeng Zheng, Shih-Chi Chen, The Chinese Univ. of Hong Kong (Hong Kong, China) [11359-41]

Lunch/Exhibition Break Wed 12:20 to 13:30

SESSION 9. WED 13:30 TO 15:10

Advanced Spectroscopy and Imaging III

Session Chair: **Claire Lefort**, XLIM (France)

Holographic imaging of tumor cells during epithelial-mesenchymal transition, Rahmetullah Varol, Bogaziçi Univ. (Turkey); Gökhan B. Esmer, Marmara Univ. (Turkey); Onur Efe, Bogaziçi Univ. (Turkey); Sevdə Ömeroglu, Gebze Technical Univ. (Turkey); Gizem Aydemir, Yıldız Technical Univ. (Turkey); Aslihan Karadag, Ecenur Meço, Yasemin Basbınar, Dokuz Eylül Univ. (Turkey); Enes Oruc, Gebze Technical Univ. (Turkey); Hüseyin Üvet, Yıldız Technical Univ. (Turkey) [11359-28]

Photoacoustic imaging of murine cervical ripening during pregnancy, Yan Yan, Wayne State Univ. (United States); Nardhy Gomez-Lopez, Wayne State Univ. (United States) and National Institutes of Health (United States); Maryam Basij, Naser Alijabbari, Wayne State Univ. (United States); Felipe Vadillo-Ortega, National Institutes of Health (United States); Edgar Hernandez-Andrade, Sonia S. Hassan, National Institutes of Health (United States) and Wayne State Univ. (United States); Roberto Romero, Wayne State Univ. (United States) and National Institutes of Health (United States) and Univ. of Michigan (United States); Mohammad Mehrmohammadi, Wayne State Univ. (United States) [11359-29]

Encapsulation of a miniaturized ultrasound and photoacoustic endoscopic probe for clinical translation, Maryam Basij, Naser Alijabbari, Wayne State Univ. (United States); Ira Winer, Karmanos Cancer Institute (United States); Mohammad Mehrmohammadi, Wayne State Univ. (United States) and Karmanos Cancer Institute (United States) [11359-30]

Force spectroscopy measurements of ligand binding with transmembrane proteins using optical tweezers, Carolin Riesenberger, Christian Alejandro Iriarte Valdez, Annegret Becker, Alexander Heisterkamp, Anacleto Ngezahayo, Maria Leilani Torres-Mapa, Leibniz Univ. Hannover (Germany) [11359-31]

Integration of optical manipulation in 3D printed microfluidic devices, Haoran Wang, Anton Enders, Alexander Heisterkamp, Janina Bahnemann, Maria Leilani Torres-Mapa, Leibniz Univ. Hannover (Germany) [11359-32]

SESSION 10. WED 15:40 TO 17:40

Advanced Spectroscopy and Imaging IV

Session Chair: **Lei Xi**,
Southern Univ. of Science and Technology of China (China)

Holographic optogenetic stimulation with calcium imaging as an all-optical tool for cardiac electrophysiological studies, Sebastian Junge, Leibniz Univ. Hannover (Germany); Felix Schmieder, TU Dresden (Germany); Philipp Sasse, Universitätsklinikum Bonn (Germany); Jürgen W. Czarske, TU Dresden (Germany); Maria Leilani Torres-Mapa, Alexander Heisterkamp, Leibniz Univ. Hannover (Germany) [11359-42]

A parametric model of human microsaccades and saccades detected with ultrafast retinal tracker, Krystian Wróbel, Nicolaus Copernicus Univ. (Poland); Michal Meina, Nicolaus Copernicus Univ. (Poland) and AM2M Sp. z.o.o. sp. k. (Poland); Maciej M. Bartuzel, Nicolaus Copernicus Univ. (Poland) and Wrocław Univ. of Science and Technology (Poland); Szymon Tamborski, Nicolaus Copernicus Univ. (Poland); Maciej Nowakowski, Krzysztof Dalasinski, Anna Szkulmowska, AM2M Sp. z.o.o. sp. k. (Poland); Maciej Szkulmowski, Nicolaus Copernicus Univ. (Poland) [11359-43]

Fast retinal tracker with high accuracy during fixation and saccades for estimation of oculomotor parameters, Michal Meina, Maciej Szkulmowski, Patrycjusz Stremplewski, Marcin Sylwestrzak, Szymon Tamborski, Maciej M. Bartuzel, Krystian Wróbel, Nicolaus Copernicus Univ. (Poland); Joanna Gorgol, Univ. of Warsaw (Poland); Anna Szkulmowska, Maciej Nowakowski, Krzysztof Dalasinski, AM2M Sp. z.o.o. sp. k. (Poland) [11359-44]

Optical properties of chlorin e6 in living melanoma cells, Antonina Dadadzhanova, Ekaterina Kolesova, ITMO Univ. (Russian Federation); Eliz Amar-Lewis, Riki Goldbart, Tamar Traitel, Ben-Gurion Univ. of the Negev (Israel); Vladimir Maslov, ITMO Univ. (Russian Federation); Joseph Kost, Ben-Gurion Univ. of the Negev (Israel); Anna Orlova, ITMO Univ. (Russian Federation) [11359-45]

Bespoke multispectral filter arrays based on Fabry-Perot optical cavities fabricated using large-area grayscale photolithography, Calum Williams, Univ. of Cambridge (United Kingdom); George S. D. Gordon, The Univ. of Nottingham (United Kingdom); Sarah E. Bohndiek, Univ. of Cambridge (United Kingdom) [11359-46]

Convolutional autoencoder-based reconstruction of vascular structures in photoacoustic images, Israr Ul Haq, RIKEN Quantitative Biology Ctr. (Japan); Yoshinobu Kawahara, RIKEN Ctr. for Advanced Intelligence Project (Japan) [11359-47]

CONFERENCE 11360

Monday–Tuesday 30–31 March 2020 • Proceedings of SPIE Vol. 11360

Neurophotronics

Conference Chairs: **Francesco Saverio Pavone**, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy); **Laurent Cognet**, Univ. de Bordeaux (France); **Thomas Kuner**, Ruprecht-Karls-Univ. Heidelberg (Germany)

Programme Committee: **Christopher W. Dunsby**, Imperial College London (United Kingdom); **Maria Angela Franceschini**, Athinoula A. Martinos Ctr. for Biomedical Imaging (United States); **Darcy S. Peterka**, Columbia Univ. (United States); **Shy Shoham**, NYU Langone Health (United States)

MONDAY 30 MARCH

HOT TOPICS I MON 9:00 TO 11:00

Photonics Europe 2020: Hot Topics Session I

- 9:00 - 9:20 **SPIE Welcome and Award Presentation**
John E. Greivenkamp, Univ of Arizona, United States
SPIE President
- Welcome**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- City of Strasbourg Welcome**
- 9:25 - 9:30 **Introduction to Hot Topics**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- 9:30 - 10:15 **Naturally fast and low power electro-optic polymer optical devices are ideally positioned for the next-generation Internet photonics roadmap**
Michael Lebbby, CEO Lightwave Logic, United Kingdom
- 10:15 - 11:00 **3D printed micro-optics: state of the art and future challenges**
Harald Giessen, University of Stuttgart, Germany

For additional details see pages 6-7

SESSION 1 MON 11:30 TO 12:40

Neurophotronics I

Session Chair: **Francesco Saverio Pavone**, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy)

- Imaging multiple cortical areas with high spatio-temporal resolution, using innovative wide-field imaging system** (*Invited Paper*), Manon Bourbousson, Aix-Marseille Univ. (France) and Ctr. National d'Études Spatiales, CNRS (France) and Lab. d'Astrophysique de Marseille (France); Isabelle Racicot, Institut de Neurosciences de la Timone, Aix-Marseille Univ. (France) and Ctr. National d'Études Spatiales, CNRS (France) and Lab. d'Astrophysique de Marseille (France); Eduard R. Muslimov, Aix-Marseille Univ. (France) and Ctr. National d'Études Spatiales, CNRS (France) and Lab. d'Astrophysique de Marseille (France); Kevin Blaize, Audrey Bourdet, Sandrine Chemla, Aix-Marseille Univ. (France) and Institut de Neurosciences de la Timone, CNRS (France); Emmanuel Hugot, Aix-Marseille Univ. (France) and Ctr. National d'Études Spatiales, CNRS (France) and Lab. d'Astrophysique de Marseille (France); Sebastien Roux, Aix-Marseille Univ. (France) and Institut de Neurosciences de la Timone, CNRS (France) and Vect-Horus S.A.S. (France); Ivo Vanzetta, Aix-Marseille Univ. (France) and Institut de Neurosciences de la Timone, CNRS (France); Pascal Weber, Aix-Marseille Univ. (France) and Institut de Neurosciences de la Timone (France); Jean-François Sauvage, ONERA (France); Frédéric Chavane, Aix-Marseille Univ. (France) and Institut de Neurosciences de la Timone, CNRS (France); Marc Ferrari, Aix-Marseille Univ. (France) and Ctr. National d'Études Spatiales, CNRS (France) and Lab. d'Astrophysique de Marseille (France) [11360-1]
- Features of electroencephalographic signals acousto-optic processing**, Boris S. Gurevich, Kirill V. Zaichenko, Institute for Analytical Instrumentation (Russian Federation) [11360-2]

Two-photon light-sheet microscopy for high-speed whole-brain functional imaging of zebrafish neuronal physiology and pathology, Giuseppe de Vito, Univ. degli Studi di Firenze (Italy) and LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy); Lapo Turrini, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) and Univ. degli Studi di Firenze (Italy); Chiara Fornetto, Pietro Ricci, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy); Caroline Müllenbroich, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) and Univ. of Glasgow (United Kingdom) and Istituto Nazionale di Ottica (Italy); Giuseppe Sancataldo, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) and Univ. degli Studi di Firenze (Italy); Elena Trabalzini, Univ. degli Studi di Firenze (Italy); Giacomo Mazzamuto, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) and Istituto Nazionale di Ottica (Italy); Natascia Tiso, Univ. degli Studi di Padova (Italy); Leonardo Sacconi, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) and Istituto Nazionale di Ottica (Italy); Duccio Fanelli, Univ. degli Studi di Firenze (Italy); Ludovico Silvestri, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) and Univ. degli Studi di Firenze (Italy) and Istituto Nazionale di Ottica (Italy); Francesco Vanzi, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) and Univ. degli Studi di Firenze (Italy); Francesco Saverio Pavone, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) and Univ. degli Studi di Firenze (Italy) and Istituto Nazionale di Ottica (Italy) [11360-3]

Lunch Break Mon 12:40 to 13:50

SESSION 2 MON 13:50 TO 15:20

Neurophotronics II

Session Chair: **Laurent Cognet**, Univ. de Bordeaux (France)

- Evaluation of the effect of acute hyperglycemia on cerebral tissue properties with diffuse optical imaging systems** (*Invited Paper*), David Abookasis, Ariel Univ. (Israel) [11360-4]
- All organic, ultrabright, red to near-infrared nanoparticles for single particle tracking and bioimaging**, Paolo Pagano, Morgane Rosendale, Jean-Baptiste Verlhac, Jessica Flores, Jonathan Daniel, Institut des Sciences Moléculaires (France); Chiara Paviolo, Lab. Photonique, Numérique et Nanosciences (France) and Institut d'Optique Graduate School (France); Joana S. Ferreira, Laurent Groc, Institut Interdisciplinaire de Neurosciences (France); Laurent Cognet, Lab. Photonique, Numérique et Nanosciences (France) and Institut d'Optique Graduate School (France); Mireille Blanchard-Desce, Institut des Sciences Moléculaires (France) [11360-5]
- Confocal detection without striping artifacts exploiting a fast multidirectional DSLM**, Pietro Ricci, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy); Giuseppe Sancataldo, Univ. degli studi di Palermo (Italy); Alessandra Franceschini, Vladislav Gavryusev, Ludovico Silvestri, Francesco Saverio Pavone, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) [11360-6]
- Movement-specific patterns of cortical activation revealed by in vivo all-optical imaging and manipulation of neuronal activity in the motor cortex**, Elena Montagni, Francesco Resta, Giuseppe de Vito, Alessandro Scaglione, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy); Anna Letizia Allegra Mascarò, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) and Istituto di Neuroscienze (Italy) and Istituto Nazionale di Ottica (Italy); Francesco Saverio Pavone, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) and Istituto Nazionale di Ottica (Italy) and Univ. degli Studi di Firenze (Italy) [11360-7]

SESSION 3 MON 15:50 TO 17:40

Neurophotronics III

Session Chair: **Thomas Kuner**, Ruprecht-Karls-Univ. Heidelberg (Germany)

- A system approach for closed loop assessment of neuro-visual-function based on convolutional neural network analysis of EEG signals** (*Invited Paper*), Simon C. Stock, Balint Kovacs, Heiko Maier, Marius Gerdes, Wilhelm Stork, Karlsruher Institut für Technologie (Germany); Alexandre Armengol-Urpi, Sanjay E. Sarma, Massachusetts Institute of Technology (United States) [11360-8]
- Probing activity-dependent dynamics of astrocytic interaction at tripartite synapses using super-resolution microscopy**, Tuamoru Odii, Univ. College London (United Kingdom) and Alex Ekwueme Federal Univ. Ndufu-Alike (Nigeria); Janosch Heller, James Reynolds, Dmitri Rusakov, Univ. College London (United Kingdom) [11360-9]

CONFERENCE 11360

Dual-view light sheet microscopy for rapid imaging of human brain slices, Luca Pesce, Annunziata Laurino, Vladislav Gavryusev, Giacomo Mazzamuto, Giuseppe Sancataldo, LENS - Lab. Europeo di Spettroscopie Non-Lineari (Italy); Matteo Roffilli, Bioretics srl (Italy); Ludovico Silvestri, LENS - Lab. Europeo di Spettroscopie Non-Lineari (Italy) and Dept. of Physics and Astronomy (Italy); Irene Costantini, LENS - Lab. Europeo di Spettroscopie Non-Lineari (Italy); Francesco Saverio Pavone, LENS - Lab. Europeo di Spettroscopie Non-Lineari (Italy) and Dept. of Physics and Astronomy (Italy). [11360-10]

Correlative imaging of single carbon nanotube and fluorescently labelled neuronal structures in the extracellular space of live brain, Chiara Paviolo, Univ. de Bordeaux (France) and Institut d'Optique Graduate School, CNRS (France); Joana S. Ferreira, Univ. de Bordeaux (France) and Institut Interdisciplinaire de Neurosciences (France); Antony Lee, Univ. de Bordeaux (France) and Institut d'Optique Graduate School (France) and Lab. Photonique, Numérique et Nanosciences, CNRS (France); Laurent Groc, Laurent Cognet, Univ. de Bordeaux (France) [11360-11]

Automated highly multiplexed super-resolution imaging of protein nano-architecture in cells and tissues, Maja Klevanski, Frank Herrmannsdoerfer, Stefan Sass, Varun Venkataramani, Ruprecht-Karls-Univ. Heidelberg (Germany); Mike Heilemann, Goethe-Univ. Frankfurt am Main (Germany); Thomas Kuner, Ruprecht-Karls-Univ. Heidelberg (Germany). [11360-12]

TUESDAY 31 MARCH

SESSION 4. TUE 9:00 TO 10:30

Neurophotonics IV

Session Chair: **Thomas Kuner**,
Ruprecht-Karls-Univ. Heidelberg (Germany)

Accurate detection of white matter tracts: mapping of human brain eloquent areas with cross-polarization OCT (*Invited Paper*), Elena B. Kiseleva, Konstantin S. Yashin, Privolzhsky Research Medical Univ. (Russian Federation); Alexander A. Moiseev, Institute of Applied Physics (Russian Federation); Diana A. Davydova, Ksenia Achkasova, Igor A. Medyanik, Marina A. Sirotkina, Elena Zagainova, Natalia D. Gladkova, Privolzhsky Research Medical Univ. (Russian Federation). [11360-13]

Long-range fluorescence propagation in amyloidogenic beta-sheet fibers, Gil Rosenman, Tel Aviv Univ. (Israel) [11360-14]

Accurate measurement of red blood cell size and velocity with laser scanning microscopy, Emmanuelle M. Chaigneau, Morgane Roche, Serge Charpak, Lab. de neurophysiologie et nouvelles microscopies (France) [11360-15]

Microscale optoelectronic infrared-to-visible upconversion device as the implantable light sources for optogenetics neuromodulation, He Ding, Beijing Institute of Technology (China) [11360-16]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair

16.35 to 17.20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States

17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

CONFERENCE 11361

Monday–Tuesday 30–31 March 2020 • Proceedings of SPIE Vol. 11361

Biophotonics in Point-of-Care

Conference Chairs: **Michael T. Canva**, CNRS (France); **Ambra Giannetti**, Istituto di Fisica Applicata “Nello Carrara”-CNR (Italy); **Hatice Altug**, Ecole Polytechnique Fédérale de Lausanne (Switzerland); **Julien Moreau**, Institut d’Optique Graduate School (France)

Programme Committee: **Francis Berghmans**, Vrije Univ. Brussel (Belgium); **Jakub Dostálek**, AIT Austrian Institute of Technology GmbH (Austria); **Laura M. Lechuga Gómez**, Institut Català de Nanociència i Nanotecnologia (Spain); **Thierry Livache**, Aryballe Technologies (France); **Boris Mizaikoff**, Univ. Ulm (Germany); **Genni Testa**, IREA-CNR (Italy); **Nathalie Vermeulen**, Vrije Univ. Brussel (Belgium); **Bruno Wacogne**, Femto-st (France)

MONDAY 30 MARCH

HOT TOPICS I MON 9:00 TO 11:00

Photonics Europe 2020: Hot Topics Session I

- 9:00 - 9:20 **SPiE Welcome and Award Presentation**
John E. Greivenkamp, Univ of Arizona, United States
SPiE President
- Welcome**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- City of Strasbourg Welcome**
- 9:25 - 9:30 **Introduction to Hot Topics**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- 9:30 - 10:15 **Naturally fast and low power electro-optic polymer optical devices are ideally positioned for the next-generation Internet photonics roadmap**
Michael Lebbay, CEO Lightwave Logic, United Kingdom
- 10:15 - 11:00 **3D printed micro-optics: state of the art and future challenges**
Harald Giessen, University of Stuttgart, Germany

For additional details see pages 6-7

SESSION 1 MON 11:30 TO 12:40

Photonic and Nanophotonic Sensing Means I

Session Chair: **Michael T. Canva**, Lab. Charles Fabry (Canada)

- Innovative POCT technologies: overview on new revolutionary products and their influence on digitalization, process optimization and costs** (*Invited Paper*), Peter Luppá, Klinikum rechts der Isar der Technischen Univ. München (Germany) [11361-1]
- Amplification strategies in plasmon-enhanced fluorescence biosensors for rapid detection of biomarkers**, Simone Hageneder, Stefan Fossati, Rick Conzemius, AIT Austrian Institute of Technology GmbH (Austria); Khulan Sergelen, Technische Univ. Eindhoven (Netherlands); Ulrich Jonas, Univ. Siegen (Germany); Ivan Barišič, Jakub Dostalek, AIT Austrian Institute of Technology GmbH (Austria) [11361-2]
- Bio-inspired M13 bacteriophage-based sub-nm actuator and its application towards the dynamic plasmonic device**, Vasanthan Devaraj, Jong-Min Lee, Hyuk Jeong, Won-Geun Kim, Jin-Woo Oh, Pusan National Univ. (Korea, Republic of) [11361-3]
- Lunch Break Mon 12:40 to 13:50

SESSION 2 MON 13:50 TO 15:30

Photonic and Nanophotonic Sensing Means II

Session Chair: **Julien Moreau**, Institut d’Optique Graduate School (France)

- Nanoplasmonic biosensors for point-of-care diagnostics and live cell analysis** (*Invited Paper*), Hatice Altug, Ecole Polytechnique Fédérale de Lausanne (Switzerland) [11361-4]
- Improving silicon nitride ring resonator performances on 300 mm industrial environment for point of care applications**, Michele Calvo, Institut National des Sciences Appliquées de Lyon, Univ. de Lyon (France) and Univ. de Sherbrooke (Canada) and STMicroelectronics (France); Guillaume Beaudin, Laurence Mercier-Coderre, Pauline Girault, Univ. de Sherbrooke (Canada); Pedro Rojo-Romeo, Institut National des Sciences Appliquées de Lyon, Univ. de Lyon (France) and Univ. de Sherbrooke (Canada); Regis Orobitchouk, Institut National des Sciences Appliquées de Lyon, Univ. de Lyon (France); Romain Stricher, Univ. de Sherbrooke (Canada); Stéphane Monfray, STMicroelectronics S.A. (France); Serge Ecoffey, Dominique Drouin, Univ. de Sherbrooke (Canada); Frederic Boeuf, STMicroelectronics S.A. (France); Michael Canva, Paul G. Charette, Univ. de Sherbrooke (Canada) . . . [11361-5]
- Plasmonic, and MIM, and Fano resonances in layered metal and dielectric structures for sensing applications** (*Invited Paper*), Zouheir Sekkat, Shinji Hayashi, Moroccan Foundation for Advanced Science, Innovation and Research (Morocco) [11361-6]
- Plasmonic structures for highly sensitive sensors**, Siham Refki, Moroccan Foundation for Advanced Science, Innovation and Research (Morocco); Shinji Hayashi, Kobe Univ. (Japan); Zouheir Sekkat, Univ. Mohammed V de Rabat (Morocco) and Moroccan Foundation for Advanced Science, Innovation and Research (Morocco) [11361-7]

SESSION 3 MON 16:00 TO 17:20

Enabling Technologies for Instrumentation and Lab-on-a-Chip I

Session Chair: **Ambra Giannetti**, Istituto di Fisica Applicata “Nello Carrara” (Italy)

- What can orthogonal surface functionalizations provide to point-of-care testing?** (*Invited Paper*), Jian Zhang, Francisco Palazon, Christelle Yeromonahos, Ecole Centrale de Lyon (France); Radoslaw Mazurczyk, Thomas Géhin, Claude Botella, Geneviève Grenet, Institut des Nanotechnologies de Lyon (France); Didier Léonard, Institut des Sciences Analytiques, Univ. Claude Bernard Lyon 1 (France); Stéphane Monfray, STMicroelectronics S.A. (France); Julien Moreau, Institut d’Optique Graduate School (France); Michael Canva, Lab. Nanotechnologies Nanosystemes (Canada); Emmanuel Maillart, HORIBA FRANCE SAS (France); Yann Chevolut, Institut des Nanotechnologies de Lyon (France); Jean-Pierre Cloarec, Ecole Centrale de Lyon (France) [11361-8]
- Biofunctionalization strategies for optical fiber grating immunosensors** (*Invited Paper*), Christophe Caucheteur, Univ. de Mons (Belgium) . . . [11361-9]
- 3D printing of multifunctional platforms for high sensitive optical analysis of liquid biopsies**, Caterina Credi, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) and Univ. degli Studi di Firenze (Italy); Caterina Dallari, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy); Elena Lenci, Andrea Trabocchi, Univ. degli Studi di Firenze (Italy); Sara Nocentini, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) and Istituto Nazionale di Ottica, Consiglio Nazionale delle Ricerche (Italy); Diederik Wiersma, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) and Univ. degli Studi di Firenze (Italy) and Istituto Nazionale di Ricerca Metrologica (Italy); Riccardo Cicchi, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) and Istituto Nazionale di Ottica, Consiglio Nazionale delle Ricerche (Italy); Francesco S. Pavone, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) and Istituto Nazionale di Ottica, Consiglio Nazionale delle Ricerche (Italy) and Univ. degli Studi di Firenze (Italy) [11361-10]

TUESDAY 31 MARCH

SESSION 4..... TUE 8:40 TO 10:10

Enabling Technologies for Instrumentation and Lab-on-a-Chip II

Session Chair: **Hatice Altug**,

Ecole Polytechnique Fédérale de Lausanne (Switzerland)

Broadband miniaturized spectrometer using a multisegment grating for spectral tissue sensing, Gebirge Yizengaw Belay, Vrije Univ. Brussel (Belgium); Willem Hoving, Arthur van der Put, Anteryon B.V. (Netherlands); Michael Vervaeke, Jurgen Van Erps, Hugo Thienpont, Heidi Ottevaere, Vrije Univ. Brussel (Belgium) [11361-11]

Non-contact PPG measurement system incorporating image analyzed photoplethysmogram signals and machine learning algorithms, Yu-Jie Hsu, Chun-Hsiung Wang, National Taiwan Univ. (Taiwan); Shu-Sheng Lee, National Taiwan Ocean Univ. (Taiwan); Wen-Jong Wu, Chih-Kung Lee, National Taiwan Univ. (Taiwan) [11361-12]

Moldless printing of silicone lenses with embedded nanostructured optical filters enables point-of-care fluorescence microscopy with mobile phones (Invited Paper), Giuseppe Barillaro, Univ. di Pisa (Italy) [11361-13]

Photoacoustic imaging for enhanced image-guided gastric tube placement, Samuel John, Nasrin Neshia, Yoseph Adie, Sumanth Putta, Naser Alijabbari, Wayne State Univ. (United States); Loay Kabbani, Henry Ford Hospital (United States); Mohammad Mehrmohammadi, Wayne State Univ. (United States) [11361-14]

SESSION 5..... TUE 10:40 TO 12:30

Enabling Technologies for Instrumentation and Lab-on-a-Chip III

Session Chair: **Julien Moreau**,

Institut d'Optique Graduate School (France)

Hydroxyethyl cellulose-based substrates for surface enhanced Raman spectroscopy, Samir Kumar, Kyoko Namura, Takao Fukuoka, Motofumi Suzuki, Kyoto Univ. (Japan) [11361-15]

Surface plasmon resonance imaging enhanced by dielectrophoresis and AC-electroosmosis for rapid and label-free bacteria detection, Marion Costella, Univ. de Sherbrooke (Canada) and Lab. Ampère, Ecole Centrale de Lyon (France); Marie Frénéa-Robin, Lab. Ampère, Univ. de Lyon (France); Julien Marchalot, Lab. Ampère, Institut National des Sciences Appliquées de Lyon (France); Julien Moreau, Lab. Charles Fabry, Institut d'Optique Graduate School (France); Oleh Andreiev, Lab. Ampère (France); Paul Charette, Lab. Nanotechnologies Nanosystemes, Institut Interdisciplinaire d'Innovation Technologique, Univ. de Sherbrooke (Canada); Michael Canva, Lab. Nanotechnologies Nanosystemes, Institut Interdisciplinaire d'Innovation Technologique (Canada) [11361-16]

Towards photonic biosensors in a SiGe BiCMOS technology, Patrick Steglich, Christian Mai, IHP GmbH (Germany); Siegfried Bondarenko, Technische Hochschule Wildau (Germany); Andreas Mai, IHP GmbH (Germany) [11361-17]

Development of an optoelectronic biosensor platform using surface plasmons and field effective transistors, Anil Bozdogan, CEST Kompetenzzentrum für elektrochemische Oberflächentechnologie GmbH (Austria); Patrik Aspermaier, AIT Austrian Institute of Technology GmbH (Austria) and CEST Kompetenzzentrum für elektrochemische Oberflächentechnologie GmbH (Austria); Johannes Binting, AIT Austrian Institute of Technology GmbH (Austria); Ulrich Ramach, Philipp Fruhmam, CEST Kompetenzzentrum für elektrochemische Oberflächentechnologie GmbH (Austria); Jakob Dostalek, AIT Austrian Institute of Technology GmbH (Austria); Wolfgang Knoll, AIT Austrian Institute of Technology GmbH (Austria) and CEST Kompetenzzentrum für elektrochemische Oberflächentechnologie GmbH (Austria) [11361-18]

Next-generation exhaled breath diagnostics via combined biophotonics: seeing more by looking at less (Invited Paper), Boris Mizaikoff, Univ. Ulm (Germany) [11361-19]

Lunch/Exhibition Break Tue 12:30 to 13:40

SESSION 6..... TUE 13:40 TO 16:00

Applications of POCT

Session Chair: **Ambra Giannetti**,

Istituto di Fisica Applicata "Nello Carrara" (Italy)

Methods development for environmental point-of-care water stream analysis (Invited Paper), Benjamin Charron, Jean-François Masson, Univ. de Montréal (Canada) [11361-20]

Toward a SPR imaging in situ system to detect biotoxin in seawater, Enora Prado, Florent Colas, Sébastien Laurent, Justine Evrard, Morgan Tardivel, Bertrand Forest, Alan Boche, Justin Rouxel, Ifremer (France) [11361-21]

Paper-based platforms for the detection of DNA with plasmonic particles, Sonia Centi, Claudia Borri, Roberto Pini, Fulvio Ratto, Istituto di Fisica Applicata "Nello Carrara", Consiglio Nazionale delle Ricerche (Italy); Sofia Chioccioli, Patrizia Bogani, Simona Scarano, Maria Minunni, Univ. degli Studi di Firenze (Italy) [11361-22]

Circulating cancer cell detection using an optical fiber aptasensor, Médéric Loyez, Univ. de Mons (Belgium); Eman Hassan, Carleton Univ. (Canada); Maxime Lobry, Univ. de Mons (Belgium); Fu Liu, Carleton Univ. (Canada); Christophe Caucheteur, Ruddy Wattiez, Univ. de Mons (Belgium); Maria C. DeRosa, William G. Willmore, Jacques Albert, Carleton Univ. (Canada) [11361-23]

Highly sensitive detection of low abundant molecules by pyro-electrohydro-dynamic jetting (Invited Paper), Simonetta Grilli, Istituto di Scienze Applicate e Sistemi Intelligenti "Eduardo Caianiello" (Italy) [11361-38]

Point-of-care system for detection and quantification of THC in oral fluid at unprecedented low concentrations, Nakisa Samadi, Damber Thapa, Nisarg Patel, Artur Parkhimchik, Nima Tabatabaei, York Univ. (Canada) [11361-24]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

- 16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair
- 16:35 to 17:20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States
- 17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

POSTERS-TUESDAY TUE 18:05 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Tuesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

FTIR imaging is as accurate as and gene expression data for characterizing breast cancer cell lines in 2D and 3D cultures, Erik Goormaghtigh, Univ. Libre de Bruxelles (Belgium) [11361-25]

Compact multichannel spectroscopic label-free biosensor platform for plant diseases point-of-care testing (POCT), Jurij Hastanin, Cedric Lenaerts, Karl Fleury-Frenette, Patrick Gally, Frédéric Rabecki, Liège Univ. (Belgium); Aline Roobroeck, Sylvain Desprez, Materia Nova ASBL (Belgium); Camille Dekuijper, Deborah Lanterbecq, C.A.R.A.H. (Belgium); Damien Bernier, Fabian Dortu, Multitel A.S.B.L. (Belgium); Karine Lecointe, Boualem Sendid, Ctr. Hospitalier Regional Univ. de Lille (France); Sophie Maricot, Mohamed Bouzaoui, Mohamed-Taieb Bakouche, Sivaramakrishnan Ganesan, Univ. de Lille (France); Jean-Pierre Vilcot, Institut d'Electronique de Microélectronique et de Nanotechnologie (France) [11361-26]

SEPSIS biomarker detection through fiber-based planar antennas, Ambra Giannetti, Istituto di Fisica Applicata "Nello Carrara", Consiglio Nazionale delle Ricerche (Italy); Paolo Cecchi, Cecchi s.r.l. (Italy); Francesco Chiavaioli, Istituto di Fisica Applicata "Nello Carrara", Consiglio Nazionale delle Ricerche (Italy); Steffen Howitz, GeSiM Gesellschaft fuer Silizium-Mikrosysteme mbH (Germany); Pietro Lombardi, Istituto Nazionale di Ottica, Consiglio Nazionale delle Ricerche (Italy); Navid Soltani, Univ. Siegen (Germany); Frank Sonntag, Fraunhofer-Institut für Werkstoff- und Strahltechnik IWS (Germany); Costanza Toninelli, Istituto Nazionale di Ottica (Italy); Mario Agio, GeSiM Gesellschaft fuer Silizium-Mikrosysteme mbH (Germany) and Istituto Nazionale di Ottica (Italy) [11361-27]

Optimization of integrated optical ring microresonator structure for sensitive absorption spectroscopy, Pauline Girault, Guillaume Beaudin, Univ. de Sherbrooke (Canada); Miguel Diez, Simon Joly, Laurent Oyhenart, Lab. d'Intégration du Matériau au Système (France); Michael Canva, Paul Charette, Univ. de Sherbrooke (Canada); Laurent Bechou, Lab. d'Intégration du Matériau au Système (France) [11361-28]

Microdisk lasers for high sensitive protein detection in microfluidic devices, Natalia V. Kryzhanovskaya, Anton Bukatin, Marina Fetisova, Anton Korenev, Eduard Moiseev, Nikita Filatov, Mikhail Maximov, Alexey Zhukov, St. Petersburg Academic Univ. (Russian Federation) [11361-29]

Microalgae ecotoxicity analyzer using a lens-free optical system, Dongmin Seo, Sanghoon Shin, Korea Univ. (Korea, Republic of); Moonjin Lee, Sangwoo Oh, Korea Research Institute of Ships and Ocean Engineering (Korea, Republic of); Sungkyu Seo, Korea Univ. (Korea, Republic of) [11361-30]

Optical fiber device for simultaneous manometry, pH-metry and bilimetry in esophagus (OPTIMO), Francesco Chiavaioli, Giovanni Bartolozzi, Istituto di Fisica Applicata "Nello Carrara", Consiglio Nazionale delle Ricerche (Italy); Manfred Rothhardt, Kerstin Schroeder, Tobias Habisreuther, Leibniz-Institut für Photonische Technologien e.V. (Germany); Martin Hahn, Oliver M. Rados, Florian Mönkediek, OSCOMED GmbH (Germany); Steffen Görlich, Johannes Gäbler, JETI Technische Instrumente GmbH (Germany); Antonio Taddei, Maria Novella Ringressi, Ilenia Bartolini, Azienda Ospedaliera Univ. Careggi (Italy); Piero Cecchi, Cecchi s.r.l. (Italy); Francesco Baldini, Istituto di Fisica Applicata "Nello Carrara", Consiglio Nazionale delle Ricerche (Italy) [11361-31]

A SERS affinity bioassay based on ion-exchanged glass microrods, Simone Berneschi, Cristiano D'Andrea, Ambra Giannetti, Marella De Angelis, Martina Banchelli, Andrea Barucci, Istituto di Fisica Applicata "Nello Carrara", Consiglio Nazionale delle Ricerche (Italy); Nadia Giovanna Boetti, Istituto Superiore Mario Boella (Italy); Stefano Pelli, Istituto di Fisica Applicata "Nello Carrara", Consiglio Nazionale delle Ricerche (Italy) and Museo Storico della Fisica e Ctr. Studi e Ricerche "Enrico Fermi" (Italy); Francesco Baldini, Roberto Pini, Istituto di Fisica Applicata "Nello Carrara", Consiglio Nazionale delle Ricerche (Italy); Davide Janner, Diego Pugliese, Politecnico di Torino (Italy); Daniel Milanese, Politecnico di Torino (Italy) and CNR-Istituto di Fotonica e Nanotecnologie (Italy) and Univ. degli Studi di Parma (Italy); Paolo Matteini, Istituto di Fisica Applicata "Nello Carrara", Consiglio Nazionale delle Ricerche (Italy) [11361-32]

Periodontal probe based on the fluorescent fiber position sensor, Ramona M. Galatus, Tiberiu Marita, Univ. Tehnica din Cluj Napoca (Romania); Loredana Buzura, Coventry Univ. (United Kingdom); Aranka Ilea, Univ. de Medicina si Farmacie "Iuliu Hatieganu" Cluj-Napoca (Romania) [11361-33]

Design of integrated hollow core waveguides for Mid-IR gas sensing, Genni Testa, Gianluca Persichetti, Romeo Bernini, Istituto per il Rilevamento Elettromagnetico dell'Ambiente, Consiglio Nazionale delle Ricerche (Italy) [11361-34]

Plasmonic heating with thermoresponsive biointerfaces for fluorescence signal amplification, Simone Katharina Auer, AIT Austrian Institute of Technology GmbH (Austria) and CEST Kompetenzzentrum für elektrochemische Oberflächentechnologie GmbH (Austria); Stefan Fossati, Simone Hageneder, Nestor G. Quilis, AIT Austrian Institute of Technology GmbH (Austria); Ulrich Jonas, Univ. Siegen (Germany); Jakub Dostalek, AIT Austrian Institute of Technology GmbH (Austria) [11361-35]

Wearable multisensor for plant monitoring, based on fluorescent fibers, Ramona M. Galatus, Radu Papara, Univ. Tehnica din Cluj Napoca (Romania); Loredana Buzura, Coventry Univ. (United Kingdom); Anamaria Roman, Tudor Ursu, Institute of Biological Research Cluj (Romania) [11361-36]

Low-cost sensor using compact disc substrates for biosensing applications, Nityanand Kumawat, Priyamvada Venugopalan, Sunil Kumar, New York Univ. Abu Dhabi (United Arab Emirates) [11361-37]

Clinical Biophotonics

Conference Chairs: **Daniel S. Elson**, Imperial College London (United Kingdom); **Sylvain Gioux**, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France); **Brian W. Pogue**, Thayer School of Engineering at Dartmouth (United States)

Programme Committee: **Arjen Amelink**, TNO (Netherlands); **Albert Claude Boccara**, Institut Langevin Ondes et Images (France); **Irving J. Bigio**, Boston Univ. (United States); **Olga M. Conde**, Univ. de Cantabria (Spain); **Gooitzen M. van Dam**, Univ. Medical Ctr. Groningen (Netherlands); **Hamid Dehghani**, The Univ. of Birmingham (United Kingdom); **Michele Diana**; **Turgut Durduran**, ICFO – Institut de Ciències Fotòniques (Spain); **Michalina J. Gora**, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France); **Frédéric Leblond**, Polytechnique Montréal (Canada); **Vasilis Ntziachristos**, Technische Univ. München (Germany); **Antonio Pifferi**, Politecnico di Milano (Italy); **David D. Sampson**, Univ. of Surrey (United Kingdom); **Paola Taroni**, Politecnico di Milano (Italy); **Ton G. van Leeuwen**, Amsterdam UMC (Netherlands); **Alexander L. Vahrmeijer**, Leiden Univ. Medical Ctr. (Netherlands)

WEDNESDAY 1 APRIL

SESSION 1 WED 8:30 TO 10:30

Microscopic Techniques

Session Chair: **Michalina J. Gora**, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France)

Elucidating neurological pathologies by imaging structural anisotropy with optical birefringence microscopy (*Invited Paper*), Irving J. Bigio, Boston Univ. (United States) [11362-1]

Ex vivo multiscale biomechanics in murine skin and human cornea using multiphoton microscopy (*Invited Paper*), Stéphane Bancelin, Lab. d'Optique et Biosciences, CNRS (France) and Ecole Polytechnique (France); Barbara Lynch, Lab. de Mécanique des Solides, CNRS (France) and Ecole Polytechnique (France) and Institut Polytechnique de Paris (France); Guillaume Ducourthial, Lab. d'Optique et Biosciences, CNRS (France) and Ecole Polytechnique (France); Christelle Bonod-Bidaud, Florence Ruggiero, Institut de Génomique Fonctionnelle de Lyon, CNRS (France) and Univ. de Lyon (France) and Ecole Normale Supérieure de Lyon (France); Aurélie Benoit, Lab. de Mécanique des Solides, Ecole Polytechnique, CNRS (France); Gaël Latour, Univ. Paris-Sud (France) and Lab d'Optique et Biosciences, Ecole Polytechnique, CNRS (France) and Institut Polytechnique de Paris (France); Jean-Marc Allain, Lab. de Mécanique des Solides, Ecole Polytechnique, CNRS (France) and Institut National de Recherche en Informatique et en Automatique, Univ. Paris-Saclay (France) and Institut Polytechnique de Paris (France); Marie-Claire Schanne-Klein, Lab. d'Optique et Biosciences, CNRS (France) and Ecole Polytechnique, Inserm (France) and Institut Polytechnique de Paris (France) [11362-2]

In vivo study of vulvar mucosa microcirculation in norm and diseases, Marina A. Sirotkina, Arseniy L. Potapov, Privolzhsky Research Medical Univ. (Russian Federation); Nailya N. Vagapova, Nizhny Novgorod Regional Clinical Hospital named after N.A. Semashko (Russian Federation); Ivan K. Safonov, Irina A. Kuznetsova, Privolzhsky Research Medical Univ. (Russian Federation); Dmitry A. Karashtin, Lev A. Matveev, Institute of Applied Physics (Russian Federation); Stefka G. Radenska-Lopovok, Anna A. Timakova, I. M. Sechenov First Moscow State Medical Univ. (Russian Federation); Elena V. Zagaynova, Natalia D. Gladkova, Privolzhsky Research Medical Univ. (Russian Federation) [11362-3]

Rotational distortion characterization in robotized scanning with steerable endoscopic OCT catheter, Oscar Caravaca Mora, Alexandre Asch, Florent P. Nageotte, Philippe Zanne, Lucile Zorn, Natalia Zulina, Sara Gravelyn, Paul C. Montgomery, Michel de Mathelin, Michalina J. Gora, Univ. de Strasbourg (France) [11362-4]

Fusion of OCT and hyperspectral imaging for tissue diagnosis and assessment, Eusebio Real, Univ. de Cantabria (Spain) and Ctr. de Investigación Biomédica en Red en Bioingeniería, Biomateriales y Nanomedicina (Spain) and Instituto de Investigación Sanitaria Valdecilla (IDIVAL) (Spain); José A. Gutiérrez, Univ. de Cantabria (Spain); Arturo Pardo, Univ. de Cantabria (Spain) and Instituto de Investigación Sanitaria Valdecilla (IDIVAL) (Spain); José M. López-Higuera, Univ. de Cantabria (Spain) and Instituto de Investigación Sanitaria Valdecilla (IDIVAL) (Spain) and Ctr. de Investigación Biomédica en Red en Bioingeniería, Biomateriales y Nanomedicina (Spain); Olga M. Conde, Univ. de Cantabria (Spain) and Ctr. de Investigación Biomédica en Red en Bioingeniería, Biomateriales y Nanomedicina (Spain) and Instituto de Investigación Sanitaria Valdecilla (IDIVAL) (Spain) [11362-5]

SESSION 2 WED 11:00 TO 12:30

Characterization and Diagnosis

Session Chair: **Daniel S. Elson**, Imperial College London (United Kingdom)

Instant pathology with higher harmonic generation microscopy (*Invited Paper*), Marie Louise Groot, Vrije Univ. Amsterdam (Netherlands) . . . [11362-6]

Phage susceptibility testing with lensless imaging technique, Prisca Perlemoine, Univ. Grenoble Alpes (France) and CEA-LETI (France); Emmanuel Picard, Univ. Grenoble Alpes (France) and Institut de recherche interdisciplinaire de Grenoble (France); Marc Zelsmann, Alexis Maire, Univ. Grenoble Alpes (France) and Lab. des Technologies de La Microélectronique, CNRS (France); Emmanuel Hadji, Univ. Grenoble Alpes (France) and Institut de recherche interdisciplinaire de Grenoble (France); Eric Lacot, Univ. Grenoble Alpes (France) and Lab. Interdisciplinaire de Physique, CNRS (France); Pierre R. Marcoux, Univ. Grenoble Alpes (France) and CEA-LETI (France) . . [11362-7]

Bacterial strain discrimination using a low-cost laser-induced breakdown spectroscopy technique under optimized growth conditions, Sujatha Narayanan Unni, Vivek Sivakumar, Nilesh Vasa, Indian Institute of Technology Madras (India); Padma Srikanth, Sri Ramachandra Medical Ctr. and Research Institute (India) [11362-8]

DGTD modeling of Mie scattering phenomenon of gold nano particles for biosensing applications, Divya Shree, Bharathi Malakareddy, BMS Institute of Technology (India); Narayan Krishnaswamy, Sai Vidya Institute of Technology (India) [11362-9]

Lunch/Exhibition Break Wed 12:30 to 13:40

SESSION 3 WED 13:40 TO 15:40

Spectroscopy

Session Chair: **Sergio Fantini**, Tufts Univ. (United States)

Subdiffuse model to measure tissue optical properties with single fiber reflectance spectroscopy applied to esophageal cancer (*Invited Paper*), Anouk L. Post, Amsterdam UMC (Netherlands) and The Netherlands Cancer Institute (Netherlands); Dirk J. Faber, Jeroen A. J. de Groof, Xu Zhang, Martijn D. M. de Bruin, Amsterdam UMC (Netherlands); Theo J. M. Ruers, The Netherlands Cancer Institute (Netherlands); Dick J. C. M. Sterenberg, The Netherlands Cancer Institute (Netherlands) and Amsterdam UMC (Netherlands); Wouter L. Curvers, Jacques J. G. H. M. Bergman, Ton G. van Leeuwen, Amsterdam UMC (Netherlands) [11362-10]

Neuromonitoring with broadband near-infrared spectroscopy brain oxygenation and metabolism: application in newborn brain injury (*Invited Paper*), Ilias Tachtsidis, Univ. College London (United Kingdom) [11362-11]

Skin autofluorescence measured with fluorescent spectrometry and blood lipids level in diabetic patients, Yulia A. Kononova, Almazov National Medical Research Ctr. (Russian Federation) and ITMO Univ. (Russian Federation); Garry V. Papayan, First St. Petersburg State Medical Univ. named after Acad. I. P. Pavlova (Russian Federation) and ITMO Univ. (Russian Federation) and Almazov National Medical Research Ctr. (Russian Federation); Alina Y. Babenko, Almazov National Medical Research Ctr. (Russian Federation); Elena N. Grineva, Almazov National Medical Research Ctr. (Russian Federation) and ITMO Univ. (Russian Federation) [11362-12]

Data compatibility across point probe Raman spectroscopy systems and its impact on statistical models portability, Fabien Picot, Guillaume Sheehy, Polytechnique Montréal (Canada); Frédéric Dallaire, Ctr. de Recherche du Ctr. Hospitalier de l'Univ. de Montréal (Canada); Jean-Philippe Tremblay, François Daoust, Polytechnique Montréal (Canada); Émile Lemoine, Ctr. de Recherche du Ctr. Hospitalier de l'Univ. de Montréal (Canada); Loyal Chaikho, Théophile Bégin, Polytechnique Montréal (Canada); Kevin Petrecca, Montreal Neurological Institute and Hospital (Canada); Samuel Kadoury, Frédéric Leblond, Polytechnique Montréal (Canada) [11362-13]

Hyperspectral image-based analysis of thermal damage in living liver undergoing laser ablation, Martina De Landro, Politecnico di Milano (Italy); Manuel Barberio, Eric Felli, Vincent Agnus, Margherita Pizzicannella, L'Institut hospitalo-univ. de Strasbourg (France); Michele Diana, L'Institut hospitalo-univ. de Strasbourg (France) and Institute de Recherche sur les Cancers de l'Appareil Digestif (France); Paola Saccomandi, Politecnico di Milano (Italy) [11362-14]

SESSION 4. WED 16:10 TO 18:00

Diffuse Optical Imaging

Session Chair: **Sylvain Gioux**, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France)

Dual-slope techniques for enhanced depth sensitivity in diffuse optics (Invited Paper), Sergio Fantini, Angelo Sassaroli, Giles Blaney, Thao T. Pham, Cristianne Fernandez, Tufts Univ. (United States) [11362-15]

Automated margin assessment in breast conserving surgery using SFDI with ensembles of self-confident deep convolutional networks, Arturo Pardo, Univ. de Cantabria (Spain) and Instituto de Investigación Valdecilla (IDIVAL) (Spain); Samuel S. Streever, Benjamin W. Maloney, Thayer School of Engineering at Dartmouth (United States); José M. López-Higuera, Univ. de Cantabria (Spain) and Instituto de Investigación Valdecilla (IDIVAL) (Spain) and Ctr. de Investigación Biomédica en Red en Bioingeniería, Biomateriales y Nanomedicina (Spain); Brian W. Pogue, Thayer School of Engineering at Dartmouth (United States); Olga M. Conde, Univ. de Cantabria (Spain) and Instituto de Investigación Valdecilla (IDIVAL) (Spain) and Ctr. de Investigación Biomédica en Red en Bioingeniería, Biomateriales y Nanomedicina (Spain) [11362-16]

Real-time processing and visualization of functional and structural conditions of living tissue, Enagnon Aguénounon, Foudil Dadouche, Wilfried Uhring, Sylvain Gioux, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France) [11362-17]

Widefield quantitative fluorescence imaging for safer oncologic surgery, Silvère Ségau, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France) and Univ. de Strasbourg (France) [11362-18]

Real-time TCSPC-based autofluorescence lifetime imaging towards intraoperative guidance, Joao Lagarto, Istituto Nazionale di Ottica (Italy); Vladislav I. Shcheslavskiy, Becker & Hickl GmbH (Germany); Francesco S. Pavone, Riccardo Cicchi, Istituto Nazionale di Ottica (Italy) [11362-19]

POSTERS-WEDNESDAY WED 18:00 TO 20:00

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Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

Anti-leishmanicidal potential of amphiphilic chlorins by photodynamic therapy, Irwin A. P. Linares Sr., Univ. de São Paulo (Brazil); Angela M. A. Velásquez, Marcia A. S. Graminha, Univ. Estadual Paulista "Júlio de Mesquita Filho" (Brazil); Kléber T. de Oliveira, Univ. Federal de São Carlos (Brazil); Janice R. Perussi, Univ. de São Paulo (Brazil) [11362-34]

The real-time Daphnia Magna heart rate monitoring system for titanium oxide nano-particles cardiac toxicity test, Ik Hwan Kwon, Sang-Won Lee, In Young Kim, Min Beom Heo, Sunae Hwangbo, Tae Geol Lee, Korea Research Institute of Standards and Science (Korea, Republic of) [11362-35]

Urethral pain syndrome: role of cross-polarization OCT in the study of the pathogenesis of the disease, Olga Streltsova, Muhammad Molvi, Pavel A. Shilyagin, Valery Lazukin, Anton Kuyarov, Privozhsky Research Medical Univ. (Russian Federation); Alexander A. Moiseev, Institute of Applied Physics (Russian Federation); Elena B. Kiseleva, Privozhsky Research Medical Univ. (Russian Federation) [11362-36]

Thermographic technologies in medicine, Sergei A. Kuznetsov, Novosibirsk State Univ. (Russian Federation); Valery Y. Belenky, Hels-Service LLC (Russian Federation) and Institute of Cytology and Genetics (Russian Federation) [11362-37]

Low noise Mueller polarimetric microscopy based on high dynamic range radiometric imaging, Ji Qi, Shenzhen Univ. (China) and University College London (United Kingdom); Yunpeng Li, Tianjin Univ. (China) and Key Lab. of Opto-Electronics Information Technology of Ministry of Education (China) and Hamlyn Ctr. for Robotic Surgery (United Kingdom); Hui Ma, Shenzhen Key Lab. for Minimal Invasive Medical Technologies (China) and Tsinghua Univ. (China) and Tsinghua-Berkeley Shenzhen Institute (United Kingdom); Daniel S. Elson, Hamlyn Ctr. for Robotic Surgery (United Kingdom) and Imperial College London (United Kingdom); Danail Stoyanov, EPSRC Ctr. for Interventional and Surgical Sciences (United Kingdom) and Univ. College London (United Kingdom) [11362-38]

Development of an application-specific integrated circuit (ASIC)-based field deployable near-infrared spectroscopy system, Timothy Quang, National Institutes of Health (United States); Jesse H. Lam, Beckman Laser Institute and Medical Clinic (United States); Saba Mohammadi, Siavash S. Yazdi, Univ. of California, Irvine (United States); Amanda Durkin, Beckman Laser Institute and Medical Clinic (United States); Brian Hill, National Institutes of Health (United States); Thomas D. O'Sullivan, Univ. of Notre Dame (United States); Michael Green, Univ. of California, Irvine (United States); Bruce J. Tromberg, National Institutes of Health (United States) . . . [11362-39]

Multimodal diffuse optical spectroscopy for real-time subsurface imaging of tissue composition, metabolism, and vascular dynamics, Hossein S. Yazdi, Jesse H. Lam, George P. Philipopoulos, Beckman Laser Institute and Medical Clinic (United States); Brian Hill, National Institutes of Health (United States); Robert G. W. Brown, Beckman Laser Institute and Medical Clinic (United States); Bruce J. Tromberg, National Institutes of Health (United States) [11362-40]

THURSDAY 2 APRIL

HOT TOPICS III THU 9:00 TO 10:35

Photonics Europe 2020: Hot Topics Session III

- 9.00 - 9.05 **Introduction**
Thierry Georges, Oxxius, France
2019 Symposium Chair
- 9.05 - 9.50 **Ultrafast solid-state lasers: a success story for the last 30 years with no end in sight**
Ursula Keller, ETH Zurich, Switzerland
- 9:50 - 10:35 **From inverse design to implementation of practical quantum photonics**
Jelena Vuckovic, Stanford Univ., United States

For additional details see page 9

SESSION 5. THU 11:00 TO 12:30

Clinical Devices

Session Chair: **Brian W. Pogue**, Thayer School of Engineering at Dartmouth (United States)

Multispectral and polarization-resolved endoscopic surgical imaging (Invited Paper), Daniel S. Elson, Imperial College London (United Kingdom) [11362-20]

Design of rigid endoscopic system for quantitative wide-field optical imaging of tissue optical properties, Luca Baratelli, Joseph P. Angelo, Enagnon Aguénounon, Sylvain Gioux, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France) [11362-21]

Endoscopic OCT characterization of digestive tissue-mimicking phantoms, Natalia Zulina, Sara Gravelyn, Oscar Caravaca, Michalina J. Gora, Univ. de Strasbourg (France) [11362-22]

Near-infrared fluorescent coatings for medical devices, Anila Hoskere Ashoka, Univ. de Strasbourg (France); Seong-Ho Kong, Seoul National Univ. Hospital (Korea, Republic of) and L'Institut hospitalo-univ. de Strasbourg (France); Barbara Seeliger, L'Institut hospitalo-univ. de Strasbourg (France); Bohdan Andreiuk, Univ. de Strasbourg (France); Manuel Barberio, Michele Diana, L'Institut hospitalo-univ. de Strasbourg (France); Andrey S. Klymchenko, Univ. de Strasbourg (France) [11362-23]

Lunch Break Thu 12:30 to 13:30

CONFERENCE 11362

SESSION 6..... THU 13:30 TO 15:20

Clinical Translation

Session Chair: **Irving J. Bigio**, Boston Univ. (United States)

Scatter and fluorescence imaging systems for margin analysis in surgery (*Invited Paper*), Brian W. Pogue, Thayer School of Engineering at Dartmouth (United States) [11362-24]

Hyperspectral imaging quantification of mouse limb microcirculation in ischemia-reperfusion model with phosphodiesterase 5 inhibitor preconditioning, Manuel Barberio, Eric Felli, Jacques Marescaux, Michele Diana, L'Institut hospitalo-univ. de Strasbourg (France); Bernard Geny, Univ. de Strasbourg (France) [11362-25]

Near infrared photoimmunotherapy: a new type of immune theranostic technology for cancer, Hisataka Kobayashi, National Cancer Institute (United States) [11362-26]

Full-field optical coherence tomography of the normal digestive mucosa: a promising tool for the study of the digestive barrier, Lucille H. Quénéhervé, Institut des Maladies de l'Appareil Digestif, CHU Nantes (France) and Univ. Bretagne Loire (France); Raphael Olivier, Institut des Maladies de l'Appareil Digestif, CHU Nantes (France) and Service de Gastroentérologie, CHU de Poitiers (France); Michalina J. Gora, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France) and Univ. de Strasbourg (France); Jean-François Mosnier, Ctr. Hospitalier Univ. de Nantes (France); Charène Brochard, Ctr. Hospitalier Univ. de Rennes (France); Céline Bossard, Ctr. Hospitalier Univ. de Nantes (France); Michel Neunlist, Institut des Maladies de l'Appareil Digestif, CHU Nantes (France) and Univ. de Nantes (France); Emmanuel Coron, Institut des Maladies de l'Appareil Digestif, Ctr. Hospitalier Univ. de Nantes (France) and Univ. de Nantes (France) [11362-27]

A multimodal approach for the diagnosis of bladder tumours, Enrico Baria, Istituto Nazionale di Ottica (Italy); Simone Morselli, Riccardo Fantechi, Andrea Liaci, Arcangelo Sebastianelli, Mauro Gacci, Sergio Serni, Marco Carini, Univ. degli Studi di Firenze (Italy); Riccardo Cicchi, Istituto Nazionale di Ottica (Italy); Francesco S. Pavone, LENS - Lab. Europeo di Spettroscopia Non-Lineari (Italy) [11362-28]

SESSION 7..... THU 15:40 TO 17:40

Special Focus on Fluorescence-guided Surgery

Session Chair: **Michele Diana**,
L'Institut hospitalo-univ. de Strasbourg (France)

Tumor-targeted fluorescence imaging in hepatopancreatic and colorectal surgery (*Invited Paper*), Alexander L. Vahrmeijer, Leiden Univ. Medical Ctr. (Netherlands) [11362-29]

Applications of intraoperative fluorescence imaging to hepatobiliary and pancreatic surgery (*Invited Paper*), Takeaki Ishizawa, Yasuteru Urano, Kiyoshi Hasegawa M.D., The Univ. of Tokyo (Japan) [11362-30]

Design and preclinical evaluation of a single-label bimodal nanobody tracer for image-guided surgery, Pieterjan Debie, Bieke De Sloovere, Vrije Univ. Brussel (Belgium); Danny M. van Willigen, Fijs W. B. van Leeuwen, Leiden Univ. Medical Ctr. (Netherlands); Catarina Xavier, Nick Devoogdt, Tony Lahoutte, Sophie Hernot, Vrije Univ. Brussel (Belgium) [11362-31]

Evaluation of pancreatic perfusion by fluorescence and hyperspectral enhanced reality, Taiga Wakabayashi, Institute de Recherche sur les Cancers de l'Appareil Digestif (France); Manuel Barberio, Takeshi Urade, Raoul Pop, Eric Felli, Pietro Mascagni, L'Institut hospitalo-univ. de Strasbourg (France); Emily Seyller, Margherita Pizzicannella, Institute de Recherche sur les Cancers de l'Appareil Digestif (France); Barbara Seeliger, L'Institut hospitalo-univ. de Strasbourg (France); Patrick Pessaux, Didier Mutter, Les Hôpitaux Univs. de Strasbourg (France); Bernard Geny, Univ. de Strasbourg (France); Jacques Marescaux, Institute de Recherche sur les Cancers de l'Appareil Digestif (France); Vincent Agnus, L'Institut hospitalo-univ. de Strasbourg (France); Michele Diana, Institute de Recherche sur les Cancers de l'Appareil Digestif (France) [11362-32]

Towards quantification of molecular targeted fluorescence imaging during cancer surgery, Labrinus van Manen, Lysanne de Muynck, Leiden Univ. Medical Ctr. (Netherlands); Silvère Ségau, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France) and Univ. de Strasbourg (France); Olivier Lefebvre, Jacky Goetz, Univ. de Strasbourg (France); Alexander L. Vahrmeijer, J. Sven D. Mieog, Leiden Univ. Medical Ctr. (Netherlands); Sylvain Gioux, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France) and Univ. de Strasbourg (France) [11362-33]

CONFERENCE 11363

Monday–Thursday 30 March–2 April 2020 • Proceedings of SPIE Vol. 11363

Tissue Optics and Photonics

Conference Chairs: **Valery V. Tuchin**, Saratov State Univ. (Russian Federation); **Walter C. P. M. Blondel**, Ctr. de recherche en automatique de Nancy (France); **Zeev Zalevsky**, Bar-Ilan Univ. (Israel)

Programme Committee: **Marine Amouroux**, Univ. de Lorraine (France); **Stefan Andersson-Engels**, Irish Photonic Integration Ctr. (IPIC) (Ireland); **Ekaterina G. Borisova**, Institute of Electronics, BAS (Bulgaria); **Anabela Da Silva**, Institut Fresnel (France); **Elina A. Genina**, Saratov State Univ. (Russian Federation); **Steven L. Jacques**, Univ. of Washington (United States); **Malgorzata Jedrzejewska-Szczerska**, Gdansk Univ. of Technology (Poland); **Alwin Kienle**, Institut für Lasertechnologien in der Medizin und Messtechnik (Germany); **Irina V. Larina**, Baylor College of Medicine (United States); **Kirill V. Larin**, Univ. of Houston (United States); **Hui Ma**, Tsinghua Univ. (China); **Teemu S. Myllylä**, Univ. of Oulu (Finland); **Tatiana Novikova**, Lab. de Physique des Interfaces et des Couches Minces (France); **Luis Oliveira**, Instituto Superior de Engenharia do Porto (Portugal); **Alexander V. Priezzhev**, M.V. Lomonosov Moscow State Univ. (Russian Federation); **Natan T. Shaked**, Tel Aviv Univ. (Israel); **Kirill I. Zaytsev**, A. M. Prokhorov General Physics Institute of the RAS (Russian Federation); **Dan Zhu**, Huazhong Univ. of Science and Technology (China); **Haishan Zeng**, BC Cancer Research Ctr. (Canada)

MONDAY 30 MARCH

HOT TOPICS I MON 9:00 TO 11:00

Photonics Europe 2020: Hot Topics Session I

- 9:00 - 9:20 **SPIE Welcome and Award Presentation**
John E. Greivenkamp, Univ of Arizona, United States
SPIE President
Welcome
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
City of Strasbourg Welcome
- 9:25 - 9:30 **Introduction to Hot Topics**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- 9:30 - 10:15 **Naturally fast and low power electro-optic polymer optical devices are ideally positioned for the next-generation Internet photonics roadmap**
Michael Leiby, CEO Lightwave Logic, United Kingdom
- 10:15 - 11:00 **3D printed micro-optics: state of the art and future challenges**
Harald Giessen, University of Stuttgart, Germany

For additional details see pages 6-7

SESSION 1 MON 11:30 TO 12:35

Imaging I

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

Tracking stem cells with gold nanostars (Keynote Presentation),
Martin J. Leahy, National Univ. of Ireland, Galway (Ireland) [11363-1]

Using in utero optical coherence tomography to evaluate changes in murine fetal brain vasculature due to prenatal exposure to teratogens,
Raksha Raghunathan, Chih-Hao Liu, Amur Kouka, Yogeshwari Sanjayrao Ambekar, Connie Yan, Noemi Bustamante, Manmohan Singh, Univ. of Houston (United States); **Rajesh C. Miranda**, Texas A&M Health Science Ctr. (United States); **Kirill V. Larin**, Univ. of Houston (United States) [11363-2]

Lunch Break Mon 12:35 to 13:50

SESSION 2 MON 13:50 TO 15:20

Imaging II

Session Chair: **Anabela Da Silva**, Institut Fresnel (France)

Imaging of early stage breast cancer with circularly polarized light (Invited Paper), **Viktor V. Dremin**, Univ. of Oulu (Finland) and Orel State Univ. named after I. S. Turgenyev (Russian Federation); **Dmytro Anin**, **Oleksii Sieriyi**, **Mariia A. Borovkova**, Univ. of Oulu (Finland); **Juha Näpänkangas**, Oulu Univ. Hospital (Finland); **Igor V. Meglinski**, Univ. of Oulu (Finland) and Aston Univ. (United Kingdom); **Alexander V. Bykov**, Univ. of Oulu (Finland) [11363-3]

Polarimetric monitoring of docetaxel treated tumors in murine models, **Briséis Varin**, **Jean Rehbinder**, **Jean Dellinger**, **Christian Heinrich**, **Jordane Schmidt**, **Caroline Spenlé**, **Dominique Bagnard**, **Jihad Zallat**, Univ. de Strasbourg (France) [11363-4]

Remote photoacoustic tomography using diode-array and speckle-analysis, **Benjamin Lengenfelder**, **Hassan Jarkas**, **Friedrich-Alexander-Universität Erlangen-Nürnberg** (Germany); **Nadav Shabairou**, Bar-Ilan Univ. (Israel); **Martin Hohmann**, **Michael Schmidt**, **Friedrich-Alexander-Universität Erlangen-Nürnberg** (Germany); **Zeev Zalevsky**, Bar-Ilan Univ. (Israel); **Florian Klämpfl**, **Friedrich-Alexander-Universität Erlangen-Nürnberg** (Germany) [11363-5]

Mobile system for early diagnosis of the parameters of pigmented skin lesions, **Elena N. Rims kaya**, **Bauman Moscow State Technical Univ.** (Russian Federation) [11363-6]

SESSION 3 MON 15:50 TO 17:50

Imaging III

Session Chair: **Irina V. Larina**,
Baylor College of Medicine (United States)

Assessing corneal biomechanics without external excitation: heartbeat optical coherence elastography (Invited Paper), **Achuth Nair**, **Manmohan Singh**, **Salavat R. Aglyamov**, **Kirill V. Larin**, Univ. of Houston (United States) [11363-7]

Functional optical coherence tomography for investigation of embryonic development in vivo in mice (Invited Paper), **Irina V. Larina**, Baylor College of Medicine (United States) [11363-8]

Digital holography-based passive elastography using time-reversal method, **Agathe Marmin**, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France); **Stefan Catheline**, Lab. of Therapeutic Applications of Ultrasound (France); **M. Amir Nahas**, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France) [11363-9]

Evaluation of germination ability of seeds at different temperatures by biospeckle optical coherence tomography, **Yiheng Lim**, **Hirofumi Kadono**, **Saitama Univ.** (Japan) [11363-10]

Polarization-assisted correlation mapping nanosensitive optical coherence tomography to detect depth-resolved ultrastructural tissue anisotropy and its alteration in precancer progress, **Nandan K. Das**, **Sergey A. Alexandrov**, **Yi Zhou**, **Anand Arangath**, **Martin J. Leahy**, National Univ. of Ireland, Galway (Ireland) [11363-11]

TUESDAY 31 MARCH

SESSION 4. TUE 8:35 TO 10:20

Diagnostics and Measurement

Session Chair: **Walter C. P. M. Blondel**,
Ctr. de recherche en automatique de Nancy (France)

Post-processing of multimodal microscopic images of tissue histological cuts for biomedical diagnostic (*Keynote Presentation*), Tatiana Novikova, Hee Ryung Lee, Lab. de Physique des Interfaces et des Couches Minces, CNRS, Ecole Polytechnique, Institut Polytechnique de Paris (France); Ilyas Saytashev, Florida International Univ. (United States); Christian Lotz, Florian Kai Groeber-Becker, Sofia Dembski, Universitätsklinikum Würzburg (Germany) and Fraunhofer-Institut für Silicatforschung ISC (Germany); Razvigor Ossikovski, Lab. de Physique des Interfaces et des Couches Minces, CNRS, Ecole Polytechnique, Institut Polytechnique de Paris (France); Jessica C. Ramella-Roman, Florida International Univ. (United States) [11363-12]

Measurement system for investigation of optical parameters of tissue mimicking phantoms, Paulina Listewnik, Gdansk Univ. of Technology (Poland); Michal Wasowicz, Warsaw Univ. of Life Sciences-SGGW (Poland); Monika Kosowska, Adam Mazikowski, Gdansk Univ. of Technology (Poland) [11363-13]

Evaluation of stress-related properties of blood vessel walls using endoscopic optical coherence elastography, Sergey V. Frolov, Tatiana A. Frolova, Anton Y. Potlov, Sergey G. Proskurin, Tambov State Technical Univ. (Russian Federation) [11363-14]

Agar-based phantoms for skin diagnostic imaging, Ilona Kuzmina, Vanesa Lukinsone, Uldis Rubins, Ilze Osina, Laura Ozolina, Anna Maslobojeva, Natalja A. Zorina, Janis Spigulis, Univ. of Latvia (Latvia) [11363-15]

SESSION 5. TUE 10:50 TO 12:40

Tissue Optics I

Session Chair: **Tatiana Novikova**,
Lab. de Physique des Interfaces et des Couches Minces (France)

Measurement of optical properties of normal and pathological human liver from deep-UV to NIR (*Invited Paper*), Luis Oliveira, Instituto Politécnico do Porto (Portugal) and Ctr. of Innovation in Engineering and Industrial Technology (Portugal); Isa Carneiro, Sónia Carvalho, Instituto Português de Oncologia do Porto (Portugal); Rui Henrique, Instituto Português de Oncologia do Porto (Portugal) and Instituto de Ciências Biomédicas Abel Salazar (Portugal); Valery V. Tuchin, Saratov State Univ. (Russian Federation) and Institute of Precision Mechanics and Control (Russian Federation) and National Research Tomsk State Univ. (Russian Federation) [11363-16]

Stain-free optical biomarkers for bladder cancer tissues based on interferometric phase microscopy (*Invited Paper*), Natan T. Shaked, Miki Haifler, Ofer Goldstein, Almog Yogeve, Tel Aviv Univ. (Israel) [11363-17]

How a highly reflective material on the skin surface may affect the light distribution within the skin (*Invited Paper*), Thereza C. Fortunato, Instituto de Física de São Carlos (Brazil) and Tergos Research and Education (Brazil); Lilian T. Moriyama, Instituto de Física de São Carlos (Brazil) [11363-18]

The ways and effects of ultraviolet radiation on the human and animal body, Leonid Chervinsky, National Univ. of Life and Environmental Sciences of Ukraine (Ukraine) [11363-19]

Lunch/Exhibition Break Tue 12:40 to 13:50

SESSION 6. TUE 13:50 TO 16:00

Imaging IV

Session Chair: **Natan T. Shaked**, Tel Aviv Univ. (Israel)

Differential diagnostics of paraffin-embedded tissues by IR-THz spectroscopy and machine learning (*Invited Paper*), Yury V. Kistenev, Alexey V. Borisov, National Research Tomsk State Univ. (Russian Federation) and Siberian State Medical Univ. (Russian Federation); Polina A. Dyachenko, Ekaterina N. Lazareva, National Research Tomsk State Univ. (Russian Federation) and Saratov State Univ. (Russian Federation); Viktor V. Nikolaev, National Research Tomsk State Univ. (Russian Federation) and Institute of Strength Physics and Materials Science (Russian Federation); Daria K. Tuchina, National Research Tomsk State Univ. (Russian Federation) and Saratov State Univ. (Russian Federation); Denis A. Vrazhnov, National Research Tomsk State Univ. (Russian Federation) and Institute of Strength Physics and Materials Science (Russian Federation); Irina Yu K. Yanina, National Research Tomsk State Univ. (Russian Federation) and Saratov State Univ. (Russian Federation); Valery V. Tuchin, National Research Tomsk State Univ. (Russian Federation) and Saratov State Univ. (Russian Federation) and Institute of Precision Mechanics and Control (Russian Federation) [11363-20]

Metabolic shifts in liver diseases and regeneration (**FLIM and TOF SIMS**) (*Invited Paper*), Elena V. Zagaynova, Privolzhsky Research Medical Univ. (Russian Federation); Svetlana A. Rodimova, Privolzhsky Research Medical Univ. (Russian Federation) and Lobachevsky State Univ. of Nizhny Novgorod (Russian Federation); Daria Kuznetsova, Privolzhsky Research Medical Univ. (Russian Federation); Dmitry Reunov, Privolzhsky Research Medical Univ. (Russian Federation) and Lobachevsky State Univ. of Nizhny Novgorod (Russian Federation); Alexander Gulin, Semenov Institute of Chemical Physics (Russian Federation); Nikolay Bobrov, Privolzhsky Research Medical Univ. (Russian Federation) and The Volga District Medical Ctr. (Russian Federation); Natalia Vdovina, Privolzhsky Research Medical Univ. (Russian Federation); Vladimir E. Zagaynov, Privolzhsky Research Medical Univ. (Russian Federation) and The Volga District Medical Ctr. (Russian Federation) [11363-21]

Life-time fluorescence tomography: concept verification (*Invited Paper*), Alexander P. Savitsky, Ilya Solovyeve, Irina Meerovich, Fundamentals of Biotechnology (Russian Federation); Vladislav Shcheslavskiy, Becker & Hickl GmbH (Germany); Alexei A. Bogdanov, Fundamentals of Biotechnology (Russian Federation); Daria Tuchina, Valery Tuchin, Saratov State Univ. (Russian Federation) [11363-22]

Terahertz microscopy of biological tissues with the spatial resolution beyond the Abbe diffraction limit, Nikita V. Chernomyrdin, Bauman Moscow State Technical Univ. (Russian Federation); Irina N. Dolganova, Gleb M. Katyba, Vladimir N. Kurlov, Institute of Solid State Physics (Russian Federation); Igor V. Reshetov, I. M. Sechenov First Moscow State Medical Univ. (Russian Federation); Valery V. Tuchin, Saratov State Univ. (Russian Federation); Kirill I. Zaytsev, A. M. Prokhorov General Physics Institute (Russian Federation) [11363-23]

Increase the diagnosis accuracy of equivocal melanocytic lesions based on multimodal optical imaging (MPM and OCA) criteria, Vadim V. Elagin, Ekaterina V. Gubarkova, Oksana Garanina, Natalia Orlinskaya, Diana A. Davydova, Irina Klemenova, Irena Shlivko, Elena V. Zagaynova, Privolzhsky Research Medical Univ. (Russian Federation) [11363-24]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

- 16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair
- 16:35 to 17:20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States
- 17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

POSTERS-TUESDAY TUE 18:05 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Tuesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

Wearable laser Doppler flowmetry for the analysis of microcirculatory changes during intravenous infusion in patients with diabetes mellitus, Yulia I. Loktionova, Elena V. Zharkikh, Igor O. Kozlov, Angelina I. Zherebtsova, Orel State Univ. named after I. S. Turgenev (Russian Federation); Victor V. Sidorov, SPE LAZMA Ltd. (Russian Federation); Evgenii A. Zherebtsov, Univ. of Oulu (Finland); Andrey V. Dunaev, Orel State Univ. named after I. S. Turgenev (Russian Federation); Edik U. Rafailov, Aston Univ. (United Kingdom) and International Ctr. of Critical Technologies in Medicine (Russian Federation) [11363-57]

Extraction of thickness and fluorophore concentration of the upper layer in a two-layered solid phantom using spatially resolved fluorescence spectroscopy, Shivam Shukla, Pankaj P. Singh, Prabodh K. Pandey, Asima Pradhan, Indian Institute of Technology Kanpur (India) [11363-58]

Adjustment of laser speckle contrast imaging of transcranial brain vasculature under the broken ergodicity conditions, Anton Y. Sdobnov, Univ. of Oulu (Finland); Vyacheslav Kalchenko, Weizmann Institute of Science (Israel); Alexander V. Bykov, Alexey P. Popov, Igor V. Meglinski, Univ. of Oulu (Finland) [11363-59]

- A multimodal approach to monitoring the state of microvasculature in patients with psoriasis in the course of treatment**, Mariya A. Filina, Elena V. Potapova, Anna K. Koroleva, Natalia Y. Yakushkina, Andrey V. Dunaev, Dmitry D. Stavtsev, Orel State Univ. named after I. S. Turgenev (Russian Federation); Nikita B. Margaryants, ITMO Univ. (Russian Federation) [11363-60]
- Additive simulation of Raman light scattering from skin cancer using the Monte Carlo method**, Irina A. Matveeva, Oleg O. Myakinin, Yulia A. Khristoforova, Ivan A. Bratchenko, Samara Univ. (Russian Federation); Alexander A. Moryatov, Sergey V. Kozlov, Samara State Medical Univ. (Russian Federation); Valery P. Zakharov, Samara Univ. (Russian Federation) [11363-61]
- The interaction mechanism between bovine serum albumin and single-walled carbon nanotubes depending on their diameter and concentration in solid nanocomposites**, Alexander Y. Gerasimenko, Dmitry I. Ryabkin, National Research Univ. of Electronic Technology (Russian Federation) and I. M. Sechenov First Moscow State Medical Univ. (Russian Federation); Galina N. Ten, Saratov State Univ. (Russian Federation); Elena Morozova, I. M. Sechenov First Moscow State Medical Univ. (Russian Federation); Dmitry Telyshev, National Research Univ. of Electronic Technology (Russian Federation) and I. M. Sechenov First Moscow State Medical Univ. (Russian Federation) [11363-62]
- Study tissue microhemodynamics in area of tumor at optical clearing by speckle-contrast imaging**, Polina A. Dyachenko Timoshina, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation); Alla B. Bucharskaya, Saratov State Medical Univ. (Russian Federation); Valery V. Tuchin, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation); Aleksandr P. Shkurinov, M.V. Lomonosov Moscow State Univ. (Russian Federation) [11363-63]
- Breast cancer detection with low coherence interferometry and discrete wavelet transform**, Dipti Bharti, Gyana Ranjan Sahoo, Shivam Shukla, Indian Institute of Technology Kanpur (India); Asha Agarwal, Regency Hospital (India); Asima Pradhan, Indian Institute of Technology Kanpur (India) [11363-64]
- Photobiomodulation therapy (PBMT): the effect of weight of rat on the delivered fluence to spinal cord injury rat model-computational study**, Ali S. Shuaib, Ali K. Bourisly, Eman Alazmi, Kuwait Univ. (Kuwait) . . . [11363-65]
- Simulation of digital diaphanography signal changes in an improved cross-sectional model**, Ekaterina O. Bryanskaya, Roman Y. Gneushev, Irina N. Makovik, Orel State Univ. named after I. S. Turgenev (Russian Federation); Viktor V. Dremin, Orel State Univ. named after I. S. Turgenev (Russian Federation) and Univ. of Oulu (Finland); Artem G. Bukin, Institute of Engineering Physics (Russian Federation); Olga A. Bibikova, art photonics GmbH (Germany); Boris M. Shuraev, Diagnostic Medical Ctr. "MediScan" (Russian Federation); Olaf Minet, Urszula J. Zabarylo, Charité Universitätsmedizin Berlin (Germany); Andrey V. Dunaev, Orel State Univ. named after I. S. Turgenev (Russian Federation); Viacheslav G. Artyushenko, art photonics GmbH (Germany) [11363-66]
- Raman spectroscopy of blood for determining age-related and pathologically-associated changes of human body**, Lyudmila A. Bratchenko, Ivan A. Bratchenko, Dmitry N. Artemyev, Oleg O. Myakinin, Samara Univ. (Russian Federation); Alexander A. Moryatov, Sergey V. Kozlov, Samara State Medical Univ. (Russian Federation); Valery P. Zakharov, Samara Univ. (Russian Federation) [11363-67]
- Contrast visualization of biological tissues using a variable light-emitting diode illuminators**, Andrei V. Aladov, Anton E. Chernyakov, Scientific and Technical Ctr. of Microelectronics (Russian Federation); Vladimir D. Kuptsov, Saint-Petersburg State Polytechnical Univ. (Russian Federation); Andrian V. Mamoshin, Elena V. Potapova, Orel State Univ. named after I. S. Turgenev (Russian Federation) and Research and Development Ctr. of Biomedical Photonics (Russian Federation); Vladimir P. Valyukhov, Aleksandr L. Zakgeim, Scientific and Technical Ctr. of Microelectronics (Russian Federation) [11363-68]
- Temperature-stimulated changes in the spectral characteristics of biological tissues**, Irina Yu Yanina, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation); Alexander A. Skaptsov, Julia G. Konyukhova, Natalia I. Kazadaeva, Elena A. Sagaidachnaya, Anna A. Doronkina, Alexander B. Pravdin, Saratov State Univ. (Russian Federation); Vyacheslav I. Kochubey, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation) [11363-69]
- Qualitative comparison of speckle image processing techniques for vein detection in plant leaf tissue**, Jarlath Dolan, John T. Sheridan, James P. Ryle, Univ. College Dublin (Ireland); Rishabh Sharma, Thapar Institute of Engineering and Technology (India) [11363-70]
- Developing an automated data acquisition and real-time analysis for clinical testing of cervical precancer**, Amar Nath Sah, Shikha Ahirwar, Asima Pradhan, Indian Institute of Technology Kanpur (India) [11363-71]
- Optical spectroscopy as an effective tool for skin cancer features analysis: applicability investigation**, Sergey M. Zaytsev, Saratov State Univ. (Russian Federation) and Univ. de Lorraine (France); Walter Blondel, Marine Amouroux, Univ. de Lorraine (France); Grégoire Khairallah, Univ. de Lorraine (France) and Ctr. Hospitalier Régional de Metz-Thionville (France); Valery V. Tuchin, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation) and Institute of Precision Mechanics and Control (Russian Federation); Elina A. Genina, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation) [11363-72]
- Effect of chromophores on photon path length in human skin, skin phantoms and cell cultures**, Vanesa Lukinsone, Anna Maslobojeva, Maris Kuzminskis, Ilona Kuzmina, Uldis Rubins, Natalja Zorina, Mindaugas Tamosiunas, Janis Spigulis, Univ. of Latvia (Latvia) [11363-73]
- Optical noninvasive diagnostics of dynamic changes in the level of blood microcirculation and oxidative metabolism using temperature tests**, Elena V. Zharkikh, Orel State Univ. named after I. S. Turgenev (Russian Federation); Galina I. Masalygina, Orel Regional Clinical Hospital (Russian Federation); Alexander I. Krupatkin, Central Scientific-Research Institute of Traumatology and Orthopedics, n.n. Priorova (Russian Federation); Victor V. Sidorov, SPE LAZMA Ltd. (Russian Federation); Andrey V. Dunaev, Orel State Univ. named after I. S. Turgenev (Russian Federation) [11363-74]
- Optical properties of liver tumor tissues in the spectral range of 350-2300 nm in laser photothermolysis treatment**, Vadim D. Genin, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation); Alla B. Bucharskaya, Saratov State Medical Univ. (Russian Federation); Elina A. Genina, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation); Georgy S. Terentyuk, First Veterinary Clinic, Ltd. (Russian Federation); Nikolay G. Khlebtsov, Saratov State Univ. (Russian Federation) and Institute of Biochemistry and Physiology of Plants and Microorganisms (Russian Federation); Valery V. Tuchin, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation) and Institute of Precision Mechanics and Control (Russian Federation); Alexey N. Bashkatov, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation) [11363-75]
- Cerebral haemodynamic effects in the human brain during radiation therapy for brain cancer**, Teemu Myllylä, Priya Karthikeyan, Ulriika Honka, Vesa Korhonen, Juha Nikkinen, Univ. of Oulu (Finland) [11363-76]
- Fiber probe configurations simulation for depth-resolved skin fluorescence registration**, Dmitry N. Artemyev, Anastasiya A. Shatskaya, Anastasiya O. Ustinova, Ivan A. Bratchenko, Samara Univ. (Russian Federation) [11363-77]
- Complex analysis of skin cancer based on spectroscopic and imaging techniques**, Yulia A. Khristoforova, Ivan A. Bratchenko, Dmitry N. Artemyev, Oleg Myakinin, Samara Univ. (Russian Federation); Alexandr Moryatov, Sergey V. Kozlov, Samara State Medical Univ. (Russian Federation); Valery Zakharov, Samara Univ. (Russian Federation) [11363-78]
- Photodynamic treatment of cholangiocarcinoma with phthalocyanine compounds in laboratory animals**, Ekaterina G. Borisova, Institute of Electronics (Bulgaria); Alla B. Bucharskaya, Nikita Navolokin, Saratov State Medical Univ. (Russian Federation); Vadim D. Genin, Elina A. Genina, Alexey N. Bashkatov, Saratov State Univ. (Russian Federation); Vanya Mantareva, Ivan Angelov, Institute of Organic Chemistry with the Ctr. of Phytochemistry (Bulgaria) [11363-79]
- Liposomal particles for fluorescent and ultrasonic contrast enhancement**, Olga A. Stelmashchuk, Andrey Vinokurov, Mikhail Apanaykin, Andrian Mamoshin, Andrey V. Dunaev, Orel State Univ. named after I. S. Turgenev (Russian Federation) [11363-80]
- In vivo application of magnetic resonance imaging contrast agents for tissue optical clearing**, Daria K. Tuchina, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation) and Fundamentals of Biotechnology (Russian Federation); Olga A. Sineeva, Saratov State Univ. (Russian Federation); Alexander P. Savitsky, Fundamentals of Biotechnology (Russian Federation); Alexei A. Bogdanov, Fundamentals of Biotechnology (Russian Federation) and Univ. of Massachusetts Medical School (United States); Valery V. Tuchin, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation) and Institute of Precision Mechanics and Control (Russian Federation) [11363-81]
- THz properties of rat skin and extracts at exposure to hyperosmotic solutions**, Ekaterina N. Lazareva, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation); Maxim M. Nazarov, National Research Ctr. "Kurchatov Institute" (Russian Federation); Alla B. Bucharskaya, Saratov State Medical Univ. (Russian Federation); Valery V. Tuchin, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation) and ITMO Univ. (Russian Federation); Alexander P. Shkurinov, M.V. Lomonosov Moscow State Univ. (Russian Federation) and Federal Research Ctr. "Crystallography and Photonics" (Russian Federation) [11363-82]
- Binding of ceruloplasmin with cationic porphyrins: pH dependence and salt composition of the medium**, Aram G. Gyulkhandanyan, Lab. Structure et Activité des Biomolécules Normales et Pathologiques, Univ. d'Evry Val d'Essonne, Univ. Paris-Saclay (France); Anna A. Zakoyan, Lusine V. Mkrtchyan, Anna G. Gyulkhandanyan, H. Buniatian Institute of Biochemistry NAS RA (Armenia); Ekaterina N. Lazareva, Valery V. Tuchin, Saratov State Univ. (Russian Federation); Grigor V. Gyulkhandanyan, H. Buniatian Institute of Biochemistry NAS RA (Armenia) [11363-83]

SESSION 7 WED 8:30 TO 10:30

Tissue Optics II

Session Chair: **Zeev Zalevsky**, Bar-Ilan Univ. (Israel)

Physical impacts on epidermal permeability in vivo for optical clearing agents (*Invited Paper*), Elina A. Genina, Alexey N. Bashkatov, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation); Sergey M. Zaytsev, Saratov State Univ. (Russian Federation) and Univ. de Lorraine (France) and Ctr. de recherche en automatique de Nancy, CNRS (France); Marine Amouroux, Univ. de Lorraine (France) and Ctr. de recherche en automatique de Nancy, CNRS (France); Walter C. P. M. Blondel, Univ. de Lorraine (France); Valery V. Tuchin, Saratov State Univ. (Russian Federation) and National Research Tomsk State Univ. (Russian Federation) and Institute of Precision Mechanics and Control (Russian Federation) [11363-25]

FDISCO: advanced solvent-based clearing method for imaging whole organs (*Invited Paper*), Dan Zhu, Huazhong Univ. of Science and Technology (China) [11363-26]

Nondestructive supercontinuum-based scattering analyses of cartilage and collagen cells before and after apoptosis and necrosis, Tobias Baselt, Westsächsische Hochschule Zwickau (Germany); Alexander Kabardiadi-Virkovski, Westsächsische Hochschule Zwickau (Germany) and Fraunhofer-Institut für Werkstoff- und Strahltechnik IWS (Germany); Ina Pade, Forschungsinstitut für Leder und Kunststoffbahnen (FILK) GmbH (Germany); Andrés Fabián Lasagni, Fraunhofer-Institut für Werkstoff- und Strahltechnik IWS (Germany) and Technische Univ. Dresden (Germany); Peter Hartmann, Westsächsische Hochschule Zwickau (Germany) [11363-27]

Optical properties of phosphorene nanosheets tuned by protein adsorption, Robert Bogdanowicz, Aleksandra Wieloszynska, Krzysztof Pyrchla, Pawel Jakóbczyk, Gdansk Univ. of Technology (Poland); Bartłomiej Dec, Gdansk Univ. of Technology (Poland); Lukasz Macewicz, Gdansk Univ. of Technology (Poland); Lukasz Skowronski, Univ. of Technology and Life Sciences in Bydgoszcz (Poland) [11363-28]

Optical clearing effects in subcutaneous red-fluorescent tumors monitored by fluorescence and magnetic resonance imaging in vivo (*Invited Paper*), Alexei A. Bogdanov, Univ. of Massachusetts Medical School (United States) and Fundamentals of Biotechnology (Russian Federation); Irina Meerovich, Natalia I. Kazachkina, Victoria Zherdeva, Ilya Solov'yev, Fundamentals of Biotechnology (Russian Federation); Daria K. Tuchina, Saratov State Univ. (Russian Federation); Alexander P. Savitsky, Fundamentals of Biotechnology (Russian Federation); Valeriy V. Tuchin, Saratov State Univ. (Russian Federation) [11363-29]

SESSION 8 WED 11:00 TO 12:40

Spectroscopy and Imaging I

Session Chair: **Dan Zhu**, Huazhong Univ. of Science and Technology (China)

Functional NIRS study of blood brain barrier disruption when induced by focused ultrasound and intra-arterial mannitol infusion (*Invited Paper*), Teemu S. Myllylä, Mika Kaakinen, Erkki Vihriälä, Jari Jukkola, Hany Ferdinando, Vesa Korhonen, Vesa Kiviniemi, Lauri Eklund, Univ. of Oulu (Finland) [11363-30]

ALA/PpIX photodiagnosis of stress-induced gastrointestinal metastatic tumours in laboratorial animals (*Invited Paper*), Ekaterina G. Borisova, Institute of Electronics (Bulgaria); Matvey Kanevskiy, Svetlana Konnova, Alexander Khorovodov, Ilana Agranovich, Saratov State Univ. (Russian Federation); Tsanislava I. Genova, Institute of Electronics (Bulgaria); Ivan Angelov, Vanya Mantareva, Institute of Organic Chemistry with the Ctr. of Phytochemistry (Bulgaria); Nikita Navolokin, Saratov State Medical Univ. (Russian Federation); Oxana Semyachkina-Glushkovskaya, Saratov State Univ. (Russian Federation) [11363-31]

Optical fine-needle biopsy in hepatocellular carcinoma mouse model, Elena V. Potapova, Ksenia Y. Kandurova, Valery V. Shupletsov, Evgeniya S. Seryogina, Orel State Univ. named after I. S. Turgenev (Russian Federation); Viktor V. Dremmin, Evgenii A. Zherebtsov, Orel State Univ. named after I. S. Turgenev (Russian Federation) and Univ. of Oulu (Finland); Alexander G. Alekseyev, Orel State Univ. named after I. S. Turgenev (Russian Federation); Andrian V. Mamoshin Jr., Orel State Univ. named after I. S. Turgenev (Russian Federation) and Orel Regional Clinical Hospital (Russian Federation); Yuri Ivanov, Federal Scientific and Clinical Ctr. for Specialized Medical Service and Medical Technologies (Russian Federation) and Central Research Institute of Tuberculosis (Russian Federation); Dmitry Panchenkov, A. I. Yevdokimov Moscow State Univ. of Medicine and Dentistry (Russian Federation); Andrey V. Dunaev, Orel State Univ. named after I. S. Turgenev (Russian Federation) [11363-32]

Scattering and absorption coefficients of native articular cartilage show a strong correlation to the tissue's composition and structure, Iman Kafan Attari, Isaac O. Afara, Juha Töyräs, Univ. of Eastern Finland (Finland) [11363-33]

Lunch/Exhibition Break Wed 12:40 to 13:50

SESSION 9 WED 13:50 TO 15:30

Spectroscopy and Imaging II

Session Chair: **Teemu S. Myllylä**, Univ. of Oulu (Finland)

In vivo study of human skin advanced glycation end-products with Raman spectroscopy (*Invited Paper*), Ivan A. Bratchenko, Lyudmila A. Bratchenko, Samara Univ. (Russian Federation); Petr A. Lebedev, Samara State Medical Univ. (Russian Federation); Valery P. Zakharov, Samara Univ. (Russian Federation) [11363-34]

Combined spectroscopic and video fluorescent instrument for intraoperative navigation when removing a glial tumor (*Invited Paper*), Tatiana A. Savelieva, Maxim V. Loshchenov, Alexander V. Borodkin, A. M. Prokhorov General Physics Institute (Russian Federation); Alexandra V. Kosyrkova, Sergey A. Goryajnov, Alexander A. Potapov, Ctr. for Neurosurgery named after acad. N. N. Burdenko (Russian Federation); Victor B. Loschenov, A. M. Prokhorov General Physics Institute (Russian Federation) [11363-35]

Measurements of iron-bound transferrin in breast cancer tumor xenografts using Raman spectral imaging, Kate Tubbesing, Albany Medical College (United States); Ting Chean Khoo, Univ. at Albany (United States); Alena Rudkouskaya, Albany Medical College (United States); Anna V. Sharikova, Univ. at Albany (United States); Margarida Barroso, Albany Medical College (United States); Alexander Khmaladze, Univ. at Albany (United States) [11363-36]

Autofluorescence spectroscopy of cutaneous neoplasia under ultraviolet, visible and near-infrared excitation, Ekaterina G. Borisova, Deyan Ivanov, Boyko Kolev, Tsanislava I. Genova, Victoria Mircheva, Stoyan Ilyov, Lidia Zaharieva, Institute of Electronics (Bulgaria); Ilze Lihachova, Aleksejs Lihachovs, Janis Spigulis, Univ. of Latvia (Latvia); Petranka Troyanova, Univ. Hospital "Tsaritsa Yoanna-ISUL" (Bulgaria); Ivan A. Bratchenko, Samara Univ. (Russian Federation) [11363-37]

SESSION 10 WED 16:00 TO 18:20

Tissue Optics III

Session Chair: **Kirill V. Larin**, Univ. of Houston (United States)

Determination of the optical properties of scattering phantoms and of ex vivo and in vivo biological tissue (*Invited Paper*), Alwin Kienle, Institut für Lasertechnologien in der Medizin und Messtechnik (Germany) [11363-38]

Tissue-mimicking phantoms for biomedical applications (*Invited Paper*), Alexey P. Popov, Oleksii Sieryi, Univ. of Oulu (Finland); Vyacheslav Kalchenko, Weizmann Institute of Science (Israel); Alexander V. Bykov, Igor Meglinski, Univ. of Oulu (Finland) [11363-39]

Diffuse reflectance Monte Carlo simulation to assess the transit time error in intraoperative fluorescence angiography, Ady Naber, Karlsruhe Institut für Technologie (Germany); Jayson Chaykowski, McMaster Univ. (Canada); Jesvin Jimmy, Univ. College Dublin (Ireland); Werner Nahm, Karlsruhe Institut für Technologie (Germany) [11363-40]

Simulation of laser-induced retinal thermal injuries for nonuniform irradiance profiles and their evaluation according to the laser safety standard, Sebastian Kutzur, Annette Frederiksen, Robert Bosch GmbH (Germany); Siegfried Wahl, Universitätsklinikum Tübingen (Germany) [11363-41]

Monte Carlo simulations to study light propagation through the skin of different phototypes, Otávio P. Palamoni, Univ. Federal de São Carlos (Brazil); Ana Carolina de Magalhães, Tergos Reseach and Education (Brazil) and Instituto de Ensino e Pesquisa (Brazil); Lilian T. Moriyama, Univ. de São Paulo (Brazil); Thereza C. Fortunato, Univ. de São Paulo (Brazil) and Tergos Reseach and Education (Brazil); Marcelo Victor Pires de Sousa, Tergos Reseach and Education (Brazil) [11363-42]

GPU-accelerated polarization-sensitive Monte Carlo simulations for diffused optical tomography with polarized light, Anabela Da Silva, Hind Oulhaj, Julien Wojak, Ugo Tricoli, Callum M. Macdonald, Institut Fresnel (France); Vadim A. Markel, Univ. of Pennsylvania (United States) ... [11363-43]

THURSDAY 2 APRIL

HOT TOPICS III THU 9:00 TO 10:35

Photonics Europe 2020: Hot Topics Session III

- 9.00 - 9.05 **Introduction**
Thierry Georges, Oxxius, France
2019 Symposium Chair
- 9.05 - 9.50 **Ultrafast solid-state lasers: a success story for the last 30 years with no end in sight**
Ursula Keller, ETH Zurich, Switzerland
- 9:50 - 10:35 **From inverse design to implementation of practical quantum photonics**
Jelena Vuckovic, Stanford Univ., United States
For additional details see page 9

SESSION 11 THU 10:55 TO 12:40

Therapy I

Session Chair: **Ekaterina G. Borisova**,
Institute of Electronics, BAS (Bulgaria)

- New laser technology for resistant forms of open-angle glaucoma treatment** (*Invited Paper*), Olga I. Baum, Institute of Photonic Technologies (Russian Federation); Emil N. Sobol, Arcuo Medical, Inc (United States) [11363-44]
- Sapphire-based medical instruments for diagnosis, surgery and therapy** (*Invited Paper*), Irina N. Dolganova, Institute of Solid State Physics (Russian Federation) and Bauman Moscow State Technical Univ. (Russian Federation); Gleb M. Katyba, Institute of Solid State Physics (Russian Federation) and A. M. Prokhorov General Physics Institute (Russian Federation); Irina A. Shkunova, Arsen K. Zotov, Institute of Solid State Physics (Russian Federation); Igor V. Reshetov, Marina A. Schcedrina, I. M. Sechenov First Moscow State Medical Univ. (Russian Federation); Kirill I. Zaytsev, A. M. Prokhorov General Physics Institute of the RAS (Russian Federation) and Bauman Moscow State Technical Univ. (Russian Federation); Valery V. Tuchin, Saratov State Univ. (Russian Federation) and Institute of Precision Mechanics and Control (Russian Federation); Vladimir N. Kurlov, Institute of Solid State Physics (Russian Federation) [11363-45]
- Study on behavior improvement of photobiomodulation therapy in Alzheimer's disease mice**, Qianqian Chen, Xiafei Shi, Huijuan Yin, Yingxin Li, Chinese Academy of Medical Sciences (China) [11363-46]
- Multiparametric spectral diagnosis of skin cancer**, Valery P. Zakharov, Lyudmila A. Bratchenko, Yulia A. Khristoforova, Oleg O. Myakinin, Dmitry N. Artemyev, Samara Univ. (Russian Federation); Alexander A. Moryatov, Sergey V. Kozlov, Samara State Medical Univ. (Russian Federation); Ekaterina G. Borisova, Tسانislava I. Genova, Institute of Electronics, BAS (Bulgaria); Petranka P. Troyanova, Specialized Hospital for Active Treatment in Oncology, Sofia (Bulgaria); Ivan A. Bratchenko, Samara Univ. (Russian Federation) [11363-47]
- Lunch Break Thu 12:40 to 13:40

SESSION 12 THU 13:40 TO 15:20

Therapy II

Session Chair: **Valery V. Tuchin**,
Saratov State Univ. (Russian Federation)

- Near-infrared phototheranostics: optical imaging and light induced therapy** (*Invited Paper*), Tymish Y. Ohulchanskyy, Shenzhen Univ. (China) and Univ. at Buffalo (United States) [11363-48]
 - An integrated setup for photo-thermal therapy treatment of the glioblastoma** (*Invited Paper*), Anabela Da Silva, Institut Fresnel (France); Khaled Metwally, Institut Fresnel (France) and Lab. de Mécanique et d'Acoustique (France); Chiara Bastiancich, Noé Dumas, Florian Correard, Institut de Neurophysiopathologie (France); Anthony Novell, Imagerie par Résonance Magnétique Médicale et Multi-Modalités (France); Florence Chaspoul, Institut de Neurophysiopathologie (France); Andrei V. Kabashin, Lab. Lasers, Plasmas et Procédés Photoniques (France); Serge Mensah, Lab. de Mécanique et d'Acoustique (France); Nicola Jones, Lab. de Mécanique et d'Acoustique (France); Marie-Anne Estève, Institut de Neurophysiopathologie (France); Gleb Tselikov, Anton Popov, Ahmed Al-Kattan, Lab. Lasers, Plasmas et Procédés Photoniques (France); Diane Braguer, Institut de Neurophysiopathologie (France); Benoit Larrat, NeuroSpin, Institut d'Imagerie Biomédicale, CEA-DRF (France) [11363-49]
 - Metronomic photodynamic therapy with 5-aminolevulinic acid induces apoptosis and autophagy in human colorectal cancer cells**, Huijuan Yin, Xiafei Shi, Chinese Academy of Medical Sciences & Peking Union Medical College (China) [11363-50]
 - Influence of the beam profile quality on damage threshold determination using explants**, Scarlett Ramos, Karlsruhe Institut für Technologie (Germany) and Robert Bosch GmbH (Germany); Wilhelm Stork, Karlsruhe Institut für Technologie (Germany); Nico Heussner, Robert Bosch GmbH (Germany) [11363-51]
- SESSION 13 THU 15:40 TO 17:40
- Imaging and Data Processing
- Session Chair: **Kirill I. Zaytsev**, A. M. Prokhorov General Physics Institute of the RAS (Russian Federation)
- Optical tissue probing based upon speckle patterns analysis during multispectral illumination and multifrequency stimulation** (*Invited Paper*), Yarden Tzabari Kelman, Hadas Lupa, Sagie Asraf, Nisan Ozana, Nadav Shabairou, Zeev Zalevsky, Bar-Ilan Univ. (Israel) [11363-52]
 - Image reconstruction for remote photoacoustic tomography using speckle analysis** (*Invited Paper*), Benjamin Lengenfelder, Martin Hohmann, Margarete Röhm, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Azhar Zam, Univ. Basel (Switzerland); Michael Schmidt, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); Zeev Zalevsky, Bar-Ilan Univ. (Israel); Florian Klämpfl, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany) [11363-53]
 - Depolarizing spaces for biological tissue classification**, Albert Van Eeckhout, Univ. Autònoma de Barcelona (Spain); Enric Garcia-Caurel, Ecole Polytechnique (France); Razvigor Ossikovski, École Polytechnique (France); Angel Lizana, Carla Rodríguez, Univ. Autònoma de Barcelona (Spain); Emilio González, Univ. Autònoma de Madrid (Spain) and Hospital Univ. de Canarias (Spain); Juan Campos, Univ. Autònoma de Barcelona (Spain) [11363-54]
 - Blood pressure measurement based on pulse transit time from different positioned photoplethysmography signals**, Yu Cheng Kao, Chun-Hsiung Wang, National Taiwan Univ. (Taiwan); Shu-Sheng Lee, National Taiwan Ocean Univ. (Taiwan); Wen-Jong Wu, Chih-Kung Lee, National Taiwan Univ. (Taiwan) [11363-55]
 - Time-frequency analysis and laser Doppler spectrum decomposition to reveal new feature space for diagnosis of diabetes mellitus vascular complications**, Igor O. Kozlov, Orel State Univ. named after I. S. Turgenev (Russian Federation); Evgenii A. Zherebtsov, Univ. of Oulu (Finland); Angelina I. Zherebtsova, Yulia I. Loktionova, Elena V. Zharkikh, Andrey V. Dunaev, Orel State Univ. named after I. S. Turgenev (Russian Federation) [11363-56]

Integrated Photonics Platforms: Fundamental Research, Manufacturing and Applications

Conference Chairs: **Roel G. Baets**, Univ. Gent (Belgium); **Peter O'Brien**, Tyndall National Institute (Ireland); **Laurent Vivien**, Ctr. de Nanosciences et de Nanotechnologies (France), CNRS, Univ. Paris Saclay (France)

Programme Committee: **Frédéric Boeuf**, STMicroelectronics (France); **José Capmany Francoy**, Univ. Politècnica de Valencia (Spain); **Frederic Y. Gardes**, Univ. of Southampton (United Kingdom); **Jin Guo**, CUMEC (China); **Martijn J. R. Heck**, Aarhus Univ. (Denmark); **Takaaki Ishigure**, Keio Univ. (Japan); **Robert E. Mallard**, Canadian Microelectronics Corp. (Canada); **Lorenzo Pavesi**, Univ. degli Studi di Trento (Italy); **Stefan F. Preble**, Rochester Institute of Technology (United States); **PoI Van Dorpe**, IMEC (Belgium); **Kevin A. Williams**, Technische Univ. Eindhoven (Netherlands); **Jeremy Witzens**, RWTH Aachen Univ. (Germany); **Dan-Xia Xu**, National Research Council Canada (Canada); **Koji Yamada**, National Institute of Advanced Industrial Science and Technology (Japan); **Zhiping Zhou**, Peking Univ. (China)

SUNDAY 29 MARCH

SESSION 1 SUN 13:10 TO 15:00

Optical Modulation

Session Chair: **Laurent Vivien**, Ctr. de Nanosciences et de Nanotechnologies (France), CNRS, Univ. Paris Saclay (France)

III-V/Si hybrid optical modulators based on MOS capacitor (*Invited Paper*), Mitsuru Takenaka, Qiang Li, Shuhei Ohno, Shinichi Takagi, The Univ. of Tokyo (Japan) [11364-1]

Optimization of deep-rib high-speed phase modulators on 300mm industrial Si photonics platform, Stephane Monfray, Sébastien CREMER, Nathalie VULLIET, STMicroelectronics S.A. (France); Emmanuel Dubois, Institut d'Electronique de Microélectronique et de Nanotechnologie (France); Florian Domengie, Sébastien Jan, Françoise Baille, Frédéric Boeuf, STMicroelectronics S.A. (France) [11364-2]

Slow light to reduce the energy dissipation of Mach-Zehnder modulators in silicon photonics, Lucio C. Andreani, Marco Passoni, Dario Gerace, Univ. degli Studi di Pavia (Italy); G. Chinna R. Devarapu, Liam O'Faolain, Cork Institute of Technology (Ireland) and Tyndall National Institute (Ireland) [11364-3]

Dual-comb spectroscopy using silicon electro-optical modulators, Lucas Deniel, Ctr. de Nanosciences et de Nanotechnologies, Univ. Paris-Sud, CNRS (France); Erwan Weckenmann, Fonctions Optiques pour les Technologies de l'information, Univ. de Rennes 1, CNRS (France); Diego Pérez Galacho, Univ. Politècnica de València (Spain); Laurent Brämmer, Fonctions Optiques pour les Technologies de l'information, Univ. de Rennes 1, CNRS (France); Charles Baudot, STMicroelectronics S.A. (France); Margaux Barbier, Mathilde Gay, Fonctions Optiques pour les Technologies de l'information, Univ. de Rennes 1, CNRS (France); Carlos Alonso-Ramos, Ctr. de Nanosciences et de Nanotechnologies, Univ. Paris-Sud, CNRS (France); Frédéric Boeuf, STMicroelectronics S.A. (France); Laurent Vivien, Ctr. de Nanosciences et de Nanotechnologies, Univ. Paris-Sud, CNRS (France); Christophe Peucheret, Fonctions Optiques pour les Technologies de l'information, Univ. de Rennes 1, CNRS (France); Delphine Marris-Morini, Ctr. de Nanosciences et de Nanotechnologies, Univ. Paris-Sud, CNRS (France) [11364-4]

Si capacitive modulator integration in a 300mm silicon photonics platform with strained SiGe to enhance the electro-optic effect, Ismael Charlet, STMicroelectronics S.A. (France) [11364-5]

Integrated silicon photonic devices for next-generation fiber-optic communication systems (*Invited Paper*), Wei Shi, Univ. Laval (Canada) [11364-6]

SESSION 2 SUN 15:20 TO 17:05

Machine-/Deep Learning and Neuromorphic Computing

Session Chair: **Roel G. Baets**, Univ. Gent (Belgium)

Design of multiparameter photonic devices using machine learning (*Invited Paper*), Daniele Melati, Yuri Grinberg, Mohsen Kamandar Dezfouli, Siegfried Janz, Jens H. Schmid, Pavel Cheben, National Research Council Canada (Canada); Alejandro Sánchez-Postigo, Univ. de Málaga (Spain); Dan-Xia Xu, National Research Council Canada (Canada) [11364-7]

Neuromorphic computing and machine learning with silicon photonics (*Invited Paper*), Bhavin J. Shastri, Bicky A. Marquez, Queen's Univ. (Canada); Alexander N. Tait, Thomas Ferreira de Lima, Hsuan-Tung Peng, Chaoran Huang, Princeton Univ. (United States); Mario Miscuglio, Volker J. Sorger, The George Washington Univ. (United States); Paul R. Prucnal, Princeton Univ. (United States) [11364-8]

Opportunities of silicon photonics for calculation and machine learning applications (*Invited Paper*), Guangwei Cong, Noritsugu Yamamoto, Takashi Inoue, Yuriko Maegami, Morifumi Ohno, Makoto Okano, Shu Namiki, Koji Yamada, National Institute of Advanced Industrial Science and Technology (Japan) [11364-9]

Reducing the thermal dependence of on-chip Fourier transform spectrometers with machine learning algorithms, Alaine Herrero-Bermello, Instituto de Óptica "Daza de Valdés", Consejo Superior de Investigaciones Científicas (Spain); Jiangfeng Li, Mohammad Khazaei, Univ. of Strathclyde (United Kingdom); Yuri Grinberg, National Research Council Canada (Canada); Aitor V. Velasco, Instituto de Óptica "Daza de Valdés" (Spain); Martin Vachon, Pavel Cheben, National Research Council Canada (Canada); Lina Stankovic, Vladimir Stankovic, Univ. of Strathclyde (United Kingdom); Dan-Xia Xu, Jens H. Schmid, National Research Council Canada (Canada); Carlos A. Alonso-Ramos, Ctr. de Nanosciences et de Nanotechnologies (France) . . . [11364-10]

Deep learning-discovered photonic power dividers, Alagappan Gandhi, Ching Eng Png, L. A. Krivitsky, Agency for Science, Technology and Research (A*STAR) (Singapore) [11364-11]

SESSION 3 SUN 17:05 TO 18:35

Photonic Circuits

Session Chair: **Peter O'Brien**, Tyndall National Institute (Ireland)

Ultrabroadband electronic-photonic data converters in silicon photonics technology (*Invited Paper*), Christoph Scheytt, Univ. Paderborn (Germany) [11364-12]

Ophthalmic imaging on a chip: spectral domain and swept source optical coherence tomography at 840nm using PICs (*Invited Paper*), Elisabet A. Rank, Ryan Sentosa, Anna Gaugutz, Danielle J. Harper, Matthias Salas, Medizinische Univ. Wien (Austria); Stefan Nevlacsil, Alejandro Maese-Novo, Moritz Eggeling, Paul Muellner, Rainer Hainberger, AIT Austrian Institute of Technology GmbH (Austria); Dana Seyringer, Stefan Partel, FH Vorarlberg (Austria); Marcus Duell, Stefan Gloor, EXALOS AG (Switzerland); Nanko Verwaal, Fraunhofer-Institut für Integrierte Schaltungen IIS (Germany); Marko Vlasovic, Gerald Meinhardt, Martin Sagmeister, Jochen Kraft, ams AG (Austria); Moises Jezzini, Zhiheng Quan, Peter O'Brien, Tyndall National Institute (Ireland); Stefan Richter, Michael Kempe, Carl Zeiss AG (Germany); Rainer Leitgeb, Wolfgang Drexler, Medizinische Univ. Wien (Austria) [11364-13]

Increased capacity of silicon photonics integrated switches by efficiently exploiting mode division multiplexing (*Invited Paper*), Odile Liboiron-Ladouceur, McGill Univ. (Canada) [11364-14]

Chip-level transceiver optical interconnect architecture based on silicon, Vikash Kumar, Aurora's Technological and Research Institute (India); Vishnu Priye, Indian Institute of Information Technology, Ranchi (India) [11364-15]

MONDAY 30 MARCH

HOT TOPICS I MON 9:00 TO 11:00

Photonics Europe 2020: Hot Topics Session I

- 9:00 - 9:20 **SPIE Welcome and Award Presentation**
John E. Greivenkamp, Univ of Arizona, United States
SPIE President
Welcome
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
City of Strasbourg Welcome
- 9:25 - 9:30 **Introduction to Hot Topics**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- 9:30 - 10:15 **Naturally fast and low power electro-optic polymer optical devices are ideally positioned for the next-generation Internet photonics roadmap**
Michael Leppy, CEO Lightwave Logic, United Kingdom
- 10:15 - 11:00 **3D printed micro-optics: state of the art and future challenges**
Harald Giessen, University of Stuttgart, Germany

For additional details see pages 6-7

SESSION 4 MON 11:20 TO 12:50

Optical Integration

Session Chair: **Roel G. Baets**, Univ. Gent (Belgium)

- Silicon-rich silicon nitride CMOS compatible photonics (Invited Paper)**, Cosimo Lacava, Optoelectronics Research Ctr. (United Kingdom); Francesca Parmigiani, Optoelectronics Research Ctr. (United Kingdom) and Microsoft Research Cambridge (United Kingdom); Frederic Gardes, Thalia Dominguez Bucio, Periklis Petropoulos, Optoelectronics Research Ctr. (United Kingdom) [11364-16]
- SiN photonic integrated circuit designed to evaluate its interaction with a hologram for an augmented reality application**, Basile Meynard, Christophe Martinez, Daivid Fowler, CEA-LETI-DOPT (France); Engin Molva, CEA (France) [11364-17]
- High-speed electronics for silicon photonics transceivers (Invited Paper)**, Johan Bauwelinck, Peter Ossieur, Michael Vanhovecke, Joris Lambrecht, Hannes Ramon, Laurens Bogaert, Laurens Breynne, Cédric Bruynsteen, Michiel Verplaetse, Joris Van Kerrebrouck, Bart Moeneclaey, Guy Torfs, Gunther Roelkens, imec, Univ. Gent (Belgium); Joris Van Campenhout, imec (Belgium); Xin Yin, imec, Univ. Gent (Belgium) [11364-18]
- Integrated photonic look-up memory architectures to relieve the memory bottlenecks (Invited Paper)**, Christos Vagionas, Apostolos Tsakyridis, Theoni Alexoudi, Amalia Miliou, Nikos Pleros, Aristotle Univ. of Thessaloniki (Greece) . [11364-19]
- Lunch Break Mon 12:50 to 13:50

SESSION 5 MON 13:50 TO 15:25

Nonlinear Integrated Structures

Session Chair: **Cosimo Lacava**, Optoelectronics Research Ctr. (United Kingdom)

- Chip-based soliton microcomb using an ultralow-noise diode laser (Invited Paper)**, Nicolas Volet, Aarhus Univ. (Denmark) [11364-20]
- Electric field-induced second harmonic generation in silicon waveguide by interdigitated contacts**, Chiara Vecchi, Claudio Castellan, Univ. degli Studi di Trento (Italy); Martino Bernard, Mher Ghulinyan, Fondazione Bruno Kessler (Italy); Lorenzo Pavesi, Univ. degli Studi di Trento (Italy) [11364-21]
- Chalcogenide integrated mid-infrared photonics (Invited Paper)**, Hongtao Lin, Zhejiang Univ. (China); Juejun Hu, Massachusetts Institute of Technology (United States) [11364-22]
- Optical frequency comb generation using low-stress CMOS compatible reactive sputtered silicon nitride waveguides**, Andreas Frigg, Andreas Boes, Guanghui Ren, Thach G. Nguyen, RMIT Univ. (Australia); Duk-Yong Choi, The Australian National Univ. (Australia); Silvio Gees, Evatec NA Inc. (United States); David J. Moss, Swinburne Univ. of Technology (Australia); Arnan Mitchell, RMIT Univ. (Australia) [11364-66]

Exploring optical gain in hybrid erbium-doped yttria-stabilized zirconia silicon waveguides, Alicia Ruiz-Caridad, Guillaume Marcaud, Ctr. de Nanosciences et de Nanotechnologies (France); Joan Manel Ramirez, III-V Lab. (France); Christian M. Lafforgue, Ludovic Largeau, Thomas Maroutian, Sylvia Matzen, Stéphane Collin, Carlos Alonso-Ramos, Guillaume Agnus, Ctr. de Nanosciences et de Nanotechnologies (France); Sylvain Guerber, STMicroelectronics S.A. (France); Charles Baudot, STMicroelectronics S.A. (France); Frédéric Boeuf, STMicroelectronics S.A. (France); Vladyslav Vakarin, Elena Duran-Valdeiglesias, Eric Cassan, Delphine Marris-Morini, Philippe Lecoœur, Laurent Vivien, Ctr. de Nanosciences et de Nanotechnologies (France) [11364-23]

SESSION 6 MON 15:45 TO 18:05

Platforms and Pilot Lines

Session Chair: **Laurent Vivien**, Ctr. de Nanosciences et de Nanotechnologies (France), CNRS, Univ. Paris Saclay (France)

- PIX4life's silicon nitride integrated photonics platforms: present status and future outlook (Invited Paper)**, Adil Masood, imec (Belgium) . . [11364-24]
- PIXAPP (Invited Paper)**, Peter O'Brien, Tyndall National Institute (Ireland) [11364-25]
- ePIXfab (Invited Paper)**, Roel G. Baets, Univ. Gent (Belgium) [11364-26]
- Key technology developments of active optical package (AOP) substrate for co-packaging of silicon photonics (Invited Paper)**, Akihiro Noriki, National Institute of Advanced Industrial Science and Technology (Japan) and Photonics Electronics Technology Research Association (Japan); Isao Tamai, Yasuhiro Ibusuki, Akio Ukita, Photonics Electronics Technology Research Association (Japan); Satoshi Suda, National Institute of Advanced Industrial Science and Technology (Japan) and Photonics Electronics Technology Research Association (Japan); Daisuke Shimura, Yosuke Onawa, Hiroki Yaegashi, Photonics Electronics Technology Research Association (Japan); Takeru Amano, Masahiko Mori, National Institute of Advanced Industrial Science and Technology (Japan) and Photonics Electronics Technology Research Association (Japan) [11364-27]
- CORNERSTONE's silicon photonics prototyping platform: present status and future outlook (Invited Paper)**, Callum G. Littlejohns, Ying Tran, Han Du, Mehdi Banakar, Xingzhao Yan, Univ. of Southampton (United Kingdom); Marc Sorel, Univ. of Glasgow (United Kingdom); Frederic Gardes, David Thomson, Goran Mashanovich, Graham T. Reed, Univ. of Southampton (United Kingdom) [11364-28]
- VTT's silicon photonics platform: present status and future outlook (Invited Paper)**, Timo Aalto, VTT Technical Research Ctr. of Finland Ltd. (Finland) [11364-29]
- Advances in imec silicon photonics technology platforms enabling co-packaging, sensing and/or power consumption reduction (Invited Paper)**, Philippe P. Absil, Guy Lepage, Peter Verheyen, Lieve Bogaerts, Andy Miller, Marianna Pantouvak, imec (Belgium); Joris Van Campenhout, Univ. Gent (Belgium) [11364-30]

TUESDAY 31 MARCH

SESSION 7 TUE 8:00 TO 10:20

Hybrid Integration

Session Chair: **Laurent Vivien**, Ctr. de Nanosciences et de Nanotechnologies (France), CNRS, Univ. Paris Saclay (France)

- New frontiers in on-chip photonics for signal processing (Invited Paper)**, Benjamin J. Eggleton, The Univ. of Sydney (Australia) [11364-31]
- Ultra-efficient Pockels modulators integrated in silicon photonic circuits (Invited Paper)**, Felix Eltes, Jean Fompeyrine, Stefan Abel, IBM Research - Zürich (Switzerland) [11364-32]
- III-V lasers directly grown on silicon (Invited Paper)**, Jianjun Zhang, Institute of Physics (China) [11364-33]
- Bound states in the continuum for photonic integration and InP membranes for heralded single photon generation (Invited Paper)**, Hon Ki Tsang, Yi Wang, Rakesh R. Kumar, Zejie Yu, Xiankai Sun, The Chinese Univ. of Hong Kong (Hong Kong, China); Marina Raevskaia, Vadim Pogoretskii, Yuqing Jiao, Technische Univ. Eindhoven (Netherlands) [11364-34]
- Hybrid III-V/silicon CMOS-compatible technology for laser integration on 200mm and 300mm platforms (Invited Paper)**, Karim Hassan, Bertrand Szelag, Laetitia Adelmini, Cécilia Dupré, CEA-LETI (France); Elodie Ghégin, STMicroelectronics S.A. (France); Philippe Rodriguez, Fabrice Nemouchi, Pierre Brianceau, Antoine Schembri, CEA-LETI (France); David Carrara, Pierrick Cavalie, Florent Franchin, Almae Technologies (France); Marie-Christine Roure, Loïc Sanchez, Christophe Jany, Segolène Olivier, CEA-LETI (France) [11364-35]
- Gigahertz acoustic waves for integration of optomechanical oscillators**, Giuseppe Modica, Rui Zhu, Remy Braive, Ctr. de Nanosciences et de Nanotechnologies, CNRS (France) [11364-36]

CONFERENCE 11364

SESSION 8. TUE 10:50 TO 11:40

Quantum Photonics

Session Chair: **Hon Ki Tsang**,

The Chinese Univ. of Hong Kong (Hong Kong, China)

Generation and manipulation of high dimensional quantum states of light with AlGaAs chips (*Invited Paper*), Saverio Francesconi, Giorgio Maltese, Felicien Appas, Arnault Raymond, Lab. Matériaux et Phénomènes Quantiques (France); Aristide Lemaître, Ctr. de Nanosciences et de Nanotechnologies (France); Maria Amanti, Florent Baboux, Sara Ducci, Lab. Matériaux et Phénomènes Quantiques (France). [11364-37]

Integrated photonics for quantum information processing (*Invited Paper*), Jelmer J. Renema, Univ. of Twente (Netherlands). [11364-38]

SESSION 9. TUE 11:40 TO 12:40

Light Manipulation

Session Chair: **Carlos A. Alonso-Ramos**, Ctr. de Nanosciences et de Nanotechnologies (France), CNRS, Univ. Paris Saclay (France)

Enhancing the performance of integrated photonic devices through subwavelength metamaterials, Aitor V. Velasco, David González-Andrade, Consejo Superior de Investigaciones Científicas (Spain); Alaine Herrero-Bermello, Alcyon Photonics (Spain); José Manuel Luque-González, Univ. de Málaga (Spain); Antonio Dias, Alcyon Photonics (Spain); Robert Halir, Gonzalo Wanguemert-Pérez, Alejandro Ortega-Moñux, Univ. de Málaga (Spain); Pavel Cheben, National Research Council Canada (Canada); Íñigo Molina-Fernández, Univ. de Málaga (Spain). [11364-39]

Large quality factors in whispering gallery mode resonators with small mode volume, Nirmalendu Acharyya, Max-Born-Institut (Germany); Gregory Kozyreff, Univ. Libre de Bruxelles (Belgium). [11364-40]

Development of integrated photonics based on SiO₂:TiO₂ sol-gel derived waveguide layers: state of the art, perspectives, prospective applications, Pawel Karasinski, Cuma Tyszkiewicz, Silesian Univ. of Technology (Poland); Ryszard Piramidowicz, Andrzej Kazmierczak, Warsaw Univ. of Technology (Poland). [11364-41]

Moire effects in subwavelength gratings: apodized structures for visible band optical applications, Andrei Ushkov, Isabelle Verrier, Thomas Kampfe, Yves Jourlin, Lab. Hubert Curien (France). [11364-42]

Lunch/Exhibition Break Tue 12:40 to 13:50

SESSION 10. TUE 13:50 TO 15:35

Silicon Photonics: Jean-Marc Fedeli's Contributions

Session Chair: **Laurent Vivien**, Ctr. de Nanosciences et de Nanotechnologies (France), CNRS, Univ. Paris Saclay (France)

The beginnings of silicon photonics at Leti (*Invited Paper*), Jean-Marc Fedéli, CEA-LETI (France). [11364-43]

Ge detectors from beginning (*Invited Paper*), Laurent Vivien, Ctr. de Nanosciences et de Nanotechnologies (France) and CNRS, Univ. Paris Saclay (France). [11364-44]

From μ -lasers to lasers on Si (*Invited Paper*), Dries Van Thourhout, Univ. Gent (Belgium). [11364-45]

History of Si modulators (*Invited Paper*), Delphine Marris-Morini, Ctr. de Nanosciences et de Nanotechnologies (France) and CNRS, Univ. Paris Saclay (France). [11364-46]

Past, present and future of open-access silicon photonics platforms (*Invited Paper*), Roel G. Baets, Univ. Gent (Belgium). [11364-47]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair

16:35 to 17:20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States

17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

POSTERS-TUESDAY TUE 18:05 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Tuesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

Realization of high-efficiency ultrasound-powered micro-LEDs for optogenetics, Tanmay Mondal, Brian Corbett, Tyndall National Institute (Ireland); Farshad Moradi, KJled Laursen, Aarhus Univ. (Denmark) . . [11364-55]

Integrated electro-optic tunable power splitter based on microring resonator having Interleaved PN junction, Rajib Ghosh, Priyanka Bhardwaj, Anuj Dhawan, Indian Institute of Technology Delhi (India) [11364-56]

Parameter extraction of silicon photonic devices using optical coherence tomography, Rabab A. Shalaby, Ain Shams Univ. (Egypt); Yasser M. Sabry, Diaa Khalil, Ain Shams Univ. (Egypt) and Si-Ware Systems (Egypt) [11364-57]

A passband and stopband switchable microwave photonic filter based on a silicon nitride microdisk, Huimin Yang, Jing Li, Pengfei Zheng, Dongdong Lin, Guohua Hu, Binfeng Yun, Yiping Cui, Southeast Univ. (China). [11364-58]

Optical beamforming network for Ka-band based on a four channel integrated optical true time delayline, Pengfei Zheng, Xueming Xu, Dongdong Lin, Binfeng Yun, Southeast Univ. (China). [11364-59]

Design of electro-optical tristate buffer and tristate inverter for high-speed optical interconnect, Amrindra Pal, Vivek Kumar Srivastava, Sandeep Sharma, DIT Univ. (India); Yadendra Singh, Indian Institute of Technology (Indian School of Mines), Dhanbad (India). [11364-60]

Design of incrementer and decremter device for optical computing, Vivek Kumar Srivastava, Aditya Pratap, Amrindra Pal, Sandeep Sharma, DIT Univ. (India); Yadendra Singh, Indian Institute of Technology (Indian School of Mines), Dhanbad (India) [11364-61]

Directed self-assembly of colloidal quantum dots and photonic structure by block copolymer templates, Byung Doo Chin, Ohyoung Kim, Dong Hyun Lee, Jaewoo Ahn, Dankook Univ. (Korea, Republic of). [11364-62]

Hydrogenated amorphous silicon compounds based devices: lithographic mask roughness mitigation, Paulo Lourenço, Univ. Nova de Lisboa (Portugal); Alessandro Fantoni, João Costa, Manuela Vieira, Instituto Superior de Engenharia de Lisboa (Portugal) [11364-63]

Analysis of integrated optical device with microfluidic channel for sensing application, Shwetha M., Narayan K., Sai Vidya Institute of Technology (India). [11364-64]

Theoretical investigation of silicon nitride waveguides for optical gas sensors in agricultural applications, Natricha Koopai, Kasetsart Univ. (Thailand); Pichet Limsuwan, King Mongkut's Univ. of Technology Thonburi (Thailand); Xavier Le Roux, Univ. Paris-Sud, Univ. Paris-Saclay (France) and CNRS (France); Laurent Vivien, CNRS, Univ. Paris-Sud, Univ. Paris-Saclay (France); Delphine Marris-Morini, CNRS, Univ. Paris-Sud, Univ. Paris-Saclay (France); Papichaya Chaisakul, Kasetsart Univ. (Thailand) [11364-65]

WEDNESDAY 1 APRIL

SESSION 11. WED 8:00 TO 9:10

Mid-IR Photonics

Session Chair: **Delphine Marris-Morini**, Ctr. de Nanosciences et de Nanotechnologies (France)

Integrated silicon photonic devices for Mid-IR applications (*Invited Paper*), Goran Z. Mashanovich, Univ. of Southampton (United Kingdom). [11364-48]

Optical modulation in Ge-rich SiGe waveguides up to 11 μ m wavelength, Miguel Montesinos Ballester, Ctr. de Nanosciences et de Nanotechnologies (France); Valdyslav Vakarin, Nexdot (France); Joan Manel Ramirez, III-V Lab. (France); Qiankun Liu, Carlos Alonso-Ramos, Xavier Le Roux, Ctr. de Nanosciences et de Nanotechnologies (France); Jacopo Frigerio, Andrea Ballabio, Andrea Barzagli, L-NESS, Politecnico di Milano (Italy); Lucas Deniel, David Bouville, Laurent Vivien, Ctr. de Nanosciences et de Nanotechnologies (France); Giovanni Isella, L-NESS, Politecnico di Milano (Italy); Delphine Marris-Morini, Ctr. de Nanosciences et de Nanotechnologies (France). [11364-49]

Port analysis using S-matrix for 2D metasurface waveguide coupler in mid-IR application, Asif Bilal, Abdullah Nafis Khan, Osama Jalil, Shahzad Ahmad, Usman Younis, Information Technology Univ. of the Punjab (Pakistan) [11364-50]

Ultra-wideband flat anomalous dispersion in nanostructured silicon membrane waveguides, Thi Thuy Duong Dinh, Jianhao Zhang, Miguel Montesinos, Xavier Le Roux, Christian Lafforgue, Daniel Benedikovic, Ctr. de Nanosciences et de Nanotechnologies (France); Pavel Cheben, National Research Council Canada (Canada); Eric Cassan, Delphine Marris-Morini, Ctr. de Nanosciences et de Nanotechnologies (France); Gregory Maisons, Mathieu Carras, mirSense (France); Sebastien Cremer, Stephane Monfray, Frederic Boeuf, STMicroelectronics S.A. (France); Laurent Vivien, Carlos A. Alonso-Ramos, Ctr. de Nanosciences et de Nanotechnologies (France) [11364-51]

SESSION 12..... WED 9:10 TO 10:15

Imaging, Microscopy and Sensing

Session Chair: **Goran Z. Mashanovich**,
Univ. of Southampton (United Kingdom)

Chip-based super-resolution structured illumination microscopy (*Invited Paper*), Qingzhong Deng, imec (Belgium) and KU Leuven (Belgium); Ongun Arisev, Dmitry Kouznetsov, MD Mahmud Ul Hasan, Pieter Neutens, Zhenxiang Luo, Seungkyu Ha, Kris Covens, Rita Vos, Pol Van Dorpe, Niels Verellen, imec (Belgium) [11364-52]

On-chip nano-imaging: integrated and multimodal nanoscopy platform (*Invited Paper*), Øystein Ivar Helle, Firehun Tsige Dullo, Jean-Claude Tinguely, David Andre André Coucheron, Marcel Lahrberg, Balpreet Singh Ahluwalia, UiT The Arctic Univ. of Norway (Norway) [11364-53]

Widely tunable optoelectronic oscillator enabled by a silicon micro-ring resonator, Phuong T. Do, Lab. de Photonique Quantique et Moléculaire, École normale supérieure Paris-Saclay (France); Carlos A. Alonso-Ramos, Xavier Le Roux, Ctr. de Nanosciences et de Nanotechnologies (France); Isabelle Ledoux, Lab. de Photonique Quantique et Moléculaire, École normale supérieure Paris-Saclay (France); Eric Cassan, Ctr. de Nanosciences et de Nanotechnologies (France); Bernard Journet, Lab. de Photonique Quantique et Moléculaire, École normale supérieure Paris-Saclay (France) [11364-54]

Organic Electronics and Photonics: Fundamentals and Devices II

Conference Chairs: **Sebastian Reineke**, TU Dresden (Germany); **Koen Vandewal**, TU Dresden (Germany); **Wouter Maes**, Univ. Hasselt (Belgium)

Programme Committee: **Artem A. Bakulin**, Imperial College London (United Kingdom); **David Beljonne**, Univ. de Mons (Belgium); **Vladimir Dyakonov**, Julius-Maximilians-Univ. Würzburg (Germany); **Malte C. Gather**, Univ. of St. Andrews (United Kingdom); **Peter Ho**, National Univ. of Singapore (Singapore); **Kristiaan Neyts**, Univ. Gent (Belgium); **Markus Clark Scharber**, Johannes Kepler Univ. Linz (Austria); **Franky So**, North Carolina State Univ. (United States); **Natalie Stingelin**, Georgia Institute of Technology (United States); **He Yan**, Hong Kong Univ. of Science and Technology (Hong Kong, China); **Eli Zysman-Colman**, Univ. of St. Andrews (United Kingdom)

TUESDAY 31 MARCH

SESSION 1 TUE 8:50 TO 10:30

Organic Electronic Devices and OLEDs I

Session Chair: **Sebastian Reineke**, TU Dresden (Germany)

Manipulation of optical modes in OLEDs (*Invited Paper*), Franky So, North Carolina State Univ. (United States) [11365-1]

Design and realization of efficient, bright and low-cost light-emitting electrochemical cells (*Invited Paper*), Ludvig Edman, Umeå Univ. (Sweden) [11365-2]

Recent advances in sustainable white light-emitting electrochemical cells, Elisa Fresta, Rubén D. Costa, IMDEA Materials Institute (Spain) [11365-3]

Inkjet printing of multiple layers for large-scale, cadmium-free electroluminescent quantum dot light-emitting diodes, Tobias Hübner, OSRAM Opto Semiconductors GmbH (Germany); Christoph J. Brabec, Friedrich-Alexander-Univ. Erlangen-Nürnberg, Institute Materials for Electronics and Energy Technology (Germany); Britta Göötz, Norwin von Malm, OSRAM Opto Semiconductors GmbH (Germany) [11365-4]

SESSION 2 TUE 11:00 TO 12:20

OLED Materials

Session Chair: **Wouter Maes**, Univ. Hasselt (Belgium)

Achieving conformational control in RTP and TADF emitters by functionalization of the central core, Nadzeya A. Kukhta, Rongjuan Huang, Andrei Batsanov, Martin R. Bryce, Fernando Dias, Durham Univ. (United Kingdom) [11365-5]

Comparison of donor-acceptor linkage strategies for organic thermally activated delayed fluorescence emitters, Yun Long, Andrew Danos, Larissa Gomes, Chunyong Li, Andrew P. Monkman, Durham Univ. (United Kingdom) [11365-6]

Sterically hindered OLED materials for solid-state lighting, Sidney A. Howell, Paul L. Burn, Emma V. Puttock, The Univ. of Queensland (Australia) [11365-7]

The interplay of thermally activated delayed fluorescence and room temperature phosphorescence in donor-acceptor compounds, Tom Cardeynaels, Univ. Hasselt (Belgium) and Univ. de Namur (Belgium); Simon Paredis, Univ. Hasselt (Belgium); Andrew Danos, Andrew P. Monkman, Durham Univ. (United Kingdom); Dirk Vanderzande, Univ. Hasselt (Belgium); Benoît Champagne, Univ. de Namur (Belgium); Wouter Maes, Univ. Hasselt (Belgium) [11365-8]

Lunch/Exhibition Break Tue 12:20 to 13:50

SESSION 3 TUE 13:50 TO 15:20

Organic Electronic Devices and OLEDs II

Session Chair: **Sebastian Reineke**, TU Dresden (Germany)

Tailoring organic light-emitting diodes for applications in biophotonics (*Invited Paper*), Caroline Murawski, Kurt-Schwabe-Institut Meinsberg (Germany) and Univ. of St. Andrews (United Kingdom); Chang-Min Keum, Andrew Morton, Ya-Li Deng, Andreas Mischok, Jonathan Booth, Stefan Pulver, Malte C. Gather, Univ. of St. Andrews (United Kingdom) [11365-9]

Combining an OLED with an insulating layer to create a new type of non-volatile memory, Axel Fischer, Integrated Ctr. for Applied Physics and Photonic Materials, TU Dresden (Germany); Yichu Zheng, Ctr. for Advancing Electronics Dresden, TU Dresden (Germany); Sebastian Reineke, Integrated Ctr. Applied Physic & Photonic Materials, TU Dresden (Germany); Stefan C. B. Mannsfeld, Ctr. for Advancing Electronics Dresden, TU Dresden (Germany) [11365-10]

Amino acids and their derivatives as platforms for photonic integrated circuits, Amir Handelman, Holon Institute of Technology (Israel) . . . [11365-11]

Rewritable and flexible high-contrast tags using switchable organic room temperature phosphorescence, Tim Achenbach, Max Gmelch, Heidi Thomas, Felix Fries, Sebastian Reineke, TU Dresden (Germany) [11365-12]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair

16:35 to 17:20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States

17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

POSTERS-TUESDAY TUE 18:05 TO 20:00

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Innovation management in laser research: research project combines technological development with economic benefits, Leon-Daniel Fischer, Tobias Frenzel, Ostfalia Hochschule für angewandte Wissenschaften (Germany) [11365-24]

Computational study of small molecules as hole transport materials for perovskite solar cells from National Physical Laboratory, Sheerin Naqvi, Council of Scientific and Industrial Research, National Physical Lab. (India); Asit Patra, National Physical Lab. (India) [11365-25]

Perovskites for printed flexible electronics, Lei Wang, Yang Wang, ABB Power Grids Research (China) [11365-26]

Visualising the role of photoinduced ion migration on optoelectronic performance in organic inorganic hybrid perovskite single crystal, Hoyeon Choi, The Univ. of Manchester (United Kingdom) [11365-27]

Synthesis and characterization of heteroleptic iridium(III) complex-cored dendrimers for OLEDs, Manikandan Koodalingam, The Univ. of Queensland (Australia) [11365-28]

Synthesis of iridium(III) complexes incorporating emissive dendrons, Akash Thamarappalli, The Univ. of Queensland (Australia) [11365-29]

Nonlinear optical studies of perylene microcrystals, Evgeniy A. Mamonov, Mikhail E. Popov, M. V. Lomonosov Moscow State Univ. (Russian Federation); Nikolai V. Mitetelo, M.V. Lomonosov Moscow State Univ. (Russian Federation); Vuppu V. Pradeep, Mari Annadhasan, Rajadurai Chandrasekar, Univ. of Hyderabad (India); Tatiana V. Murzina, M.V. Lomonosov Moscow State Univ. (Russian Federation) [11365-31]

Plasmonic metal-dielectric core-shell nanoparticles for enhanced power conversion efficiency of organic solar cells, Abhijit Das, Kamal Kumar, Anuj Dhawan, Indian Institute of Technology Delhi (India) [11365-32]

A micrometer-scale patterning of OLED substrates for the enhancement of outcoupling efficiency by redirection of substrate and organic waveguided modes, Savanna Lloyd, Japan Advanced Institute of Science and Technology (Japan); Tatsuya Tanigawa, IMRA America, Inc. (Japan); Hideyuki Murata, Japan Advanced Institute of Science and Technology (Japan) [11365-33]

Metal oxide-based nanomesh electrode: its application to organic LEDs, Tae Geun Kim, Hojin Lee, Kyungrock Son, Korea Univ. (Korea, Republic of) [11365-34]

Ultrafast photophysical processes of Soret-band excited zinc phthalocyanine and femtosecond third-order nonlinear optical properties, Naga Krishnakanth Katturi, Univ. of Hyderabad (India); Venkata Suman Krishna Jonnadula, Indian Institute of Chemical Technology (India); Chinmoy Biswas, Indian Institute of Technology Hyderabad (India); Venugopal Rao Soma, Univ. of Hyderabad (India); Sai Santosh Kumar Raavi, Indian Institute of Technology Hyderabad (India); Lingamallu Giribabu, Indian Institute of Chemical Technology (India) [11365-35]

Photosensitive junctions based on graphene field-effect transistors, Ivan I. Bobrinetskiy, National Research Univ. of Electronic Technology (Russian Federation) and BioSense Institute (Serbia); Aleksei Emelianov, Nikita Nekrasov, National Research Univ. of Electronic Technology (Russian Federation) [11365-36]

Applying the design principles from thermally activated delayed fluorescence to create novel materials for photodynamic therapy, Tom Cardeynaels, Univ. Hasselt (Belgium) and Univ. de Namur (Belgium); Jasper Dekkers, Simon Paredis, Univ. Hasselt (Belgium); Eduard Fron, Johan Hofkens, KU Leuven (Belgium); Dirk Vanderzande, Univ. Hasselt (Belgium); Benoît Champagne, Univ. de Namur (Belgium); Wouter Maes, Univ. Hasselt (Belgium) [11365-37]

WEDNESDAY 1 APRIL

SESSION 4 WED 9:30 TO 12:20

Spectroscopy and Fundamentals I

Session Chair: **Koen Vandewal**, Univ. Hasselt (Belgium)

Spectroscopy-TBA2 (Invited Paper), Jenny Nelson, Imperial College London (United Kingdom) [11365-13]

Charge dynamics in organic photovoltaic devices based on non-fullerene acceptor materials (Invited Paper), Artem A. Bakulin, Imperial College London (United Kingdom) [11365-14]

Mapping the energetic landscape of solution-processed organic photovoltaic devices (Invited Paper), Yana Vaynzof, TU Dresden (Germany) [11365-15]

Exciton dynamics in donor-acceptor-donor molecules: impact of molecular structure and self-assembly on the exciton lifetime, Jiang JING, Emilie Steveler, Univ. de Strasbourg, CNRS, Institut National des Sciences Appliquées de Strasbourg, ICube (France); Nicolas Leclerc, Institut de Chimie et Procédés pour l'Énergie, l'Environnement et la Santé, Univ. de Strasbourg (France); Benoît Heinrich, Institut de physique et chimie des matériaux de Strasbourg (France); Wilfried Uhring, Thomas Heiser, ICUBE, Univ. de Strasbourg (France) [11365-16]

Electro-optical considerations for thin film organic semiconductor solar cells and photodiodes (Invited Paper), Paul Meredith, Ardan Armin, Nasim Zarrabi, Stefan Zeiske, C. Kaiser, Oskar J. Sandberg, Swansea Univ. (United Kingdom) [11365-17]

Lunch/Exhibition Break Wed 12:20 to 13:50

SESSION 5 WED 13:50 TO 15:00

Organic Photodetectors

Session Chair: **Wouter Maes**, Univ. Hasselt (Belgium)

Narrow band gap conjugated polymers for infrared organic optoelectronics (Invited Paper), Jason D. Azoulay, The Univ. of Southern Mississippi (United States); Tse Nga Ng, Univ. of California, San Diego (United States); Matthew Sfeir, Photonics Initiative, Advanced Science Research Ctr., The City Univ. of New York (United States); Naresh Eedugurala, Lifeng Huang, The Univ. of Southern Mississippi (United States) [11365-18]

Organic spectroscopic photodetectors for VIS-NIR sensing applications, David Wynands, Robert Brückner, Rico Meerheim, Matthias Jahnel, Senorics GmbH (Germany); Johannes Benduhn, TU Dresden (Germany); Sascha Ullbrich, Senorics GmbH (Germany) [11365-19]

External quantum efficiency amplification via photomultiplication in organic photodetectors, Jonas Kublitski, Dresden Integrated Ctr. for Applied Physics and Photonic Materials (Germany); Axel Fischer, Integrated Ctr. for Applied Physics and Photonic Materials, TU Dresden (Germany); Shen Xing, Donato Spoltore, Dresden Integrated Ctr. for Applied Physics and Photonic Materials (Germany); Koen Vandewal, IMO-IMOMECE, Univ. Hasselt (Belgium); Karl Leo, Dresden Integrated Ctr. for Applied Physics and Photonic Materials (Germany) [11365-20]

SESSION 5 WED 15:30 TO 16:50

Spectroscopy and Fundamentals II

Session Chair: **Sebastian Reineke**, TU Dresden (Germany)

Single-particle electroluminescence and photoluminescence spectroscopy of conjugated polymers and perovskite nanocrystals (Invited Paper), Martin Vacha, Tokyo Institute of Technology (Japan) [11365-21]

Intrinsic analysis of transition processes from the lowest excited triplet state of heavy atom-free molecules with persistent room-temperature phosphorescence (Invited Paper), Shuzo Hirata, The Univ. of Electro-Communications (Japan) [11365-22]

Probing structure-function relationships in thermally-activated delayed fluorescence emitters using electron spin resonance spectroscopy, Bluebell Drummond, Univ. of Cambridge (United Kingdom); Matthew Cooper, Yadong Zhang, Georgia Institute of Technology (United States); William Myers, Univ. of Oxford (United Kingdom); Stephen Barlow, Georgia Institute of Technology (United States); Saul Jones, Univ. of Cambridge (United Kingdom); Seth Marder, Georgia Institute of Technology (United States); Daniel Credgington, Univ. of Cambridge (United Kingdom) [11365-23]

CONFERENCE 11366

Tuesday–Thursday 31 March–2 April 2020 • Proceedings of SPIE Vol. 11366

Photonics for Solar Energy Systems VIII

Conference Chairs: **Alexander N. Sprafke**, Martin-Luther Univ. Halle-Wittenberg (Germany); **Jan Christoph Goldschmidt**, Fraunhofer-Institut für Solare Energiesysteme ISE (Germany); **Gregory Pandraud**, Technische Univ. Delft (Netherlands)

Programme Committee: **Benedikt Bläsi**, Fraunhofer-Institut für Solare Energiesysteme (Germany); **Christoph J. Brabec**, Friedrich-Alexander-Univ. Erlangen-Nürnberg (Germany); **Mark Brongersma**, Geballe Lab. for Advanced Materials (GLAM) (United States); **Ning Dai**, Shanghai Institute of Technical Physics (China); **Klaus Jäger**, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); **Jung-Ho Lee**, Hanyang Univ. (Korea, Republic of); **Ulrich Wilhelm Paetzold**, Karlsruher Institut für Technologie (Germany); **Martin P. Pfeiffer**, Heliatek GmbH (Germany)

TUESDAY 31 MARCH

SESSION 1 TUE 13:40 TO 16:00

Perovskite Silicon Tandem Solar Cells

Light management for high-efficiency perovskite/silicon tandem photovoltaics (*Invited Paper*), Ulrich Wilhelm Paetzold, Karlsruher Institut für Technologie (Germany) [11366-1]

Optimizing perovskite silicon tandem solar cells for highest efficiency and energy yield (*Invited Paper*), Jan Christoph Goldschmidt, Patricia S. C. Schulze, Alexander J. Bett, Özde Kabakli, Kristina M. Winkler, Fraunhofer-Institut für Solare Energiesysteme ISE (Germany); Ludmila Cojocar, Albert-Ludwigs-Univ. Freiburg (Germany); Martin Bivour, Benedikt Bläsi, Hubert Hauser, Clarissa Hofmann, Armin Richter, Nico Tucher, Leonard Tutsch, Qinxin Zhang, Martin Hermle, Fraunhofer-Institut für Solare Energiesysteme ISE (Germany); Stefan W. Glunz, Fraunhofer-Institut für Solare Energiesysteme ISE (Germany) and Albert-Ludwigs-Universität Freiburg (Germany) . . [11366-2]

Energy yield and cost optimizations of large-scale perovskite/silicon tandem bifacial solar power plants (*Invited Paper*), Klaus Jäger, Peter Tillmann, Robert Wenisch, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany); Eugene A. Katz, Ben-Gurion Univ. of the Negev (Israel); Christiane Becker, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) [11366-3]

Energy yield modelling of three-terminal perovskite-based tandem photovoltaics (*Invited Paper*), Fabrizio Gota, Karlsruher Institut für Technologie (Germany) [11366-4]

Invisibility cloaking of dead areas on perovskite photovoltaics, David Benedikt Ritzer, Malte Langenhorst, Karlsruher Institut für Technologie (Germany); Frederik Kotz, Patrick Risch, Bastian E. Rapp, Univ. of Freiburg (Germany); Bryce Sidney Richards, Ulrich Wilhelm Paetzold, Karlsruher Institut für Technologie (Germany) [11366-9]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair

16.35 to 17:20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States

17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

POSTERS-TUESDAY TUE 18:05 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Tuesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Tuesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

A unified detailed-balance thermodynamic approach for photovoltaic efficiency, Ido Frenkel, Ben-Gurion Univ. of the Negev (Israel) [11366-32]

Silver nanoparticle-based antireflection coating for solar cells, Bhaskar Singh, Technische Univ. Clausthal (Germany); Mohammed M. Shabat, Islamic Univ. of Gaza (Palestine, State of); Daniel M. Schaadt, Technische Univ. Clausthal (Germany) [11366-33]

Hybrid plasmonic organic perovskite solar cell, Fatemeh Hosseini Alast, Salar Mehdipour Naiemi, Amir Hossein Baradaran Ghasemi, Ezeddin Mohajerani, Hamid Latifi, Shahid Beheshti Univ. (Iran, Islamic Republic of) [11366-34]

Bismuth perfect absorber as a highly efficient hot electron-based water splitting cell, Amir Ghobadi, Turkan Gamze Ulusoy Ghobadi, Ekmel Özbay, Bilkent Univ. (Turkey) [11366-35]

Algorithm for precise positioning of photovoltaic panels, Kamil Plachta, Wrocław Univ. of Science and Technology (Poland) [11366-36]

Tailoring the structural and electronic properties of CsPbBr₃ by Mn doping, Nivedita Pandey, Abhishek Kumar, Subhananda Chakrabarti, Indian Institute of Technology Bombay (India) [11366-37]

Density functional theory-based study of CsPb(Cl/Br)₃ mixed halide perovskites with experimental validation, Abhishek Kumar, Nivedita Pandey, Subhananda Chakrabarti, Indian Institute of Technology Bombay (India) [11366-38]

Spectral splitting of a broadband light using a spatial light modulator, Berk Nezir Gun, Emre Yüce, Middle East Technical Univ. (Turkey) . . [11366-39]

Investigation on charge carrier dynamics of core-shell nanocrystal modified mixed halide perovskite using transient absorption spectroscopy, Sayan Prodhan, Indian Institute of Technology Kharagpur (India); Sayan Bhattacharya, Indian Institute of Science Education and Research Kolkata (India); Prasanta Kumar Datta, Indian Institute of Technology Kharagpur (India) [11366-40]

WEDNESDAY 1 APRIL

SESSION 2 WED 9:00 TO 10:30

III-IV Silicon Tandem Solar Cells

Fabrication techniques for photonic contacts in highest efficiency silicon-based tandem solar cells (*Invited Paper*), Hubert Hauser, Oliver Höhn, Ralph Müller, Kai Mühlbach, Rita M. d. S. Freitas, Jan Benick, Frank Dimroth, Martin Hermle, Benedikt Bläsi, Fraunhofer-Institut für Solare Energiesysteme ISE (Germany) [11366-5]

Plasmonic and Mie scattering in nanopatterned back reflectors for III–V-on-silicon solar cells (*Invited Paper*), Concetto Eugenio Andrea Cordaro, AMOLF (Netherlands); Nico Tucher, Fraunhofer-Institut für Solare Energiesysteme ISE (Germany); Stefan Tabernig, AMOLF (Netherlands); Hubert Hauser, Oliver Höhn, Ralph Müller, Benedikt Bläsi, Fraunhofer-Institut für Solare Energiesysteme ISE (Germany); Albert Polman, AMOLF (Netherlands) . . [11366-6]

Direct wafer bonding for the realization of transparent and electrically conductive heterojunctions in III-V solar cells with highest efficiencies (*Invited Paper*), Felix Predan, Ralph Müller, Oliver Höhn, David Lackner, Frank Dimroth, Fraunhofer-Institut für Solare Energiesysteme ISE (Germany) [11366-7]

SESSION 3 WED 11:00 TO 12:20

Light Management and Energy Yield in Tandem and Single Junction Solar Cells

Photovoltaic energy yield predictions using satellite data (*Invited Paper*), Ian Marius Peters, Forschungszentrum Jülich GmbH (Germany); Haohui Liu, National Univ. of Singapore (Singapore); Tonio Buonassisi, Massachusetts Institute of Technology (United States) [11366-8]

Shallow nanotextures for light management in solution-processed perovskite solar cells, Johannes Sutter, Philipp Tockhorn, Klaus Jäger, Amran Al-Ashouri, Steve Albrecht, Christiane Becker, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany) [11366-10]

The role of texturing in perovskite silicon 2T tandems (*Invited Paper*), Michele de Bastiani, King Abdullah Univ. of Science and Technology (Saudi Arabia) [11366-11]

Lunch/Exhibition Break Wed 12:20 to 13:30

SESSION 4 WED 13:30 TO 15:30

Light Trapping, Disorder, and Hyperuniformity

Hyperuniform designs for enhanced light trapping in ultrathin single and tandem solar cells (*Invited Paper*), Nasim Tavakoli, Ctr. for Nanophotonics, AMOLF, NWO-I (Netherlands); Richard J. Spalding, Georgios Gkantzounis, Chenglong Wan, Advanced Technology Institute, Univ. of Surrey (United Kingdom); Ruslan Röhrich, Evgenia Koutoleta, Ctr. for Nanophotonics, AMOLF, NWO-I (Netherlands); Marian Florescu, Advanced Technology Institute, Univ. of Surrey (United Kingdom); Riccardo Sapienza, Imperial College London (United Kingdom); Femius Koenderink, Esther Alarcón-Lladó, Ctr. for Nanophotonics, AMOLF, NWO-I (Netherlands). [11366-12]

Fabrication of nearly hyperuniform disordered substrates for photonic applications (*Invited Paper*), Alexander N. Sprafke, Martin-Luther-Univ. Halle-Wittenberg (Germany); Peter M. Piechulla, Martin-Luther-Univ. Halle-Wittenberg (Germany); Ralf B. Wehrspohn, Martin-Luther-Univ. Halle-Wittenberg (Germany); Carsten Rockstuhl, Karlsruher Institut für Technologie (Germany) [11366-13]

External light trap for enhanced solar power production, Ido Frenkel, Ben-Gurion Univ. of the Negev (Israel) [11366-14]

Modulated surface texturing of temporary Al foils substrates for high-efficiency thin film, flexible solar cells, Gianluca Limodio, Technische Univ. Delft (Netherlands); Davide Bartesaghi, Maurice Hietkamp, HyET Solar B.V. (Netherlands); Devika Rajagopal, Sajith Nawaratne, Technische Univ. Delft (Netherlands); Robin Quax, Edward A. G. Hamers, HyET Solar B.V. (Netherlands); Arno H. M. Smets, Technische Univ. Delft (Netherlands). [11366-15]

Aperiodically structured surface layers for efficient light harvesting of organic solar cells, Milena Theresa Merkel, Thomas Schemme, Cornelia Denz, Westfälische Wilhelms-Univ. Münster (Germany) . . . [11366-16]

SESSION 5 WED 16:00 TO 18:00

Perovskite Solar Cells

Effect of graphene doping of PEDOT:PSS in inverted perovskite solar cells properties, Carmen Coya, Teresa Ripolles, Carlos D. Redondo-Obispo, Univ. Rey Juan Carlos (Spain) [11366-17]

UV degradation mechanism of TiO₂-based perovskite solar cells studied by pump-probe spectroscopy, Chih-Wei Luo, National Chiao Tung Univ. (Taiwan); Anusha Puliparambil Thilakan, Vellore Institute of Technology (India); Jia-Xin Li, National Chiao Tung Univ. (Taiwan); Tzu-Pei Chen, Ctr. of Atomic Initiative for New Materials, National Taiwan Univ. (Taiwan); Shao-Sian Li, Graduate Institute of Biomedical Optomechatronics, Taipei Medical Univ. (Taiwan); Chun-Wei Chen, National Taiwan Univ. (Taiwan); Atsushi Yabushita, National Chiao Tung Univ. (Taiwan); Minoru Osada, Nagoya Univ. (Japan); Kazuhito Tsukagoshi, Takayoshi Sasaki, International Ctr. for Materials Nanoarchitectonics, National Institute for Materials Science (Japan) [11366-18]

Remarkable carrier diffusion length and slow hot carrier cooling in thin film missed halide perovskite, Kamlesh Kumar Chauhan, Sayan Proshan, Indian Institute of Technology Kharagpur (India); Sayan Bhattacharya, Indian Institute of Science Education and Research Kolkata (India); Pranab Kumar Dutta, Prasanta Kumar Datta, Indian Institute of Technology Kharagpur (India). [11366-19]

On the potential of metal nickel oxide front contact for efficient perovskite solar cells, Mohammad Ismail Hossain, The Hong Kong Polytechnic Univ. (Hong Kong, China). [11366-20]

Plasmonics-enhanced organic solar cells with complex metallic nanoparticles, Kamal Kumar, Abhijit Das, Anuj Dhawan, Indian Institute of Technology Delhi (India) [11366-21]

Influence of plasmonic nanoislands on photovoltaic properties of n-ZnO/p-Si heterojunction solar cells, Piotr Wróbel, Univ. of Warsaw (Poland); Rafal Pietruszka, Institute of Physics (Poland); Arkadiusz Ciesielski, Univ. of Warsaw (Poland); Bartłomiej Witkowski, Monika Ozga, Tomasz Wojciechowski, Marek Godlewski, Institute of Physics (Poland); Pawel Trautman, Maria Kaminska, Tomasz Szoplík, Univ. of Warsaw (Poland). [11366-22]

THURSDAY 2 APRIL

HOT TOPICS III THU 9:00 TO 10:35

Photonics Europe 2020: Hot Topics Session III

- 9.00 - 9.05 **Introduction**
Thierry Georges, Oxxius, France
2019 Symposium Chair
- 9.05 - 9.50 **Ultrafast solid-state lasers: a success story for the last 30 years with no end in sight**
Ursula Keller, ETH Zurich, Switzerland
- 9:50 - 10:35 **From inverse design to implementation of practical quantum photonics**
Jelena Vuckovic, Stanford Univ., United States

For additional details see page 9

SESSION 6 THU 11:00 TO 12:30

New Concepts

Strong directional CdSe/ZnS core-shell quantum dot emission for tetracene/Si singlet-triplet down-conversion photovoltaics (*Invited Paper*), Tom P. N. Veeken, Benjamin Daiber, Harshal Agrawal, Albert Polman, Bruno Ehrler, AMOLF (Netherlands). [11366-23]

Efficient solar vapour generation by porous photo-reduced graphene oxide membrane, Tieshan Yang, Han Lin, Keng-Te Lin, Swinburne Univ. of Technology (Australia); Chunsheng Guo, Shandong Univ. (China); Scott Fraser, Baohua Jia, Swinburne Univ. of Technology (Australia) [11366-24]

Implementing a p-SiOx:H/p-Si:C:H double window layer for high efficiency, roll-to-roll processed flexible thin film silicon solar modules, Davide Bartesaghi, HyET Solar B.V. (Netherlands); Gianluca Limodio, Arno H. M. Smets, Technische Univ. Delft (Netherlands); Edward A. G. Hamers, HyET Solar B.V. (Netherlands) [11366-25]

Development of a novel smooth texture on crystalline silicon for processing polycrystalline materials, Thierry de Vrijer, Arno H. M. Smets, Technische Univ. Delft (Netherlands). [11366-26]

Lunch Break Thu 12:30 to 13:40

SESSION 7 THU 13:40 TO 15:40

Angular Dependency of Photonics Structures and Spectral Splitting

Colored modules for integrated PV: from the MorphoColor concept to high-efficiency prototypes (*Invited Paper*), Benedikt Bläsi, Oliver Höhn, Thomas Kroyer, Johannes Eisenlohr, Martin Heinrich, Holger Neuhaus, Tilmann Kuhn, Fraunhofer-Institut für Solare Energiesysteme ISE (Germany) [11366-27]

Spectrum splitting and directivity control by optical metasurfaces integrated in photovoltaic devices, Verena Neder, Floris Uleman, Concetto Eugenio Andrea Cordaro, Albert Polman, AMOLF (Netherlands). . . . [11366-28]

Holographic spectrum-splitting photovoltaic system using bifacial silicon cells, Benjamin D. Chrysler, Raymond K. Kostuk, The Univ. of Arizona (United States) [11366-29]

Angle-independent diffractive optical elements for efficient solar energy conversion, Alim Yolalmaz, Emre Yüce, Middle East Technical Univ. (Turkey) [11366-30]

Solar energy yield simulation toolbox for novel photovoltaic module concepts (*Invited Paper*), Hesam Ziar, Technische Univ. Delft (Netherlands). [11366-31]

CONFERENCE 11367

Tuesday 31 March 2020 • Proceedings of SPIE Vol. 11367

Photosensitive Materials and their Applications

Conference Chairs: Robert R. McLeod, Univ. of Colorado Boulder (United States); Inmaculada Pascual Villalobos, Univ. de Alicante (Spain); Yasuo Tomita, Univ. of Electro-Communications (Japan); John T. Sheridan, Univ. College Dublin (Ireland)

Programme Committee: Andrea Bianco, Istituto Nazionale di Astrofisica (Italy); Augusto Beléndez, Univ. de Alicante (Spain); Hans I. Bjelkhagen, Glyndwr Univ. (United Kingdom); Friedrich-Karl Bruder, Covestro AG (Germany); Ivan B. Divliansky, CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States); Antonio Fimia Gil, Univ. Miguel Hernández (Spain); Martin Fally, Univ. Wien (Austria); Sergi Gallego Rico, Univ. de Alicante (Spain); Jinxin Guo, Beijing Univ. of Technology (China); Yuan Luo, National Taiwan Univ. (Taiwan); Christian Ley, Univ. de Haute Alsace (France); Izabela Naydenova, Dublin Institute of Technology (Ireland); Nikolay V. Nikonov, ITMO Univ. (Russian Federation); Sergey B. Odinov, Bauman Moscow State Technical Univ. (Russian Federation); Tina Sabel, Technische Univ. Berlin (Germany); Oksana V. Sakhno, Fraunhofer-Institut für Angewandte Polymerforschung IAP (Germany); Takeo Sasaki, Tokyo Univ. of Science (Japan); Kalaichelvi Saravanamuttu, McMaster Univ. (Canada); Amy C. Sullivan, Univ. of Colorado Boulder (United States); Xiaodi Tan, Fujian Normal Univ. (China)

TUESDAY 31 MARCH

SESSION 1 TUE 13:10 TO 16:10

Material Design, Characterization and Analysis

Session Chair: John T. Sheridan, Univ. College Dublin (Ireland)

Aqueous photochemistry for the fabrication of grating sensors in hydrogels (*Invited Paper*), Ruchi Gupta, Univ. of Birmingham (United Kingdom) [11367-1]

Photochemical aspects of high-performance initiating systems for holographic recording and 3D printing applications (*Invited Paper*), Xavier Allonas, Univ. de Haute Alsace (France) [11367-69]

Minimizing the scattering in holographic optical elements based on Bayfol® HX, Alessio Zanutta, Osservatorio Astronomico di Brera, Istituto Nazionale di Astrofisica (Italy); Giulio Riva, Politecnico di Milano (Italy); Andrea Bianco, Osservatorio Astronomico di Brera, Istituto Nazionale di Astrofisica (Italy) [11367-2]

Scattering and recording dynamics in holographic photopolymers, Izabella Berman, Benjamin A. Kowalski, Robert R. McLeod, Univ. of Colorado Boulder (United States) [11367-3]

Optimisation of the performance of holographic beam-shaping diffractive diffusers through refinement of the recording process, Cara Jones, Sanjay Keshri, Suzanne Martin, Dervil Cody, Kevin Murphy, Ctr. for Industrial & Engineering Optics, Technological Univ. Dublin (Ireland) [11367-4]

A predictive model for index formation in two-stage photopolymers, Izabella Berman, Amy Sullivan, Robert R. McLeod, Univ. of Colorado Boulder (United States) [11367-5]

Continuous tuning of spatial frequency as a tool to probe recording kinetics, Amy Sullivan, Benjamin A. Kowalski, Robert R. McLeod, Univ. of Colorado Boulder (United States) [11367-6]

Development of holographic materials based on thiol-x click chemistry, Yunfeng Hu, Univ. of Colorado Boulder (United States) [11367-7]

Hot Topics II TUE 16:30 TO 18:05

Photonics Europe 2020: Hot Topics Session II

- 16.30 to 16.35 **Introduction**
Francis Berghmans, Vrije Univ. Brussel, Belgium
2019 Symposium Chair
- 16.35 to 17.20 **Computational microscopy**
Laura Waller, University of California, Berkeley, United States
- 17.20 to 18.05 **Seeing the unseen in patients: advancing disease prevention and treatment through microimaging**
Guillermo Tearney, Harvard Medical School, Massachusetts General Hospital, United States

For additional details see page 8

WEDNESDAY 1 APRIL

SESSION 2 WED 8:20 TO 10:20

Sensing Applications and Volume Reflection Gratings

Session Chair: Yasuo Tomita, Univ. of Electro-Communications (Japan)

HLSM for live C. elegans, Ting-Yu Hsieh, Yuan Luo, National Taiwan Univ. (Taiwan) [11367-8]

Multiplexed spatial-spectral fluorescent holographic imaging, Yuan Luo, National Taiwan Univ. (Taipei) [11367-60]

Holographic hydrogel sensors for biosensing applications, Manuel Gutiérrez Ramírez, Marta Morales-Vidal, Augusto Beléndez, Inmaculada Pascual Villalobos, Univ. de Alicante (Spain); María José Bañuls Polo, Ángel Maquieira Catala, María Isabel Lucio Benito, Univ. Politècnica de València (Spain) [11367-9]

Functionalized photosensitive materials for development of holographic sensors, Sabad E-Gul, Muhammad Irfan, Tatsiana Mikulchik, John Cassidy, Suzanne Martin, Izabela Naydenova, Technological Univ. Dublin (Ireland) [11367-10]

Variable angle spectroscopic readout of high-efficiency reflection holograms, Benjamin A. Kowalski, Amy Sullivan, Maciej Podgorski, Sudheendran Mavila, Christopher Bowman, Robert R. McLeod, Univ. of Colorado Boulder (United States) [11367-11]

Reflective volume Bragg grating with a transverse chirp, Sergiy Mokhov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States) [11367-12]

SESSION 3 WED 11:00 TO 12:30

Photosensitive Glass

Session Chair: Robert R. McLeod, Univ. of Colorado Boulder (United States)

Photo-thermo-refractive glass: features and applications (*Invited Paper*), Leonid B. Glebov, CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States) [11367-13]

Novel fast drying and water resistant photopolymerisable glass for volume holography, Tatsiana Mikulchik, Ctr. for Industrial & Engineering Optics, Technological Univ. Dublin (Ireland); Mohamed Oubaha, Ctr. for Research in Engineering Surface Technology, Technological Univ. Dublin (Ireland); Sabad E-Gul, Izabela Naydenova, Dervil Cody, Ctr. for Industrial & Engineering Optics, Technological Univ. Dublin (Ireland) [11367-14]

Bleaching of Bragg gratings based on photo-thermo-refractive glasses: procedure, mechanisms and applications, Nikolay V. Nikonov, Sergey A. Ivanov, Alexander I. Ignatiev, ITMO Univ. (Russian Federation) [11367-15]

Fluorine diffusion during the grating formation in photo-thermo-refractive glass, Sergei A. Ivanov, Nikolay V. Nikonov, ITMO Univ. (Russian Federation) [11367-16]

Lunch/Exhibition Break Wed 12:30 to 13:30

SESSION 4..... WED 13:30 TO 15:20

Photosensitive Nanocomposite Materials

Session Chair: **Inmaculada Pascual Villalobos**,
Univ. de Alicante (Spain)

Photoinitiator: a new concept with Janus initiation and inhibition functions for regulating holographic polymer nanocomposites (*Invited Paper*), Haiyan Peng, Xiaolin Xie, Huazhong Univ. of Science and Technology (China)..... [11367-17]

Ag nanoparticle doped holographic photopolymer: mechanism of metallic nanoparticle, Jialing Jian, Jinxin Guo, Beijing Univ. of Technology (China); Yasuo Tomita, The Univ. of Electro-Communications (Japan); Dayong Wang, Xiping Zhang, Beijing Univ. of Technology (China) . [11367-18]

Study of the holographic recording properties of photosensitive nanocomposite containing magnetic nanoparticles, Muhammed Irfan, Suzanne Martin, Izabela Naydenova, Technological Univ. Dublin (Ireland)..... [11367-19]

Nanodiamond-polymer composite gratings as diffractive optical elements for light and neutrons: I. Their fabrication and light optical diffraction properties, Yasuo Tomita, Akihisa Kageyama, Yuko Iso, The Univ. of Electro-Communications (Japan); Koichi Umemoto, Ming Liu, Daicel Corp. (Japan); Jürgen Klepp, Univ. Wien (Austria); Christian Pruner, Univ. Salzburg (Austria); Tobias Jenke, Peter Geltenbort, Institut Laue-Langevin (France); Martin Fally, Univ. Wien (Austria) . [11367-20]

Nanodiamond-polymer composite gratings as diffractive optical elements for light and neutrons: II. Neutron optical diffraction properties, Martin Fally, Jürgen Klepp, Univ. Wien (Austria); Christian Pruner, Univ. Salzburg (Austria); Tobias Jenke, Peter Geltenbort, Institut Laue-Langevin (France); Akihisa Kageyama, Yuko Iso, The Univ. of Electro-Communications (Japan); Koichi Umemoto, Ming Liu, Daicel Corp. (Japan); Yasuo Tomita, The Univ. of Electro-Communications (Japan)..... [11367-21]

SESSION 5..... WED 15:50 TO 18:00

Applications of Volume Holographic Gratings

Session Chair: **John T. Sheridan**, Univ. College Dublin (Ireland)

DigiLens holographic photopolymers for wide angle AR waveguides (*Invited Paper*), Jonathan D. Waldern, Shibu Abraham, DigiLens Inc. (United States); Milan M. Popovich, Creative Physics Ltd. (United Kingdom) [11367-22]

Comparison of sol-gel-based holographic recording medium and photopolymer for use in a solar concentrator, Brian Rogers, FOCAS Research Institute, TU Dublin (Ireland); Izabela Naydenova, Suzanne Martin, Ctr. for Industrial & Engineering Optics (Ireland)..... [11367-23]

Multilayer photopolymer for broad spectral range holographic optical elements, Sanjay Keshri, Izabela Naydenova, Kevin Murphy, Suzanne Martin, Technological Univ. Dublin (Ireland)..... [11367-24]

Increasing diffraction efficiency in gradient index diffractive optical elements using numerical simulation, John E. Hergert, Univ. of Colorado Boulder (United States); Jenna Tom, Carleton College (United States); Robert R. McLeod, Univ. of Colorado Boulder (United States) [11367-25]

Multifunctional volume holographic photopolymers and their applications, Ken Y. Hsu, Shuan Huei Lin, National Chiao Tung Univ. (Taiwan); Vera Marinova, National Chiao Tung Univ. (Taiwan) and Bulgarian Academy of Sciences (Bulgaria)..... [11367-26]

Optical replication of relief-phase gratings in volume medium, Alexander Y. Zherdev, Dmitriy V. Kuzmin, Maria V. Shishova, Sergey B. Odinov, Bauman Moscow State Technical Univ. (Russian Federation)..... [11367-27]

POSTERS-WEDNESDAY WED 18:00 TO 20:00

Conference attendees are invited to attend the Photonics Europe Poster Session on Wednesday 18.05 to 20.00 hrs. Posters will be on display after 10.00 Wednesday morning in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster authors, view poster presentation guidelines and set-up instructions at <http://spie.org/x34963.xml>.

Electron plasma parameters of mixed silver iodide crystals, Nadezhda P. Netesova, M.V. Lomonosov Moscow State Univ. (Russian Federation)..... [11367-43]

All-inorganic perovskite quantum dots templated in self-assembled block copolymer thin films, Yu Chen, Shisheng Xiong, Shiliang Mei, Fengxian Xie, Fudan Univ. (China)..... [11367-44]

Trapping of dielectric microparticles on iron-doped lithium niobate crystal by optical Bessel beam-induced space-charge field, Lusine Tsarukyan, Anahit Badalyan, Ruben Hovsepian, Rafael Drampyan, Institute for Physical Research, NAS RA (Armenia)..... [11367-45]

Raman study of multimetal plasmonic sensors, Benjamin Charron, Jean-François Masson, Univ. de Montréal (Canada)..... [11367-46]

Batch imprinting of DFB fiber lasers for underwater sensing using excimer KrF laser, Alexei Tikhomirov, Defence Science and Technology Group (Australia); Alexander Kolodin, QinetiQ (Australia); Scott Foster, Joanne Harrison, Defence Science and Technology Group (Australia)..... [11367-47]

Photopolymer-based volume holographic optical elements for abrupt autofocusing beams, Sunil Vyas, Yu-Hsin Chia, Cheng Hung Chu, Yuan Luo, National Taiwan Univ. (Taiwan)..... [11367-48]

Three-dimensional modelling of the DOE's formation in PVA/AA, Roberto Fernández, Sergi Gallego Rico, Andrés Márquez, Jorge Francés, Cristian Neipp, Daniel Puerto, Eva María Calzado, Inmaculada Pascual Villalobos, Augusto Beléndez, Univ. de Alicante (Spain)..... [11367-49]

Simulation and experimental study of single-crystal phosphor material for lighting applications, Elisavet Chatziziryli, Andreas Wienke, Laser Zentrum Hannover e.V. (Germany); Roland Lachmayer, Institut für Produktentwicklung und Gerätebau, Leibniz Univ. Hannover (Germany); Jörg Neumann, Dietmar Kracht, Laser Zentrum Hannover e.V. (Germany)..... [11367-50]

Diffraction efficiency of polarization holographic gratings recorded in azopolymer thin films coated using different solvents, Lian Nedelchev, Institute of Optical Materials and Technologies (Bulgaria) and Univ. of Telecommunications and Post (Bulgaria); Dimana Nazarova, Elena Stoykova, Blaga Blagoeva, Georgi Mateev, Institute of Optical Materials and Technologies (Bulgaria)..... [11367-51]

Testing the coherence of light waves within self-written waveguides, Derek J. Cassidy, Min Wan, Ra'ed Malallah, John Healy, John T. Sheridan, Univ. College Dublin (Ireland)..... [11367-52]

Principles of developing of a scintillation detector based on SiPM for a field gamma-spectrometry problems, Ilya O. Bokaty, ITMO Univ. (Russian Federation); Victor Denisov, Flagman-geo, Ltd. (Russian Federation); Victoria Ryzhova, ITMO Univ. (Russian Federation)..... [11367-53]

Application of scanning focused X-ray imaging positioning technique in preparation of GaAs photocathodes, Yijun Zhang, Yunsheng Qian, Junju Zhang, Kaimin Zhang, Jingzhi Zhang, Minmin Rong, Nanjing Univ. of Science and Technology (China); Gangcheng Jiao, Xiaofeng Bai, Science and Technology on Low-Light-Level Night Vision Lab. (China)..... [11367-54]

Direct laser writing of crystallized TiO₂ and TiO₂ carbon microstructures with tunable conductive properties, Shang-Yu Yu, Institut de Sciences des Matériaux de Mulhouse (France) and National Chiao Tung Univ. (Taiwan); Gautier Schrodj, Karine Mougins, Joseph Dentzer, Jean-Pierre Malval, Institut de Sciences des Matériaux de Mulhouse (France); Hsiao-Wen Zan, National Chiao Tung Univ. (Taiwan); Olivier Soppera, Arnaud Spangenberg, Institut de Sciences des Matériaux de Mulhouse (France)..... [11367-55]

Non-interferometric phase retrieval for phase image, Xiao Lin, Jianying Hao, Yuanying Zhang, Kun Wang, Yuhong Ren, Hui Li, Xiaodi Tan, Fujian Normal Univ. (China)..... [11367-56]

Direct laser writing of hybrid SiO₂ metal oxide and metal oxide microstructures with tunable optical or magneto-optical properties, Xingyu Wu, Institut de Sciences des Matériaux de Mulhouse, (France) and CNRS (France); Alexandra Madeira, Lab. PHENIX (France); Jérémy Riporto, Lab. Hubert Curien (France); Jean-Pierre Malval, Olivier Soppera, Institut de Sciences des Matériaux de Mulhouse (France) and CNRS (France); Agnès Bée, Vincent Dupuis, Lab. PHENIX (France); Emilie Gamet, Marie-Françoise Blanc-Mignon, Damien Jamon, François Royer, Lab. Hubert Curien (France); Sophie Neveu, Lab. PHENIX (France); Dominique Berling, Arnaud Spangenberg, Institut de Sciences des Matériaux de Mulhouse (France) and CNRS (France)..... [11367-57]

Achromatic metalens array for light-field imaging, Hsin Yu Kuo, National Taiwan Univ. (Taiwan) and Research Ctr. for Applied Sciences - Academia Sinica (Taiwan); Cheng Hung Chu, Ren Jie Lin, Research Ctr. for Applied Sciences - Academia Sinica (Taiwan); Jia-Wern Chen, National Taiwan Univ. (Taiwan); Yu-Jung Lu, Research Ctr. for Applied Sciences - Academia Sinica (Taiwan) and National Taiwan Univ. (Taiwan); Yuan Luo, Institute of Medical Device and Imaging, National Taiwan Univ. (Taiwan); Din Ping Tsai, Research Ctr. for Applied Sciences - Academia Sinica (Taiwan) and National Taiwan Univ. (Taiwan)..... [11367-58]

THURSDAY 2 APRIL

HOT TOPICS III THU 9:00 TO 10:35

Photonics Europe 2020: Hot Topics Session III

- 9.00 - 9.05 **Introduction**
Thierry Georges, Oxxius, France
 2019 Symposium Chair
- 9.05 - 9.50 **Ultrafast solid-state lasers: a success story for the last 30 years with no end in sight**
Ursula Keller, ETH Zurich, Switzerland
- 9:50 - 10:35 **From inverse design to implementation of practical quantum photonics**
Jelena Vuckovic, Stanford Univ., United States

For additional details see page 9

SESSION 6 THU 10:50 TO 12:20

Liquid Crystal and Waveguide Structure

Session Chair: **Yasuo Tomita**,
 Univ. of Electro-Communications (Japan)

- Photo-addressing liquid crystal light valve using organic-inorganic hybrid structures** (*Invited Paper*), Shiu-an-Huei Lin, National Chiao Tung Univ. (Taiwan); Vera Marinova, National Chiao Tung Univ. (Taiwan) and Bulgarian Academy of Sciences (Bulgaria); Ken Y. Hsu, National Chiao Tung Univ. (Taiwan) [11367-28]
- Effect of chiral concentration of chiral smectic C liquid crystal mixture on the photorefractive property**, Takeo Sasaki, Tokyo Univ. of Science (Japan) [11367-29]
- Light modulation in optical waveguides based on electrochromic materials**, Jin Tae Kim, Chil Seong Ah, Electronics and Telecommunications Research Institute (Korea, Republic of) [11367-30]
- Optical analysis and characterization of self-written waveguides**, Derek J. Cassidy, Min Wan, John Healy, John T. Sheridan, Univ. College Dublin (Ireland) [11367-31]
- Lunch Break Thu 12:20 to 13:20

SESSION 7 THU 13:20 TO 15:40

Photosensitive Materials

Session Chair: **Inmaculada Pascual Villalobos**,
 Univ. de Alicante (Spain)

- Controlled luminophore placement in photoactive organic-inorganic hybrid waveguides for optical device technologies** (*Invited Paper*), Rachel C. Evans, Guanpeng Lyu, Univ. of Cambridge (United Kingdom) [11367-32]
- Azobenzenes as optically responsive, smart antifouling coatings** (*Invited Paper*), Devatha Nair, Gannon Kehe, Dylan Mori, Michael Schurr, Univ. of Colorado Denver (United States) [11367-33]
- Reversible surface structuring of photosensitive polymer films: in-situ atomic force microscopy and diffraction efficiency measurements**, Joachim Jelken, Univ. Potsdam (Germany) [11367-34]
- High fidelity holographic recording with cyclic allylic sulfide monomer**, Paola Galli, Osservatorio Astronomico di Brera, Istituto Nazionale di Astrofisica (Italy); Richard Evans, Commonwealth Scientific and Industrial Research Organisation (Australia); Chiara Bertarelli, Politecnico di Milano (Italy); Andrea Bianco, Osservatorio Astronomico di Brera, Istituto Nazionale di Astrofisica (Italy) [11367-35]
- New phosphine oxides as photoinitiators for LED irradiation around 400 nm**, Céline Dietlin, Stéphane Schweizer, Bernadette Graff, Institut de Sciences des Matériaux de Mulhouse (France); Fabrice Morlet-Savary, Ecole Nationale Supérieure de Chimie de Mulhouse (France); Jacques Lalevée, Institut de Sciences des Matériaux de Mulhouse (France) [11367-36]
- Push-pull diarylethenes showing a high modulation of optical properties**, Maria Chiara Mantero, Luca Oggioni, Osservatorio Astronomico di Brera, Istituto Nazionale di Astrofisica (Italy); Silvano Tosi, Maurizio Canepa, Univ. degli Studi di Genova (Italy); Chiara Bertarelli, Politecnico di Milano (Italy); Andrea Bianco, Osservatorio Astronomico di Brera, Istituto Nazionale di Astrofisica (Italy) [11367-37]

SESSION 8 THU 16:00 TO 17:50

Applications of Photosensitive Materials

Session Chair: **Robert R. McLeod**,
 Univ. of Colorado Boulder (United States)

- Quadrupled holographic data storage record density using polarization holography** (*Invited Paper*), Xiaodi Tan, Fujian Normal Univ. (China); Jinliang Zang, National Institute of Metrology (China); Zhiyun Huang, Lili Zhu, Yuanying Zhang, Yuhong Ren, Peiliang Qi, Chenhao Wu, Fujian Normal Univ. (China); Fenglan Fan, Hebei Normal Univ. for Nationalities (China); Ying Liu, Beihang Univ. (China) [11367-38]
- New ways how to apply Bayfol HX® film into recording stacks and into optical parts**, Friedrich-Karl Bruder, Johannes Frank, Sven Hansen, Christel Manecke, Richard Meisenheimer, Covestro AG (Germany); Jack Mills, Covestro LLC (United States); Lena Pitzer, Thomas Rölle, Covestro AG (Germany) [11367-39]
- Effects of surface tension on the shapes of fabricated photopolymer lenses**, Martha-Elizabeth Baylor, Emily Schwartz, Sam Stevenson, Zach Johnson, Robert Thompson, Carleton College (United States) [11367-40]
- Relief phase diffraction grating providing quadrature phase shift for optical encoder**, Maria V. Shishova, Alexander Y. Zherdev, Sergey B. Odinkov, Mikhail S. Kovalev, Dmitrii S. Lushnikov, Bauman Moscow State Technical Univ. (Russian Federation) [11367-41]
- Repeatability and uniformity of dichromated gelatin holograms**, Benjamin D. Chrysler, Elias J. Salay, Raymond K. Kostuk, The Univ. of Arizona (United States) [11367-42]

CONFERENCE 11368

Thursday 2 April 2020 • Proceedings of SPIE Vol. 11368

Photonics and Plasmonics at the Mesoscale

Conference Chairs: **Sylvain Lecler**, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France); **Vasily N. Astratov**, The Univ. of North Carolina at Charlotte (United States); **Igor V. Minin**, National Research Tomsk State Univ. (Russian Federation)

THURSDAY 2 APRIL

HOT TOPICS III THU 9:00 TO 10:35

Photonics Europe 2020: Hot Topics Session III

- 9.00 - 9.05 **Introduction**
Thierry Georges, Oxxius, France
2019 Symposium Chair
- 9.05 - 9.50 **Ultrafast solid-state lasers: a success story for the last 30 years with no end in sight**
Ursula Keller, ETH Zurich, Switzerland
- 9:50 - 10:35 **From inverse design to implementation of practical quantum photonics**
Jelena Vuckovic, Stanford Univ., United States

For additional details see page 9

SESSION 1 THU 11:00 TO 12:30

Whispering Gallery Modes and Applications

Session Chair: **Sylvain Lecler**, ICube (France)

- Hybrid system of different shapes of gold nanoparticles on microcavity to study Purcell's effect** (*Invited Paper*), Tulika Agrawal, Shubhayan Bhattacharya, Aneesh Vincent Veluthandath, Indian Institute of Technology Madras (India); Ganapathy Senthil Murugan, Optoelectronics Research Ctr., Univ. of Southampton (United Kingdom); Gurvinder Singh, Hala Zreiqat, The Univ. of Sydney (Australia); Prem Bisht, Indian Institute of Technology Madras (India). [11368-1]
- Fabrication of arrays of quasi-micro-beads for massively parallel nanojet super-resolution imaging**, Guillaume Basset, Angélique Luu-Dinh, Ctr. Suisse d'Electronique et de Microtechnique SA (Switzerland) [11368-2]
- Scatterer induced Fano resonances in WS₂ coated microsphere resonator**, Shubhayan Bhattacharya, Aneesh Vincent Veluthandath, Indian Institute of Technology Madras (India); Chung Che Huang, Ganapathy Senthil Murugan, Optoelectronics Research Ctr., Univ. of Southampton (United Kingdom); Prem Ballabh Bisht, Indian Institute of Technology Madras (India). [11368-3]
- Whispering gallery mode in super-resolution microsphere-assisted microscopy**, Rayenne Boudoukha, ICube, Univ. de Strasbourg (France) and Institute of Optics and Precision Mechanics, Univ. Ferhat Abbas Sétif 1 (Algeria) and CNRS (France); Stéphane Perrin, ICube (France); Assia Guessoum, Nacer-Eddine Demagh, Univ. Ferhat Abbas Sétif 1 (Algeria); Paul Montgomery, Sylvain Lecler, ICube (France) [11368-4]
- Lunch Break Thu 12:30 to 13:40

SESSION 2 THU 13:40 TO 15:40

Photonic Jets and Unconventional Beams

Session Chair: **Igor V. Minin**,

National Research Tomsk State Univ. (Russian Federation)

- Tuning the nanojet based on Babinet principle** (*Invited Paper*), Alina Karabchevsky, Yaakov Keren, Ben-Gurion Univ. of the Negev (Israel); Igor V. Minin, National Research Tomsk Polytechnic Univ. (Russian Federation) [11368-5]
- Electromagnetic field localization behind a mesoscale dielectric particle with a broken symmetry: a photonic hook phenomenon** (*Invited Paper*), Kirill I. Zaytsev, A. M. Prokhorov General Physics Institute (Russian Federation); Gleb M. Katyba, Vladimir N. Kurlov, Institute of Solid State Physics (Russian Federation); Liyand Yue, Zengbo Wang, Bangor Univ. (United Kingdom); Oleg V. Minin, National Research Tomsk Polytechnic Univ. (Russian Federation); Igor V. Minin, National Research Tomsk State Univ. (Russian Federation). [11368-6]
- Photonic integrated nanojet: a new platform to harness light at the nanoscale**, Ali Belarouci, Michele Calvo, Pedro Rojo Romeo, Regis Orobtcouk, Institut des Nanotechnologies de Lyon (France) and CNRS (France) [11368-7]
- Nanojet-based dielectric multimaterial color splitters for image sensor applications**, Oksana Shramkova, Valter Drazic, Laurent Blondé, Bobin Varghese, Valérie Allié, InterDigital, Inc. (France) [11368-8]
- Structuring nondiffracting hollow beams within micrometer spatial domains**, Michel Zamboni-Rached, Univ. Estadual de Campinas (Brazil) [11368-9]
- #### SESSION 3 THU 16:00 TO 17:30
- ##### Plasmonics and Metamaterials
- Session Chairs: **Sylvain Lecler**, ICube (France); **Igor V. Minin**, National Research Tomsk State Univ. (Russian Federation)
- Mesostructures and metasurfaces composed of Mie-resonant nanoparticles for light accumulation and concentration** (*Invited Paper*), Andrey B. Evlyukhin, Leibniz Univ. Hannover (Germany) [11368-10]
- Tailoring light absorption of plasmonic-doped spherical dielectric microcapsule**, Yuri E. Geints, Ekaterina K. Panina, Alexander A. Zemlyanov, V. E. Zuev Institute of Atmospheric Optics (Russian Federation) [11368-11]
- Photonic heterostructure with an embedded plasmonic nanoparticle array for polarization-sensitive dichroic filtering**, Igor Glukhov, Lab. des Sciences et Techniques de l'Information, de la Communication et de la Connaissance (France) and Ulyanovsk State Univ. (Russian Federation) and Ecole Nationale des Ingénieurs de Brest (France); Sergey Moiseev, Ulyanovsk State Univ. (Russian Federation) and Kotelnikov Institute of Radio Engineering and Electronics (Russian Federation) and Ulyanovsk State Technical Univ. (Russian Federation); Yuliya Dadoenkova, Lab. des Sciences et Techniques de l'Information, de la Communication et de la Connaissance (France) and Ulyanovsk State Univ. (Russian Federation) and Ecole Nationale des Ingénieurs de Brest (France); Florian Bentivegna, Lab. des Sciences et Techniques de l'Information, de la Communication et de la Connaissance (France) and Ecole Nationale des Ingénieurs de Brest (France) and CNRS (France) [11368-12]
- Temperature-controlled switching of plasmonic response in gallium solid, liquid and oxide core-shell nanoparticle**, Prithu Roy, ITMO Univ. (Russian Federation); Alexey D. Bolshakov, Ivan S. Mukhin, ITMO Univ. (Russian Federation) and St. Petersburg Academic Univ. (Russian Federation) [11368-13]

CONFERENCE FS100

Monday 30 March 2020 • Proceedings of SPIE Vol. FS100

Light Shaping Focus Session

Conference Chairs: **Frank Wyrowski**, Friedrich-Schiller-Univ. Jena (Germany); **Youri Meuret**, KU Leuven (Belgium); **John T. Sheridan**, Univ. College Dublin (Ireland)

Light Shaping Focus Session will provide an overview of various methods of spatial light shaping, covering refractive freeform surfaces, diffractive beam splitters, diffusers, and multichannel array-type components including lens arrays. Light shaping techniques are classified and the strengths and weaknesses of the different methods are discussed with respect to different applications and light sources. The usage and limitations of ray and physical optics for the modeling and design of light shaping systems is considered. Fabrication techniques for light shaping components will be addressed.

Five in-depth presentations by the top experts in the field will examine the challenges and advances presented by these technologies and techniques; event participants will be able to further discuss these topics during the Panel Discussion planned at the conclusion of this session.

MONDAY 30 MARCH

HOT TOPICS I MON 9:00 TO 11:00

Photonics Europe 2020: Hot Topics Session I

- 9:00 - 9:20 **SPIE Welcome and Award Presentation**
John E. Greivenkamp, Univ of Arizona, United States
SPIE President
- Welcome**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- City of Strasbourg Welcome**
- 9:25 - 9:30 **Introduction to Hot Topics**
Paul Montgomery, Univ. of Strasbourg, France
2019 Symposium Chair
- 9:30 - 10:15 **Naturally fast and low power electro-optic polymer optical devices are ideally positioned for the next-generation Internet photonics roadmap**
Michael Lebby, CEO Lightwave Logic, United Kingdom
- 10:15 - 11:00 **3D printed micro-optics: state of the art and future challenges**
Harald Giessen, University of Stuttgart, Germany

For additional details see pages 6-7

PROGRAMME OVERVIEW

SESSION 1 MON 11:30 TO 12:20

Light Shaping I

Lunch Break 12:20 to 13:30

SESSION 2 MON 13:30 TO 17:20

Light Shaping II

PANEL DISCUSSION MON 17:20 TO 18:00

CONFERENCE WS200

Thursday 2 April 2020 • Proceedings of SPIE Vol. WS200

6th annual Sino-French “Photonics and Optoelectronics” PHOTONET International Research Network Workshop

Conference Chairs: **Walter C. P. M. Blondel**, Ctr. de recherche en automatique de Nancy (France); **Boris Gralak**, Institut Fresnel (France); **Christophe Peucheret**, Fonctions Optiques pour les Technologies de l'information (France); **Xinliang Zhang**, Wuhan National Lab. for Optoelectronics (China), Huazhong Univ. of Science & Technology (China); **DingShan Gao**, Huazhong Univ. of Science and Technology (China), Wuhan National Laboratory of Optoelectronics (China); **Benfeng Bai**, Tsinghua Univ. (China)

Programme Committee: **Régis Barillé**, Univ. d'Angers (France); **Eric Cassan**, Ctr. de Nanosciences et de Nanotechnologies (France); **Béatrice Dagens**, Ctr. de Nanosciences et de Nanotechnologies (France); **Thierry Engel**, Institut National des Sciences Appliquées de Strasbourg (France); **Feng Gao**, Tianjin Univ. (China); **Pierre Gilliot**, Institut de physique et chimie des matériaux de Strasbourg (France); **Stefan Haacke**, Institut de physique et chimie des matériaux de Strasbourg (France); **Jiaming Hao**, Shanghai Institute of Technical Physics, Chinese Academy of Sciences (China); **Ran Hao**, Zhejiang Univ. (China); **Sailing He**, Zhejiang Univ. (China); **Bin Hu**, Beijing Jiaotong Univ. (China); **Sylvain Lecler**, Lab. des sciences de l'Ingénieur, de l'Informatique et de l'Imagerie (France); **Lifeng Li**, Tsinghua Univ. (China); **Yan Liu**, Xidian Univ. (China); **Laurent Vivien**, Ctr. de Nanosciences et de Nanotechnologies (France); **Lei Zhou**, Fudan Univ. (China); **Dan Zhu**, Huazhong Univ. of Science and Technology (China)

THURSDAY 2 APRIL

SESSION 1 THU 9:00 TO 10:15

Integrated Optics and Optical Communications I

Session Chair: **Sylvain Lecler**, ICube (France)

Low-loss and low crosstalk arrayed waveguide grating based on ultrathin silicon nitride waveguides (*Invited Paper*), DingShan Gao, Shuting Fan, Lifeng Cai, Shuyi Li, Huazhong Univ. of Science and Technology (China) [WS200-1]

An overview of opto-electronic THz communications (*Invited Paper*), Xianbin Yu, Shiwei Wang, Zhejiang Univ. (China); Shi Jia, Technical Univ. of Denmark (Denmark); Lu Zhang, Zijie Lu, Wei Li, Mengyao Qiao, Zhejiang Univ. (China); Xiaodan Pang, Royal Institute of Technology (Sweden); Nazar Idrees, Syed Muhammad Saqlain, Zhejiang Univ. (China) [WS200-2]

Impact of dispersion fluctuations on dissipative fiberoptic parametric amplifiers (*Invited Paper*), Hanwen Hu, Haofan Yang, Yuntian Chen, Huazhong Univ. of Science and Technology (China); Haisong Jiang, Kiichi Hamamoto, Kyushu Univ. (Japan); Christophe Peucheret, Fonctions Optiques pour les Technologies de l'information (France); Jing Xu, Huazhong Univ. of Science and Technology (China); Xinliang Zhang, Wuhan National Research Ctr. for Optoelectronics (China) [WS200-3]

SESSION 2 THU 10:45 TO 11:30

Integrated Optics and Optical Communications II

Session Chair: **Christophe Peucheret**, Fonctions Optiques pour les Technologies de l'information (France)

Integrated multifunctional polarization processor (*Invited Paper*), Wenhao Wu, Wei Liu, Yu Yu, Huazhong Univ. of Science and Technology (China); Xinliang Zhang, Wuhan National Research Ctr. for Optoelectronics (China) [WS200-4]

Electro-optic frequency comb generation in a silicon ring resonator modulator, Erwan Weckenmann, Univ. de Rennes 1 (France); Lucas Deniel, Diego Pérez-Galacho, Ctr. de Nanosciences et de Nanotechnologies (France); Laurent Bramerie, Mathilde Gay, Margaux Barbier, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France); Frederic Boeuf, STMicroelectronics S.A. (France); Laurent Vivien, Delphine Marris-Morini, Ctr. de Nanosciences et de Nanotechnologies (France); Christophe Peucheret, Fonctions Optiques pour les Technologies de l'information (France) [WS200-5]

BREAK/DISCUSSION 11:30 TO 11:40

SESSION 3 THU 11:40 TO 12:30

Emerging Materials and Concepts in Photonics I

Session Chair: **Pierre Gilliot**, Institut de Physique et de Chimie des Matériaux de Strasbourg (France)

On-chip zero-index metamaterials: physics and applications (*Invited Paper*), Yang Li, Tsinghua Univ. Shenzhen International Graduate School (China) [WS200-6]

Energy density engineering in all-dielectric stratified materials for huge field enhancement (*Invited Paper*), Myriam Zerrad, Dikai Niu, Fabien Lemarchand, Aude L. Lereu, Institut Fresnel (France); Ali Passian, Oak Ridge National Lab. (United States); Juan Antonio Zapien, City Univ. of Hong Kong (Hong Kong, China); Michel Lequime, Institut Fresnel (France); Vincent Aubry, Groupe PSA (France); Claude Amra, Institut Fresnel (France) [WS200-7]

Lunch Break Thu 12:30 to 13:30

SESSION 4 THU 13:30 TO 14:35

Emerging Materials and Concepts in Photonics II

Session Chair: **Benfeng Bai**, Tsinghua Univ. (China)

Extreme nonlinear optics in epsilon-near-zero materials (*Invited Paper*), Yuanmu Yang, Tsinghua Univ. (China) [WS200-8]

On the limiting amplitude principle for Maxwell's equations at the interface of a metamaterial, Maxence Cassier, Institut Fresnel (France); Christophe Hazard, Patrick Joly, Ecole Nationale Supérieure de Techniques Avancées (France) [WS200-9]

Quasi-normal modal expansion of electromagnetic fields: making use of nonlinear eigenvalue problems, Guillaume Demésy, Frédéric Zolla, André Nicolet, Boris Gralak, Institut Fresnel (France) [WS200-10]

BREAK/DISCUSSION 14:35 TO 14:45

SESSION 5 THU 14:45 TO 15:35

Biomedical Optics and Biophotonics I

Session Chair: **Anabela Da Silva**, Institut Fresnel (France)

FDISCO: tissue optical clearing for whole organs 3D imaging (*Invited Paper*), Dan Zhu, Huazhong Univ. of Science and Technology (China) [WS200-11]

All-optical computing of real-time FFT for ultrahigh speed optical coherence tomography (*Invited Paper*), Ping Xue, Chengming Wang, Shennan Ai, Juicheng Hsieh, Zhengyu Chen, Bin He, Tsinghua Univ. (China) [WS200-12]

CONFERENCE WS200

POSTERS AND COFFEE THU 15:35 TO 16:30

Workshop attendees are invited to attend the PHOTONET Poster Session on Thursday 15.35 to 16.30 hrs. Posters will be on display after 10.00 on Thursday in the Conference Area Hallway. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers.

Exciton fine structure in transition-metal dichalcogenides monolayers, Pierre Gilliot, Mathieu Gallart, Bernd H. Hönerlage, Institut de Physique et de Chimie des Matériaux de Strasbourg (France) [WS200-16]

Probe-assisted phase-sensitive processes by intermodal four-wave mixing in few-mode fibers, Valentina Gaudillat, Margaux Barbier, Christophe Peucheret, Yannick Dumeige, Univ. Rennes, CNRS (France) [WS200-17]

Integrated optical biosensor based on microresonator and Vernier effect, Fabien Cassio, Paul Azuelos, Nathalie Lorrain, Luiz Poffo, Parasteh Pirasteh, Jonathan Lemaître, Isabelle Hardy, Monique Thual, Mohammed Guendouz, Joël Charrier, Univ. de Rennes 1 (France) . [WS200-18]

Unidirectional ultrafast photon emission from quantum dots mediated by plasmonic hybrid nanoantennas, Benfeng Bai, Guoce Yang, Tsinghua Univ. (China); Hong-Bo Sun, Nanjing Univ. of Science and Technology (China) [WS200-19]

Multiparameter biomedical imaging computing technology, Zhengjun Liu, Harbin Institute of Technology (China); Hang Chen, Space Engineering Univ. (China); Walter C. P. M. Blondel, Ctr. de recherche en automatique de Nancy (France) [WS200-20]

Wavelet decomposition based multiwavelength image fusion for enhancing performances of brain functional high-density diffuse optical tomography, Dongyuan Liu, Yang Liu, Bingyuan Wang, Feng Gao, Tianjin Univ. (China) [WS200-21]

Development of nonlinear photonic integrated circuit based on chalcogenide thin layers, Nessim Jebali, Enguerran Delcourt, Loïc Bodiou, Univ. de Rennes 1 (France); Marion Baillieul, Emeline Baudet, ISCR, UMR-CNRS (France); Jonathan Lemaître, Virginie Nazabal, Yannick Dumeige, Joël Charrier, Univ. de Rennes 1 (France) [WS200-22]

Development of integrated optical sensor based on chalcogenide thin layers for Surface Enhanced Infra-Red Absorption spectroscopy, Jonathan Lemaître, Loïc Bodiou, Univ. de Rennes 1 (France); Marion Baillieul, ISCR, UMR-CNRS (France); Guillaume Demesy, Aix-Marseille Univ. (France); Anna Rummyantseva, Univ. de Technologie Troyes (France); Florent Colas, Emmanuel Rinnert, Kada Bourkema, Ifremer (France); Gilles Lérondel, Univ. de Technologie Troyes (France); Gilles Renversez, Aix Marseille Univ. (France); Catherine Boussard-Plédel, Bruno Bureau, Virginie Nazabal, Joël Charrier, Univ. de Rennes 1 (France) [WS200-23]

Diffuse reflectance spectroscopy with polarization gating, Anabela Da Silva, Hind Oulhaj, Julien Wojak, Institut Fresnel (France) [WS200-24]

Experimental modelling of skin optical properties combining optical clearing and spatially resolved multimodal spectroscopy (diffuse reflectance and autofluorescence), Walter C.P. M. Blondel, Ctr. de recherche en automatique de Nancy (France); Victor Colas, Christian Daul, Univ. de Lorraine (France); Sergey M. Zaytsev, Elina A. Genina, Saratov State Univ. (Russian Federation); Grégoire Khairallah M.D., Prisca Rakotomanga, Univ. de Lorraine (France); Valery V. Tuchin, Saratov State Univ. (Russian Federation); Dan Zhu, Huazhong Univ. of Science and Technology (China); Marine Amouroux, Univ. de Lorraine (France) [WS200-25]

SESSION 6 THU 16:30 TO 17:45

Biomedical Optics and Biophotonics II

Session Chairs: **Dan Zhu**, Huazhong Univ. of Science and Technology (China); **Feng Gao**, Tianjin Univ. (China)

Silicon nanoprobes for bioimaging and biosensing (Invited Paper), Yao He, Soochow Univ. (China) [WS200-13]

Multiscale photoacoustic microscopy (Invited Paper), Lei Xi, Southern Univ. of Science and Technology of China (China) [WS200-14]

Break the unbreakable limits toward high-/super-resolution microscopy (Invited Paper), Quiqiang Zhan, South China Normal Univ. (China) . [WS200-15]

PANEL DISCUSSION 17:45 TO 18:45

PHOTONET Board Meeting



Present and publish with SPIE.

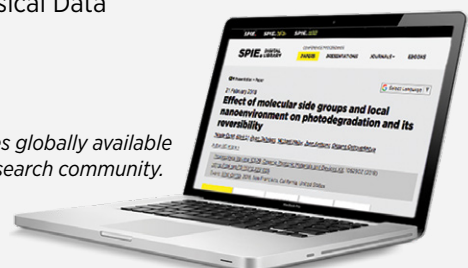
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Available on the SPIE Digital Library as papers are published, usually by 3 weeks after the meeting. In the tables below, find product order numbers for use on the registration form.

- **Online Proceedings Volume**—access to a single conference proceedings volume.
- **Online Proceedings Collection**—access to multiple related proceedings volumes.

Accessing your Proceedings

Visit <http://spiedigitallibrary.org>, sign in or create an account using the same email address you used to register. Access is also available through an organization's SPIE Digital Library account. Contact SPIE if you need assistance.

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- Additional online volumes: **€55**
- Additional online collections: **€160**

Print availability

Print volumes of Proceedings of SPIE can be purchased at <http://www.proceedings.com>

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DL 11356	Semiconductor Lasers and Laser Dynamics IX , Krassimir Panajotov, Marc Sciamanna, Rainer Michalzik, Sven Höfling
DL 11357	Fiber Lasers and Glass Photonics: Materials through Applications II , Stefano Taccheo, Maurizio Ferrari, Jacob I. Mackenzie
DL 11358	Nonlinear Optics and its Applications 2020 , Anna C. Peacock, Neil G. R. Broderick, John M. Dudley
DL 11359	Biomedical Spectroscopy, Microscopy, and Imaging Jürgen Popp, Csilla Gergely
DL 11360	Neurophotonics , Thomas Kuner, Francesco Saverio Pavone, Laurent Cognet

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DL 11363	Tissue Optics and Photonics , Zeev Zalevsky, Valery V. Tuchin, Walter C. P. M. Blondel
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DL 11365	Organic Electronics and Photonics: Fundamentals and Devices II , Sebastian Reineke, Koen Vandewal, Wouter Maes
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DLC783	Photonics Europe 2020: Biophotonics Includes Volumes 11359, 11360, 11361, 11362, 11363



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International Day of Light

16 May

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

SPIE supports the International Day of Light and its annual celebration on 16 May.



SPIE IDL GRANTS

SPIE will provide seed funding up to US\$3,000 to organizations creating Day of Light activities.



IDL RESOURCES

SPIE encourages communities to plan their own annual celebration on 16 May and provides various resources to help create an event.



SPIE PHOTO CONTEST

Amateur and professional photographers alike should submit photos demonstrating the vital role that light plays in our lives for a chance to win US\$2,500.



SPIE.

Learn more: spie.org/idl

Registration

Onsite services at Photonics Europe

ONSITE REGISTRATION AND BADGE PICKUP HOURS

Location: Schweitzer Accueil

Sunday 29 March	12:00 to 18:00
Monday 30 March	7:30 to 17:00
Tuesday 31 March	8:00 to 17:00
Wednesday 1 April	8:00 to 17:00
Thursday 2 April	8:00 to 16:00

What is included with each registration type			
	Full conference*	Courses & workshops only*	Exhibition & industry events only
EXHIBITION	✓	✓	✓
INDUSTRY SESSIONS on the exhibition floor	✓	✓	✓
WELCOME RECEPTION	✓		
ALL CONFERENCE SESSIONS, PLENARIES, POSTERS, TECH EVENTS, ETC.	✓		
CHOICE OF PROCEEDINGS** view Proceedings options, see p.x	✓		
* Both Full Conference and Courses and Workshop only registration allow the ability to add on special events and other items to a registration. For more details see online			
** Proceedings available 3 to 4 weeks after the event ends.			

EXHIBITION REGISTRATION

Exhibition-Only visitor registration is complimentary.

EARLY REGISTRATION PRICING AND DATES

Conference registration prices increase by EU€135 after 10 March 2020 (student and course rates increase by EU€25).

COURSE INFORMATION

Courses are priced separately and prices include applicable taxes.

Prices increase €25 after 10 March 2020.

Course-only registration includes your selected course(s), course notes, coffee breaks, and admittance to the exhibition. Onsite, please go to Course Materials Pickup after you pick up your badge. Allow yourself enough time to register, pick up your materials, and get to your course.

SPIE MEMBER, SPIE STUDENT MEMBER, AND STUDENT PRICING

SPIE Members receive conference and course registration discounts. Discounts are applied at the time of registration.

SPIE Student Members receive a 60% discount on all courses.

Student authors and presenters may register at the student rate as long as they meet the definition of a student.

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 planning to register onsite, your credit card payment will be processed during registration. If you wish to pay with cash or check, register at the "Need to Register" stations; you will be directed to the Cashier once you have completed registration except for final payment. If you have already registered and wish to add a course, workshop or special event, you may do so at the "Need to Register" stations.

RECEIPTS AND CERTIFICATE OF ATTENDANCE

Preregistered attendees who need an SPIE-stamped receipt or attendees who need a Certificate of Attendance may obtain those at Badge Corrections and Receipts.

BADGE CORRECTIONS

Badge corrections can be made at the Badge Corrections station. Please have your badge removed from the badge holder and marked with your changes before approaching the counter.

REFUND INFORMATION

There is a €50 USD service charge for processing refunds. Requests for refunds must be received by 19 March 2020; all registration fees will be forfeited after this date. Membership dues, SPIE Digital Library subscriptions or Special Events purchased are not refundable.

Stay Connected

INTERNET ACCESS

Complimentary Internet will be available. Connection speeds will depend on the number of users.

SPIE CONFERENCE AND EXHIBITION APP

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

URGENT MESSAGE LINE

An urgent message line is available during registration hours: +33 88 37 67 38. Attendees should check the message board in the registration area for any messages.

Food and Beverage

COMPLIMENTARY COFFEE

Sunday - Monday

7:30 to 16:00 Galerie Schweitzer

Tuesday - Thursday

7:30 to 9:30 Galerie Schweitzer

10:00 to 16:00 Exhibition Hall (Exhibition Rhin)

Please check the conference schedule for specific break times.

FOOD AND REFRESHMENTS FOR PURCHASE

There are a variety of food and drink options, including hot and cold snacks, espresso, beverages, hot entrees, deli sandwiches, salads, and pastries available for purchase. Cash and credit cards accepted.

Monday 11:30 to 13:00

Food trucks located near the front entrance

Tuesday - Wednesday 11:30 to 13:00

Food stations in the Exhibition Hall

Thursday 11:30 to 13:00

Food trucks located near the front entrance

SPIE MARKETPLACE

Browse the latest SPIE Press Books and proceedings.

SPIE LUGGAGE & COAT CHECK

Open Daily

Luggage, package, and coat storage are available free of charge. Please note opening hours.

QUIET ROOM

Open during registration hours. Please see registration desk for key. The room is intended for silent meditation, reflection or prayer, and privacy for nursing mothers. No mobile device or computer use, and no food or beverages allowed. Please note that there is no running water or refrigeration in this space.

Travel to Strasbourg for SPIE Photonics Europe



JOIN US IN STRASBOURG

One of Europe's primary business and event destinations, located at the junction of France's North-South and East-West high-speed rail lines, close to 4 international airports, and on the banks of Europe's main commercial waterway. Strasbourg is home to many European institutions and known for its impressive architecture and museums.

EVENT LOCATION

Palais de la Musique et des Congrès

(Strasbourg Convention & Exhibition Centre)

Place de Bordeaux, 67082

Strasbourg, France

The convention centre is ideally situated in the heart of the European district, accessible via two direct tram lines from the city centre. Only minutes from Strasbourg's historic centre, the TGV rail station, and less than 5 minutes from 3 tram stations.

Tram passes will be available from MyStrasbourg upon arrival at the event.

Strasbourg Area Information - tourism, shopping, restaurants

AIRPORTS

Visit our event travel webpage at spie.org/epe-Travel for links and resources to assist in planning the travel logistics for your visit to Strasbourg.

You will find resources for:

- Daily shuttles leaving from the TGV rail station and the Hilton hotel (opposite the Convention Centre).
- AIRPORTS
 - Strasbourg-Entzheim International Airport
 - Airport Baden Airpark
 - EuroAirport Basel Mulhouse Freiburg
 - Frankfurt International Airport

Book your United Airlines flight on this group discount page, united.com/meetingtravel and enter code ZHYZ707882. MileagePlus members will earn Premier Qualifying Dollars and miles for their travel.

GROUND TRANSPORTATION

Visit our event travel webpage at spie.org/epe-Travel for links and resources to assist in planning the travel logistics for your visit to Strasbourg.

- Getting around in Strasbourg
- CTS - Compagnie des Transports Strasbourgeois - Bus, tram and trains
- SNCF - Railway/Trains
- Taxi 13

CAR RENTAL AND PARKING

Parking 250 free parking spaces on-site and a 570-space park-and-ride nearby. Convention Centre Maps



Hertz Car Rental is the official car rental agency for this event. To reserve a car, call the Hertz International Reservation Center at 1-800-654-3001 in the USA or your local Hertz Reservations Center to receive a special discount for SPIE. Reservations may also be placed on-line at www.hertz.com. You will receive 15% off qualifying rates at participating locations in France.

Be sure to identify yourself as a SPIE attendee. The **PC#137480** below must be on your advance reservation to receive this special offer. You must PRINT THE ONLINE COUPON and present at the time of rental in order to receive this discount.

This special offer is available for rentals from 15 March - 15 April 2020.

Reserve your hotel room for SPIE Photonics Europe

MAKE YOUR RESERVATIONS EARLY

In 2020, SPIE Photonics Europe will fall over the same dates the Parliament is in session. Book early as Strasbourg hotels will be busy and the best rates and availability will be limited. See online for a full list of hotels.

Additional Information & Deadline Dates

HOTEL RESERVATION DETAILS

To guarantee a room reservation, requests must include your valid credit card information. Problems or delays with your payment may affect your hotel request.

CANCELLATION DEADLINE

Individual cancellations will incur a full cancellation fee if made less than seventy-two (72) hours prior to the arrival date or if the reservation is a no show. Some hotels impose an early departure fee.

INFORMATION SHARED BY HOTELS

Attendee understands that if an audit to verify occupancy in the contracted rooms is necessary, reservation information will be shared by the hotels with the SPIE Photonics Europe Housing to facilitate the audit.

BEWARE

Exercise due diligence when approached by vendors not endorsed by SPIE. Any solicitations or representations of housing for the convention without the official contractor logo are not endorsed by SPIE, and we advise you to NOT book with them due to misrepresentation of SPIE housing services and inherent risks. Read more.

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To receive special hotel rates for this meeting, you must use the SPIE Official Hotel. SPIE strongly recommends you DO NOT book housing from any company that contacts you via phone or email.



SPIE OFFICIAL CONTRACTOR

- The reservation system that SPIE uses for this event is available only via the Hotel page on the event website.
- SPIE Official Housing Suppliers use an Official SPIE Contractor logo to verify they are authorized by SPIE
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- Our housing suppliers may follow up with you about housing once you have begun booking via our website, but NOT as an initial solicitation.
- SPIE cannot be liable for any claims made by unofficial entities or for any damages suffered by you if you use any vendor or service that is not an SPIE Official Housing Supplier.

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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 Policies and Conditions contained herein.

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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.

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It is SPIE policy that all employees, volunteers, and participants are entitled to respectful treatment. Any form of bullying, discrimination, harassment, sexual or otherwise, is unacceptable and will not be tolerated. This policy applies to all locations and situations where SPIE business is conducted and to all SPIE-sponsored activities and events.

Read complete policy <http://spie.org/harassment>

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Code of Conduct

SPIE is committed to providing a harassment- and discrimination-free experience for everyone at our events, an experience that embraces the richness of diversity where participants may exchange ideas, learn, network, and socialize in the company of colleagues in an environment of mutual respect.

Read complete Code: <http://spie.org/conduct>

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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.

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Conference Events: All conference technical and networking events require a badge for admission. Registered attendees may bring children with them if 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.

Exhibition Hall: Everyone who attends the exhibition must be registered and have a badge. Badges for children are free and available onsite at the registration desk. Children under 14 years of age must be accompanied by an adult at all times. Guardians are asked to help maintain a professional, disturbance-free exhibition environment. Children under 18 are not allowed in the exhibition area during exhibition move-in and move-out.

Identification Requirement

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.

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No-Smoking Policy

Attendees will observe all non-smoking regulations that are publicly posted by the facilities used by the event.

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Reporting of Unethical or Inappropriate Behavior

Onsite at an SPIE meeting, contact any SPIE Staff with concerns or questions. 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 meeting 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.

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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.

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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.

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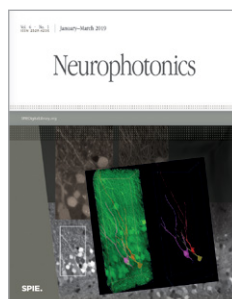
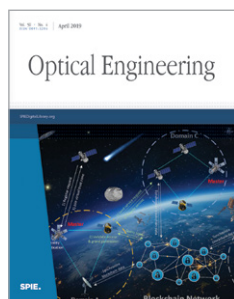
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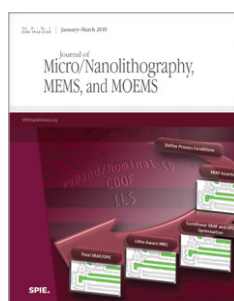
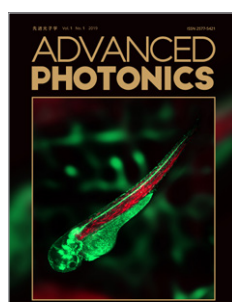
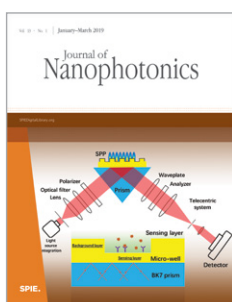
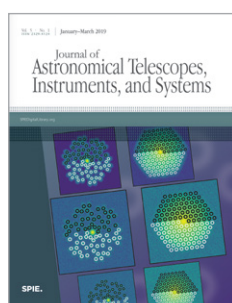
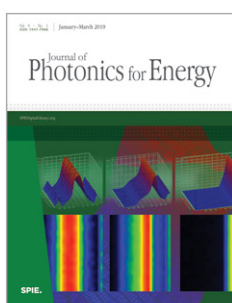
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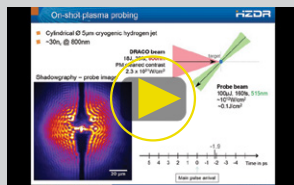
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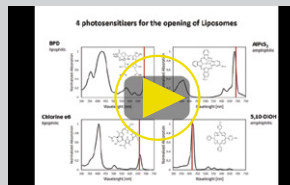
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