

Plenary lectures

Claude Boccara, Emeritus Professor, Institut Langevin, ESPCI Paris, CNRS, PSL University, France
Static and dynamic full field OCT from Tissues to cells

Elena Zagaynova, Director of the Institute of Biomedical Technologies, Privolzhsky research medical University, Nizhny Novgorod, Russia
FLIM metabolic imaging from cells to patients

Jürgen Popp, Scientific Director of the Leibniz Institute of Photonic Technology Jena, Germany
Recipient of the 2016 Pittsburgh Spectroscopy Award, fellow of SPIE and AIMBE
Photonics for medical diagnosis and therapy

Sergio Fantini, Science & Technology Center, Tufts University, Medford, USA
Fellow of SPIE, OSA and AIMBE
Quantitative studies of cerebral hemodynamics with near-infrared spectroscopy

Keynote and invited Talks

Update: November 27, 2019

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1. Diffuse Optical Imaging

Chairs: **Sylvain Gioux**, Université de Strasbourg, France (*coordinator*)

Zeev Zalevsky, Bar-Ilan University, Israel, **Turgut Durduran**, Institute of Photonic Sciences ICFO Barcelona, Spain, **Hamid Dehghani**, University of Birmingham, UK, **Adam Gibson**, University College London, UK, **Ori Katz**, Hebrew University of Jerusalem, Israel, **Brian Pogue**, Dartmouth College, USA, **Demetri Psaltis**, EPFL, Switzerland, **Paula Taroni**, Politecnico di Milano, Italy

Diffuse optical imaging offers unique capabilities for measuring functional (e.g. hemoglobin concentration, oxygenation or water content) and structural (e.g. nuclear density) parameters in living tissues. In particular, while compromising on resolution, diffuse optical imaging can perform measurements over very large fields of view, in depth and/or in real-time. Altogether, it enables the exploration of novel areas in medicine where time and field-of-view are strong constraints. This session will review the recent efforts in imaging methods, processing algorithms and their application to solve longstanding clinical problems.

Brian Pogue , Thayer school of Engineering at Dartmouth, USA <i>Successes in Optical Imaging of Medicine</i>	Keynote
Hamid Dehghani , MI-LAB, University of Birmingham, England <i>Applications of diffuse optics for detection and characterisation of disease: Thyroid cancer and Rheumatoid Arthritis</i>	Invited
Dimitris Gorpas , Institute of Biological and Medical Imaging, Helmholtz Zentrum München, Germany <i>Standardization of intraoperative fluorescence molecular imaging systems and data referencing</i>	Invited
Alwin Kienle , Ulm University, Germany <i>Spatial frequency domain imaging: theory, phantom experiments and applications</i>	Invited
Antonio Pifferi , Department of Physics, Politecnico di Milano, Milano, Italy <i>Advancing Clinical Translation in Biophotonics through multi-laboratory initiatives on Performance Assessment and Standardization</i>	Invited
Olga Conde , Photonics Engineering Group, Universidad de Cantabria, Cantabria, Spain <i>Machine learning fusion of hyperspectral and OCT imaging for tissue diagnosis and assessment</i>	Invited

2. Light Propagation in Tissues, Modelling & Optical Phantoms

Chairs: **Valery Tuchin**, Saratov State University, Saratov, Russia, **Luis Oliveira**, Polytechnic of Porto - School of Engineering, Porto, Portugal (**coordinators**)

Alexey Popov, University of Oulu, Finland, **Walter Blondel**, University of Lorraine, Nancy, France, **Tatiana Novikova**, Ecole polytechnique, Palaiseau, France, **Anne Planat-Chrétien**, CEA-Leti, Grenoble, France, **Gal Shafirstein**, Roswell Park Comprehensive Cancer Center, Buffalo, USA

Actual problems of the propagation and interaction of laser light with all types of tissues, including hard, soft and liquid, in a wide spectral range from deep ultraviolet to terahertz will be presented and discussed. The phenomena of elastic, quasielastic, and Raman scattering, which are basic for laser applications in the life sciences, will be considered. Theoretical and numerical models of the interaction of light with multicomponent living tissues will be discussed, taking into account strong scattering, scattering anisotropy, and complex absorption properties. Various types of interaction of coherent, low coherent, and incoherent light with tissues, such as diffraction, interference, second harmonic generation, speckle formation, polarization transfer, and related phenomena will be considered. New approaches to creating suitable optical phantoms that simulate the static and dynamic properties of tissues for a particular one light interaction mode will be discussed.

Dan Zhu, Wuhan National Laboratory for Optoelectronics, Huazhong university of Science and Technology, China **Keynote**

Optical clearing skull window for imaging and controlling cortical blood vessels

Steven Jacques, University of Washington, Seattle, USA **Keynote**

The use of subdiffusive light scattering as a contrast mechanism for imaging superficial tissue layers

Luis Oliveira, Polytechnic of Porto - School of Engineering, Porto, Portugal **Invited**

Measurement of optical properties from human kidney from the UV to NIR

Mikhail Kirillin, Institute of Applied Physics RAS, Nizhny Novgorod, Russia **Invited**

Dual-wavelength fluorescence monitoring for photodynamic therapy: numerical simulations, phantom and in vivo studies

Tymish Ohulchanskyy, College of Physics and Optoelectronic Engineering, Shenzhen University, China **Invited**

Optical bioimaging in short-wave infrared region: endogenous contrasts and exogenous probes

Viacheslav Artyushenko, Art Photonics GmbH, Berlin, Germany **Invited**

Advanced Fiber Solutions in 0.3/16 um range for Biomedical Applications

Tanja Tarvainen, University of Eastern Finland, Finland **Invited**

Utilizing approximative models in optical imaging and modelling of errors

3. Image-guided therapy, Lasers & PDT for treatment and diagnosis

Chairs: **Elena Zagaynova**, Privolzhsky research medical University, Nizhny Novgorod, Russia (**coordinator**)
Georges Wagnières, EPFL, Lausanne, Switzerland, **Céline Frochot**, University of Lorraine, Nancy, France,
Christine Vever-Bizet, Université Pierre et Marie Curie, France, **Serge Mordon**, University of Lille, France

In this session, new approaches to laser and PDT therapy will be discussed. Special attention will be paid to optical monitoring of therapy using lasers. The session will organically combine the reports of physicists, chemists and clinicians. That will allow to consider the problem comprehensively.

Angelika Rück , University of Ulm, Germany <i>Metabolic FLIM and oxygen PLIM in new theranostic PDT procedures</i>	Keynote
Brian Pogue , Thayer school of Engineering at Dartmouth, USA <i>Optical guidance for radiation therapy</i>	Invited
Gal Shafirstein , Roswell Park Comprehensive Cancer Center, USA <i>Image-Based Dosimetry Guided Interstitial Photodynamic Therapy for Locally Advanced Cancer</i>	Invited
Xunbin Wei , School of Biomedical Engineering, Shanghai Jiao Tong University, China <i>Near infrared light therapy for treating Alzheimer's disease</i>	Invited
Xiaolong Liu , Mengchao Hepatobiliary Hospital of Fujian Medical University, China <i>Smart strategies for Synergistic Antitumor Therapy: against hypoxia microenvironment aggravated by phototherapy</i>	Invited
Valery Tuchin , Research State Saratov University, Russia <i>Molecular diffusivity of normal and pathological tissues at immersion optical clearing</i>	Invited
Alex Vitkin , Medical Biophysics, University of Toronto, Canada <i>Shedding light on radiobiology with functional optical coherence tomography</i>	Invited
Zvi Malik , Bar Ilan University, Israel <i>Applications of endogenous Protoporphyrin in photo-diagnosis and photo-therapy of cancer</i>	Invited
Kristian Berg , Oslo University Hospital, Norway <i>Title to be confirmed</i>	Invited
Anastasiya Ryabova , Prokhorov General Physics Institute of Russian Academy of Sciences, Moscow, Russia <i>The use of fluorescence lifetime imaging microscopy to assess the interaction of photosensitizers with tumor tissues</i>	Invited
Antje Neubauer , Becker&Hickl GmbH, Berlin, Germany. <i>In vivo study of metabolic and oxygen states in tumors with fiber-based fluorescence/phosphorescence lifetime spectroscopy</i>	Invited

4. Optical Microscopy & Laser-cell-tissue interactions

Chairs: **Hideaki Kano**, University of Tsukuba, Japan (*coordinator*)

Evgeny Shirshin, M. V. Lomonosov State University, Moscow, Russia, **Andrei Lugovtsov**, M. V. Lomonosov State University, Moscow, Russia, **Dominique Dumas**, University of Lorraine, Nancy, France, **Karsten Koenig**, Saarland University, Germany, **Herbert Schneckenburger**, Aalen University, Germany, **Alexander Priezzhev**, M. V. Lomonosov State University, Moscow, Russia

This session covers state-of-the-art microscopy techniques including super-resolution, 3D and deep-tissue imaging, spectral and fluorescence lifetime imaging, elastic and inelastic light scattering, interferometry, live-cell visualization techniques, micromanipulation.

Christoph Cremer , Institute of Molecular Biology; University of Mainz, Germany <i>Lens free super-resolution microscopy at large working distances - Implications for genome nanostructure analysis</i>	Keynote
Junle Qu , Shenzhen university, China <i>Super-resolution imaging for living cell</i>	Keynote
Ling Fu , Wuhan National Laboratory for Optoelectronics, Huazhong university of Science and Technology, China <i>Deep brain Calcium recording in behaving mice</i>	Invited
Tongsheng Chen , College of Biophotonics, South China Normal University, China <i>Stoichiometry and regulation network of Bcl-2 family complexes quantified by live-cell FRET assay</i>	Invited
Philippe Leproux , Limoges University, France <i>Recent advances in cell imaging by multiplex CARS microspectroscopy</i>	Invited
Daniel Claus , ILM Ulm, Germany <i>Chromatic confocal scanning interferometry</i>	Invited
Alexander Priezzhev , M. V. Lomonosov State University, Moscow, Russia <i>Laser applications in hemorheologic research</i>	Invited
Herbert Schneckenburger , Aalen University, Germany <i>Deep View Microscopy of Cells and Tissues</i>	Invited
Christian Wagner , Saarland University, Germany <i>Red Blood Cell aggregation: An optical tweezers and a confocal holographical approach</i>	Invited
Evgeny Shirshin , Lomonosov Moscow State University, Moscow, Russia <i>Label-free molecular imaging: investigation of photophysical processes and applications for biomedical diagnostics</i>	Invited
Alexander Savitsky , A.N. Bakh Institute of Biochemistry, Russian Academy of Sciences, Moscow, Russia <i>Femtosecond kinetic of the kindling fluorescent protein KFP. Proton transfer as the result of cis-trans isomerization of chromophore</i>	Invited
Liwei Liu , Shenzhen university, China <i>Tumor microenvironment monitoring based on FLIM</i>	Invited

5. Multimodal and Multispectral approaches

Chairs: **Dan Zhu**, Huazhong University of Science and Technology, Wuhan, China, **Walter Blondel**, University of Lorraine, Nancy, France (**coordinators**)

Ekaterina Borisova, Bulgarian Academy of Sciences, Sofia, Bulgaria, **Elena Zagaynova**, Privolzhsky research medical University, Nizhny Novgorod, Russia, **Dick Sterenborg**, Netherlands Cancer Institute and Amsterdam University Medical Center, Amsterdam, The Netherlands, **Irving Bigio**, Boston University, USA

This session is devoted to recent advances and technological developments of multimodal and multispectral optical spectro-imaging methods applied to spatial and spectral quantitative characterization of biological tissues in vivo, with emphasis on clinical applications. Spectroscopic and imaging modalities shall include, but not limited to: elastic and inelastic (Raman) scattering, diffuse reflectance, intrinsic and extrinsic fluorescence.

Francesco Pavone , LENS & Department of Physics, University of Florence, Italy <i>Human brain optical mapping</i>	Keynote
Dick Sterenborg , Netherlands Cancer Institute and Amsterdam University Medical Center, Amsterdam, The Netherlands <i>Diffuse reflection spectroscopy and imaging for assessment of resection margins during cancer surgery</i>	Invited
James Tunnell , The University of Texas at Austin, USA <i>Raman spectroscopy for surgical guidance of skin cancer resections</i>	Invited
Tatiana Savelieva , Russian Academy of Sciences, Prokhorov General Physics Institute, Moscow, Russia <i>Multi-modal techniques of optical spectroscopy for in vivo demarcation of intracranial tumors</i>	Invited
Benjamin Castaneda Aphan , Pontificia Universidad Católica del Perú, Lima, Peru <i>Multimodal imaging for skin ulcers</i>	Invited
Irving Bigio , Boston University, USA <i>quantitative measurement of fibrosis in chronic kidney disease (and transplant organ viability) with elastic-scattering spectroscopy</i>	Invited

6. Nano-biophotonics for cancer

Chairs: **Alexander Priezzhev**, M. V. Lomonosov State University, Moscow, Russia, **Victor Loschenov**, Prokhorov General Physics Institute of Russian Academy of Sciences, Moscow, Russia, (**coordinators**)

Alexey Popov, University of Oulu, Finland, **Muriel Barberi-Heyob**, University of Lorraine, France, **Victor Zadkov**, M. V. Lomonosov State University, Moscow, Russia,

Nikolai Khlebtsov, Saratov State University, Saratov, Russia **Keynote**
Gold nanoparticles in bioanalytical applications

Yuqing Gu, Dept. of Biomedical Engineering, China Pharmaceutical University, China **Invited**
Biological Detection of Reactive Oxygen Species Based On Upconversion Nanomaterials

Yuri Ryabchikov, HiLASE Centre, Institute of Physics of the Czech Academy of Sciences, Czech Republic **Invited**
Ultrapure laser-synthesized single and multi-component nanoparticles for biomedical applications

Gang Liu, Xiamen University, China **Invited**
Bioinspired nanovesicles as a Versatile Drug Delivery System for Imaging-Guided Cancer Therapy

Yao He, Soochow University, China **Invited**
Silicon-based optical bioimaging and sensing

Nirmalya Ghosh, IISER – Kolkata, India **Invited**
Probing nano scale tissue multifractal anisotropy for pre-cancer detection

Daria Pominova, RAS - Prokhorov General Physics Institute of RAS, Moscow, Russia **Invited**
Upconversion nanoparticles as multifunctional biomarkers and biosensors

Vladimir Makarov, RAS - Prokhorov General Physics Institute of RAS, Moscow, Russia **Invited**
Phthalocyanine aluminum crystalline nanoparticles spectral properties and the possibility of their use in biophotonics

Chia-Liang Cheng, National Dong-Hwa University, Hualien, Taiwan **Invited**
A 3D Co-cultured model for evaluation of nanoparticle facilitated drug delivery

Andrei Lugovtsov, M. V. Lomonosov State University, Moscow, Russia **Invited**
Evaluation by laser-optic techniques of nanoparticles safety for theranostic applications: interaction with blood components and effect on blood microrheology

7. OCT, Elastography, Photoacoustic, Polarization Imaging

Chairs: **Zeev Zalevsky**, Bar-Ilan University, Israel (*coordinator*)

Anabela Da Silva, Institut Fresnel, France, **Igor Meglinski**, University of Oulu, Finland, **Ma Hui**, Tsinghua University, China, **Tatiana Novikova**, Ecole polytechnique, Palaiseau, France, **Jessica Ramella-Roman**, Florida International University, Miami, USA, **Arnaud Dubois**, Institut d'Optique Graduate School, Palaiseau, France, **Emmanuel Bossy**, Physics Interdisciplinary Laboratory, France, **Amos Danieli**, Faculty of Engineering, Bar Ilan University, Israel

There is an important recent scientific and engineering progress in various imaging modalities that can provide a more complete and more comprehensive understanding of a biological tissue while applying those insights for enhanced biomedical diagnosis as well as tissue treatments. In this session we focus on such optical imaging modalities specifically those involving optical coherent tomography known for its capability of giving high quality 3D imaging of tissues, tissue elastography providing important insights of the elastic properties of the inspected tissue, photoacoustic imaging allowing extracting spatial imaging information also from deep layers inside the light scattering tissue as well as polarization imaging modalities capable of correlating the polarization properties of the back scattered and transmitted light with essential physical characteristics of the inspected tissue.

Dan Elson , Imperial College London, London, UK <i>Polarization endoscopy</i>	Keynote
Jessica Ramella-Roman , Florida International University, Miami, USA <i>Image polarimetry clinical and pre-clinical directions</i>	Keynote
Zhihua Ding , Zhejiang University, China <i>Structural and Functional Optical Coherence Tomography, Technology and Applications</i>	Invited
Ping Xue , Department of Physics, Tsinghua University, China <i>Dispersion-mediated conjugate suppression for high speed optical computing OCT imaging</i>	Invited
Damien Gasteau , Biomedical Photonic Imaging group, University of Twente, The Netherlands <i>Combining photoacoustics and laser-induced ultrasound for tomographic imaging</i>	Invited
Tatiana Novikova , Ecole polytechnique, Palaiseau, France <i>Multi-modal imaging of thin tissue cuts for biomedical diagnostic</i>	Invited
Igor Meglinski , Oulu University, Finland, Aston University, Birmingham, UK <i>Optical Angular Momentum in Tissue Diagnosis</i>	Invited
Rinat Esenaliev , University of Texas Medical Branch, USA <i>Title to be confirmed</i>	Invited
Vladimir Zaitsev , Institute of Applied Physics, Russian Academy of Sciences, Nizhny Novgorod, Russia <i>OCE-study of Slow Processes in Cartilaginous Samples: Mechanical Relaxations after Later-Assisted Reshaping and Osmotic Phenomena Accompanying Optical Clearing</i>	Invited
Zeev Zalevsky , Bar-Ilan University, Israel <i>Super resolved and localized photoacoustic sensing</i>	Invited

8. Microwave and terahertz applications in biology and medicine

Chairs: **Alexander Shkurinov**, M. V. Lomonosov State University, Russia (*coordinator*)

Kirill Zaytsev, Prokhorov General Physics Institute of Russian Academy of Sciences, Moscow, Russia, **Olga Cherkasova**, Institute of Laser Physics of SB RAS, Novosibirsk, Russia, **Irina Dolganova**, Bauman Moscow State Technical University, Moscow, Russia, **Daria Tuchina**, Saratov State University, Saratov, Russia

The session is dedicated to modern developments in the microwave and terahertz technology for biomedical applications. The main topics will cover fundamental aspects of microwave and terahertz radiation – tissue interactions, immersion optical clearing of tissues in the microwave and terahertz ranges, novel emitters, detectors, optical systems and emerging modalities of high resolution spectroscopy and imaging for microwave and terahertz biophotonics. Special attention will be paid to applications of microwave and terahertz technology in non-invasive and intraoperative medical diagnoses.

Emma Pickwell MacPherson , Department of Physics, Warwick University, Coventry, England <i>Advancements for biomedical THz imaging</i>	Keynote
Joo-Huik Son , Department of Physics, University of Seoul, South Korea <i>Manipulation of biological molecules and cells using terahertz radiation for potential cancer treatment</i>	Keynote
Zhiyu Qian , Dept. of Biomedical Engineering, Nanjing University of Aeronautics and Astronautics, China <i>Real time assessment of microwave ablation on tumors by NIR spectra techniques</i>	Invited
Olga Smolyanskaya , ITMO University, Saint-Petersburg, Russia <i>Pulse terahertz holographic reconstruction of optical parameters for blood plasma pellets</i>	Invited
Kirill Zaytsev , Prokhorov General Physics Institute of the Russian Academy of Sciences, Moscow, Russia <i>THz imaging of soft biological tissues with the spatial resolution beyond the Abbe limit</i>	Invited
Olga Cherkasova , Institute of Laser Physics of the Siberian Branch of the Russian Academy of Sciences, Russia <i>Cellular effects of terahertz waves</i>	Invited
Gun-Sik Park , Seoul National University, South Korea <i>Nanoscale confined water dynamics studied by dielectric relaxation</i>	Invited
Yan Peng , Terahertz Technology Innovation Research Institute, University of Shanghai for Science and Technology, China <i>Application of Terahertz Precision Spectrum in Biophotonics</i>	Invited
Guilhem Gallot , Laboratory for Optics and Biosciences, Ecole polytechnique, Palaiseau, France <i>Sensing the cytosol dynamics of living cells by terahertz attenuated total reflection</i>	Invited
Patrick Mounaix , Université Bordeaux, France <i>Tissue malignancy assessment by terahertz refractive index thresholding for breast cancer demarcation</i>	Invited

9. Microcirculation imaging, Laser Speckle Contrast Imaging

Chairs: **Irina Larina**, Baylor College of medicine, Houston, USA (**coordinator**)

Valery Tuchin, Saratov State University, Saratov, Russia, **Dan Zhu**, Huazhong University of Science and Technology, Wuhan, China, **Anne Humeau-Heurtier**, Université d'Angers, France

This session is dedicated to recent advances and technological developments of optical technologies in investigation of dynamic biomedical processes through analysis of laser speckle fluctuations. The talks of the session are focused on:

- new and improved imaging approaches based on contrast produced by speckle fluctuations
- advances in computational approaches for speckle analysis of dynamic biological processes such as blood circulation, lymph flow and cilia dynamics
- novel applications of speckle technologies in various areas of biomedicine including ophthalmology, cardiovascular pathologies, ciliopathies and developmental biology

Wiendelt Steenbergen , University of Twente, The Netherlands <i>Movement artefacts in handheld laser speckle contrast imaging</i>	Keynote
Pengcheng Li , Wuhan National Laboratory for Optoelectronics, Huazhong university of Science and Technology, China <i>Statistics for mean-invariant estimation of blood flow using laser speckle</i>	Invited
Martin Leahy , National University of Ireland, Galway, Ireland <i>Microcirculation imaging with light and sound</i>	Invited
Gert Nilsson , Wheelsbridge AB, Linköping, Sweden <i>TiVi technology and Laser Doppler Imaging</i>	Invited
Anne Humeau-Heurtier , Université d'Angers, France <i>Texture analysis of biomedical data: a powerful mean to extract physiological information, but are laser speckle contrast data eligible?</i>	Invited
Tomas Strömberg , Linköping University, Sweden <i>Title to be confirmed</i>	Invited

10. Machine Learning, Bioinformatics, Image and signal Processing

Chairs: **Christian Daul**, University of Lorraine, France (**coordinator**)

Yuri Kistenev, Tomsk University, Russia, **July Galeano**, Instituto Tecnológico Metropolitano. Medellín, Colombia, **Franck Marzani**, Université de Bourgogne, France, **Walter Blondel**, University of Lorraine, France

This session deals with all simulation and modelling, machine learning and deep-learning techniques relating to the processing, analysis, understanding and interpretation of signals and images acquired with spectroscopic, imaging, laser based or biophotonic sensing devices. A particular focus is done on monomodal, multimodal and nonconventional systems such as multispectral, supplemented by data segmentation, fusion, analysis and classication of signals for lesion diagnosis or treatment of all types of human tissues.

Aydogan Ozcan , University of California, Los Angeles, USA <i>Deep learning-enabled computational microscopy and sensing</i>	Keynote
Yury Kistenev , Tomsk University, Russia <i>Molecular imaging and machine learning</i>	Invited
Yannick Benezeth , Université de Bourgogne, France <i>Automated detection of stomach lesions by endoscopic imaging: comparison of NBI and multispectral images</i>	Invited
Alexander Kel , geneXplain GmbH, Germany <i>Application of machine learning in Bioinformatics towards drug target discovery</i>	Invited
Thomas Mangeat , CNRS - CBI (Center for Integrative Biology) - Paul Sabatier University - Toulouse III, France <i>Super-resolved live imaging for a wide range of biological applications using Random Illumination Microscopy (RIM)</i>	Invited

11. Clinical transfer applied to Cancer Treatment and Diagnosis

Chairs: *Ekaterina Borisova*, Bulgarian Academy of Sciences, Sofia, Bulgaria (**coordinator**)

Marine Amouroux, University of Lorraine, Nancy France, *Geneviève Bourg-Heckly*, Université Pierre et Marie Curie, France, *Elena Zagaynova*, Privolzhsky research medical University, Nizhny Novgorod, Russia

From benchtop to bedside, latest innovations involving lasers for life sciences will be presented, including metrological validation, normalization, industrial transfer, in vivo experiments and clinical economics.

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| Angelo Pierangelo , Ecole polytechnique, Paris, France
<i>Polarized light for cancer detection in vivo</i> | Keynote |
| Buhong Li , School of Photonics and Electronic Engineering, Fujian Normal University, China
<i>Enhanced photodynamic therapy for clinical applications</i> | Invited |
| Victor Loschenov , Prokhorov General Physics Institute of Russian Academy of Sciences, Moscow, Russia
<i>New methods and tools for fluorescence navigation and photodynamic therapy in the surgical clinic</i> | Invited |
| Yu. S. Maklygina , Prokhorov General Physics Institute of Russian Academy of Sciences, Moscow, Russia
<i>New spectral-fluorescent methods for the deep brain tumors theranostics</i> | Invited |
| Ronald Sroka , LIFE-Center of the Munich University Hospital, Munich, Germany
<i>Techniques for Photodiagnosis and Photodynamic in Neurosurgery</i> | Invited |

12. Biophotonics devices for personalized diagnostics and wearables

Chairs: *Evgeny Shirshin*, M. V. Lomonosov State University, Moscow, Russia (**coordinator**)

This Session is devoted to devices that are already commercially available (or close to it) and implement advanced optical techniques as a final stage of "laser applications in life sciences. The session focuses on patient-oriented personalized diagnostics, including:

- *optofluidic devices for analysis of bioliquids*
- *noninvasive skin analysis techniques,*
- *optical methods for personalized adjustment of therapy,*
- *smartphone-based imaging and sensing,*
- *wearable optoelectronics for sensing,*
- *functional NIRS etc.*

The aim of the Session is to show which concrete valuable information can be extracted using optical techniques and what are the new directions in applied biophotonics, focusing on physical mechanisms and technical aspects.

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| Gerwin Puppels , Erasmus Medical Center and River Diagnostics company
<i>Raman applications for skin diagnostics</i> | Keynote |
| Maxim Darvin , Charité Universitätsmedizin, Berlin, Germany
<i>Non-invasive assessment of antioxidant status of human skin using spectroscopic methods</i> | Invited |
| Sehyun Shin , Korea University, Seoul, South Korea
<i>Early detection of diabetic chronic kidney disease using microfluidic-based biophotonics</i> | Invited |
| Vladislav Shcheslavskiy , Becker&Hickl GmbH, Germany
<i>Clinical FLIM: from micro to macroworld</i> | Invited |

13. Lasers in dermatology - Photodermatology

Chairs: **Karsten Koenig**, Saarland University, Germany, **François Will**, Dermatologist, Laser Center Nord Alsace-Haguenau and Laser Center Strasbourg Rhin-Strasbourg, Vice-President French Laser Group, France (coordinators)

Ekaterina Borisova, Bulgarian Academy of Sciences, Sofia, Bulgaria, **Marine Amouroux**, University of Lorraine, Nancy France

The latest laser-based clinical management of cutaneous diseases (among them cancers) will be presented: from in vivo imaging for diagnosis to therapy and post-surgery management.

Karsten Koenig, Saarland University, Germany

Keynote

Multiphoton applications

Ana-Maria Pena, L'Oréal Research and Innovation

Keynote

Multiphoton imaging in cosmetics research

François Will, Laser Center Nord Alsace-Haguenau and Laser Center Strasbourg Rhin-Strasbourg, France

Invited

Lasers and Basal Cell Carcinomas

Hans Laubach, Dermatologist at LaserMD Center in Strasbourg (France), Laser consulting at University Hospital in Geneva (Switzerland), President of the European Society for Laser in Dermatology

Invited

Real anti-aging using laser medicine