Saratov National Research State University

Research-Education Institute of Optics & Biophotonics

Saratov Fall Meeting SFM'16 – International Symposium

Optics and Biophotonics IV

September 27 - 30, 2016
Saratov, Russia

General Chair

Valery V. Tuchin, Saratov National Research State University, Institute of Precision Mechanics and Control RAS, National Research Tomsk State University, Russia

General Secretary

Elina A. Genina, Saratov National Research State University, National Research Tomsk State University, Russia

Conferences and Workshops:

- Optical Technologies in Biophysics & Medicine XVIII (*E.A. Genina, I.V. Meglinski, V.V. Tuchin*)
- Laser Physics and Photonics XVIII (*V.L. Derbov*)
- Spectroscopy and Molecular Modeling XVII (*L.M. Babkov, K.V. Berezin*)
- Electromagnetics of Microwaves, Submillimeter & Optical Waves XV (*M.V. Davidovich*)
- Nanobiophotonics XII (*N.G. Khlebtsov*)
- Internet Biophotonics IX (*A.N. Bashkatov, I.V. Fedosov, V.V. Tuchin*)
- Microscopic and Low-Coherence Methods in Biomedical and Non-Biomedical Applications IX (*K.V. Larin*)
- Nonlinear Dynamics VII (*V.S. Anishchenko*)
- Low-dimensional structures VI (*O.E. Glukhova*)
- Biomedical Spectroscopy III (*V.I. Kochubey, A.B. Pravdin*)
- Computational Biophysics and Analysis of Biomedical Data III (*D.E. Postnov*)
- Advanced Polarization Technologies in Biomedicine and Material Science III (*I.V. Meglinski, D.A. Zimnyakov*)

Co-located with:

XX International School for Junior Scientists and Students on Optics, Laser Physics & Biophotonics (Saratov Fall Meeting SFM'16-School, September 26 - 30, 2016)

Short Course Program

SPIE SC:

In vivo Flow Cytometry: Fundamentals and Biomedical Applications
Ekaterina Galanzha
University of Arkansas for Medical Sciences, USA

OSA SC:

Multi-Photon Tissue Imaging
Peter So
Massachusetts Institute of Technology, USA

Foundation "Dynasty" SC:

Quantitative phase imaging for basic

and clinical biomedical applications
Gabriel Popescu
University of Illinois, Urbana-Champaign, Illinois, USA

Plenary / Internet Plenary speakers 2016

Advances of PDT
Brian Wilson
University of Toronto, Toronto, USA

Optoacoustic imaging from principles to designs to medical applications
Alexander Oraevsky
TomoWave Laboratories Inc, Houston, USA

Optical Phase Measurements in Biology and Medicine
Gabriel Popescu
University of Illinois, Urbana-Champaign, Illinois, USA

Quantitative Fluorescence Polarization Imaging for Detecting Cancer at the Cellular Level
Anna N. Yaroslavsky, University of Massachusetts Lowell, USA

Tissue Optical Clearing
Dan Zhu
Huazhong University of Science and Technology, China

In vivo Photoacoustic and Photothermal Cytometry
Vladimir Zharov
University of Arkansas for Medical Sciences, USA

Optical Monitoring of Lymphatics
Ekaterina Galanzha
University of Arkansas for Medical Sciences, USA

Depth-Resolved Wide-Field High-Content Optical Imaging
Peter So
Massachusetts Institute of Technology, USA

OCT in Live Embryonic Imaging
Kirill V. Larin
University of Houston, USA; SSU, TSU

Advances of Biomedical Digital Holography
Juergen Schnekenburger
Biomedical Technology Center of the Medical Faculty Münster, Medical Clinic of Internal Medicine B: Gastroenterology and Metabolic Disorders Münster, Germany

Hyperbolic metamaterials: properties and approaches to homogenization
Michael V. Davidovich
Saratov State University, Russia

On-the-fly processing of imaging data using the localization of wavelet spectral components via the spline - smoothing approach
Eugene B. Postnikov
Kursk State University, Russia

Optical Techniques for Assessing the Risk Factors of Socially Important Diseases in Blood of Human Individuals and Laboratory Animals
Alexander V. Priezzhev, Physics Department and Intertational Laser Centre, Lomonosov Moscow State University, Russia

Fundamentals and Advances of Biomedical Spectroscopy
Yukihiro Ozaki, Kwansei Gakuin University, Japan

will be announced
Igor K Lednev, Department of Chemistry, University at Albany, SUNY, NY, USA

will be announced
Alexander V. Soldatov, International Research Center "Smart Materials", Southern Federal university of Russia, Rostov-on-Don, Russia

Organized by

Saratov National Research State University n.a. N.G. Chernyshevsky (SSU)

Research-Education Institute of Optics and Biophotonics, SSU

International Research-Education Center of Optical Technologies for Industry and Medicine “Photonics”, SSU

Institute of Biochemistry and Physiology of Plants and Microorganisms, RAS

Institute of Precision Mechanics and Control, RAS (IPMC RAS)

Saratov State Medical University n.a. V.I. Razumovsky

Volga Region Center of New Information Technologies, SSU

National Research Tomsk State University (TSU), Russia

Biomedical Photonics Committee of Chinese Optical Society, China

University of Oulu, Finland

SPIE Student Chapter, SSU

OSA Student Chapter, SSU

Saratov/Penza IEEE Chapter

In cooperation with

Academy of Natural Sciences, Saratov Regional Division

Russian Society for Photobiology

Saratov Science Center, RAS

Photonics4Life Consortium (**P4L**) of EC FP7: Network of Excellence for Biophotonics

Biophotonics4Life Worldwide Consortium (**BP4L**) and BiophotonicsWorld.org

EPIC – European Photonics Industry Consortium

Co-sponsored by

RFBR – Russian Foundation for Basic Research

RAS – Russian Academy of Sciences

SPIE – The International Society of Photo-Optical Instrumentation Engineers

OSA – Optical Society of America

IEEE - Institute of Electrical and Electronics Engineers

LLC SPE Nanostructed Glass Technology, Saratov

Russian Technology Platform “The Medicine of the Future”

Russian Technology Platform “Photonics”

European Technology Platform “Photonics21”

Government of the Russian Federation (grant №14.Z50.31.0004 to support scientific research projects implemented under the supervision of leading scientists at Russian institutions and Russian institutions of higher education)

OJSC “RME ”INJECT”, Saratov, Russia

COST Action, BM1205 (European Cooperation in Science and Technology)

General Program Committee

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Juergen Popp, Institute of Photonic Technology, Jena, Germany

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Alexander B. Pravdin, Saratov State University

Alexander Priezzhev, International Laser Center, Moscow State University

Alexander M. Sergeev, Institute of Applied Physics RAS

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Vladimir L. Derbov, Saratov State University

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Marina D. Kozintseva

Maxim A. Kurochkin

Nina A. Lakodina

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Daria K. Tuchina

Elena K. Volkova

Dmitry Yakovlev

Irina Yu. Yanina

Anastasiya A. Zanishevskaya

The main goal of the Symposium is to present and discuss recent developments and applications of optical and laser technologies in medicine and biology, precise mechanics and control of tissues and cells, coherent optics of random and ordered media, material and environmental sciences, nonlinear dynamics of laser systems, laser physics, spectroscopy and molecular modeling, nanophotonics and nanobiophotonics. Fundamental problems of photonics, quantum optics and ultrafast optical techniques will be discussed. The main attention will be paid to discussion of basic research of interactions of coherent, low-coherent, polarized, spatially- and temporally-modulated electromagnetic radiation within the broad wavelength range from x-rays to terahertz with inhomogeneous scattering media and biological tissues and cells. Elastic, inelastic (Raman, SERS and CARS) and dynamic light

scattering, Doppler effect, photoacoustic, photothermal and nonlinear effects and interactions, mechanical stresses, and photobiological effects will be considered. On this basis the variety of laser and optical technologies for medical diagnostics, therapy, surgery, and light dosimetry, as well as for diagnostics and imaging of random and ordered media will be presented. Studies on lasers, fibers, and photonic crystal waveguides will be discussed. Plasmonics and biosensing will be one of the key features of the meeting.

Last year plenary speakers

Delivery Systems: How to Delivery and to Activate at Time and Site Specific Manner
Gleb B. Sukhorukov, The Queen Mary University of London, UK; Saratov State University, Russia

Biophotonics on Its Way into the Clinic
Juergen Popp, Leibniz Institute of Photonic Technology, Jena, Germany

Nonlinear Metasurfaces
Ildar Gabitov, Skolkovo Institute of Science and Technology, Moscow, Russia; University of Arizona, USA

Plasmonics Engineering for SERS Detection
Nicolás Pazos-Pérez, Centre Tecnologic de la Quimica de Catalunya, Spain

Fiber spectroscopy to detect tumor margins
Viacheslav Artyushenko, art photonics GmbH, Berlin, Germany; Prokhorov General Physics Institute, RAS, Russia

Hybrid Plasmonic Nanoparticles and Atomic Clusters for Analytical and Theranostic Applications
Nikolay G. Khlebtsov, Institute of Biochemistry and Physiology of Plants and Microorganisms, Russian Academy of Sciences, Saratov State University, Russia

Wavefront Imaging and Shaping Techniques for Biomedicine & Nanotechnology
YongKeun (Paul) Park, Department of Physics, KAIST, South Korea

Advanced Software «KVAZAR» for Molecular Biology
Olga Glukhova, Department of mathematical modeling of Educational scientific institute of nanostructures and biosystems, Saratov State University, Russia

Naming Bacteria: Revolutionising Molecular Microbial Ecology
Aleš Lapanje, Institute of Metagenomics and Microbial Technologies, Slovenija

Silicon-iron Hybrid Nanoparticles with Optical, Luminescent and Magnetic Functionality
Munir Nayfeh, Department of Physics, University of Illinois at Urbana-Champaign, USA

Last year internet plenary speakers

Advance in multimodality intravascular imaging for diagnosis and characterization of vulnerable plaques
Zhongping Chen, University of California, Irvine, USA

Quantitative phase imaging for basic and clinical biomedical applications
Gabriel Popescu, University of Illinois at Urbana-Champaign, Beckman Institute for Advanced Science and Technology, IL, USA

Participants from Australia, Bulgaria, Belarus, Belgium, Canada, China, Denmark, Finland, Germany, India, Iran, Ireland, Italy, New Zealand, Latvia, Russia, Slovakia, Portugal, Singapore, Switzerland, Turkey, UK, USA, Uzbekistan have located their papers at the meeting website: http://sfm.eventry.org/symposium2015/internet

Among invited Internet lecturers were well recognized experts in the fields of biomedical optics and light scattering.

Official languages of the School and the Workshops are English and Russian, translation will be provided.

The Conference fee

For foreign participants the conference fee is $ 200 (lunches, barbecue, Volga-river voyage, and light refreshments), may be paid during the Meeting or transferred to the account number for request.

For Russian participants the Conference fee will depend on financial support from sponsoring organizations.

Lodging

Hotel “Slovakia” ashore the Volga river

http://slovakia.all-hotels.ru/

Hotel “Volga” in the downtown

http://astoria-saratov.ru/en/hotels/volga/

Western style mini-hotel Bohemia in the downtown

http://www.bohemiahotel.ru

Hotel “Volna” ashore the Volga river

http://volna64.ru/

Student hostel of SSU

Culture program

Visits to Conservatoire, Theaters, and Museums, 4-hour Volga-tour.

Registration

Electronic registration before **August 1, 2016**, at http://sfm.eventry.org/symposium2016/ is required.

Submission of Abstracts

Each author is requested to submit a one-page abstract. Abstract must be uploaded to the Conference website http://sfm.eventry.org/symposium2016/ before **August 1, 2016**.

Proceedings

Conference papers will be published as Conference Proceedings (in Russian and English) under the title “Optical Physics and Biophotonics” and in Russian and International peer-reviewed journals: *Journal of Biomedical Photonics & Engineering, Quantum Electronics (Russian/English), Optics and Spectroscopy (Russian/English), Nonlinear Applied Physics (Russian/English).*

Last year Conference Proceedings:

http://proceedings.spiedigitallibrary.org/volume.aspx?conferenceid=3639&volumeid=17635

http://optics.sgu.ru/_media/library/pop/sfm-2015.pdf

All papers will be subjected to the normal refereeing process for the journals. Manuscripts of papers should be submitted not later than **November 1, 2016**.

Visa application support

To apply for visa to Russian Consulate you need an official invitation letter. Procedure for letter preparation takes two months; the following information about you and accompany persons is needed:

1. Passport (valid up to six months after September 30, 2016) number:_____ dates of issue:___ and of expiry:_____ (copy of passport page with photo)

2. Date of birth:___, place of birth:____

3. Living address:_____

4. Working position:_____

5. Working address:_____

6. Name of town, where you are going to apply for visa (Russian consulate)

Please, send this information to general secretary of the SFM-16

Elina A. Genina: eagenina@yandex.ru

Important deadlines

Visa application support – information for official invitation letter, before May 31, 2016

Submission of Abstracts – before August 1, 2016

Registration – before August 1, 2016

Hotel reservation – before August 1, 2016

Conference fee – before September 30, 2016

Manuscripts submission – before November 15, 2016

SFM-16 webpage:
http://sfm.eventry.org/symposium2016/

On behalf of the Organizing Committee of SFM'16-Symposium IV have a pleasure in inviting you to attend this Meeting

Valery V. Tuchin

Conference:
Optical Technologies in Biophysics & Medicine XVIII

Chairs

Elina A. Genina, Saratov National Research State University; National Research Tomsk State University, Russia

Igor V. Meglinski, University of Oulu, Finland; Saratov State University

Valery V. Tuchin, Saratov National Research State University; Institute of Precision Mechanics and Control RAS; National Research Tomsk State University, Russia

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Polina A. Timoshina, Saratov State University

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Victor N. Bagratashvili, Inst. of Laser and Information Technologies RAN (Russia); **Alexey N. Bashkatov**, Saratov State Univ. (Russia); **Alexander V. Bykov**, Univ. of Oulu (Finland); **Wei Chen**, Univ. of Central Oklahoma (USA); **Kishan Dholakia**, Univ. of St. Andrews (UK); **Paul M.W. French**, Imperial College of Sci., Technol. and Med. (UK); **James G. Fujimoto**, MIT (USA); **Steven L. Jacques**, Oregon Health Sciences Univ. (USA); **Vyacheslav Kalchenko,** Weizmann Institute of Science (Israel); **Sean J. Kirkpatrick**, Michigan Technological Univ. (USA); **Kirill V. Larin**, Univ. of Houston (USA), Saratov State Univ.; **Juergen Lademann**, Humboldt University (Germany); **Martin Leahy**, National Univ. of Ireland, Galway; **Qingming Luo**, Huazhong Univ. of Sci. and Technol. (China); **Risto Myllyla**, Univ. of Oulu (Finland); **Maria Farsari**, FORTH-IESL (Greece); **Alexey P. Popov**, Univ. of Oulu (Finland); **Juergen Popp**, Inst. of Photonic Technology, Jena (Germany); **Alexander V. Priezzhev**, Moscow State Univ. (Russia); **Lihong Wang**, Washington Univ. in St. Louis (USA); **Ruikang K. Wang**, Univ. of Washington (USA); **Dan Zhu**, Huazhong Univ. of Sci. and Technol. (China)

The main goal of the Conference is to present and discuss recent developments and applications of laser and optical technologies in medicine and biology. The main attention will be paid to discussion of basic research and applications of coherent, low-coherent, polarized, spatially and temporally modulated light interaction with inhomogeneous absorbing media, tissue phantoms, and various types of tissues *in vitro* and *in vivo*. Such phenomena, as elastic, inelastic and dynamic light scattering, Doppler effect, nonlinear effects, photoacoustic and photothermal interactions, mechanical stresses, photobiological effects, will be considered. On this basis the variety of laser and optical technologies for medical diagnostics, therapy, surgery, and light dosimetry will be analyzed. Lasers and optical techniques for cardiology, dermatology, ophthalmology, gynecology, dentistry and other fields of medicine will be presented. Light scattering and photochemical techniques in cell biology and microbiology will be discussed.

Topics:

- Photon migration in tissues
- Diffusion wave and correlation spectroscopy of tissues
- Spectrophotometry, fluorescence and Raman spectroscopy of tissues
- Static and dynamic light scattering in tissues
- Coherent optical methods for medical diagnostics
- Cell and tissue coherent microscopy

- Optical diffusion and coherent medical topography and tomography
- Laser Doppler measuring systems for medicine and biology
- Full field speckle-correlation biomedical techniques
- Optical techniques of biovibrations measurements
- Optical polarimetric methods for study of tissues and cell structures
- Photothermal and photoacoustic methods for tissue diagnostics
- Optical biopsy
- Optical microelastography of tissues
- Osmotic effects and optical monitoring of matter diffusion in tissues
- Tissue and blood optical clearing
- Optical glucose sensing
- Laser and optical technologies in microbiology
- Tissue phantoms designing
- Photochemical, photothermal and photobiological effects, mechanisms of phototherapy
- High energy laser interactions with cells and tissues, laser surgery techniques
- Lasers and optical technologies in dermatology, ophthalmology, gynecology, cardiology, dentistry, etc
- Microchannel and photonic crystal technologies in biology and medicine
- Biosensors

Conference: Laser Physics and Photonics XVIII

Chair

Vladimir L. Derbov, Saratov State University (Russia)

Secretary

Andrei I. Konukhov

Saratov State University (Russia)

International Program Committee

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Alexander P. Nizovtsev (Institute of Physics of NASB, Minsk, Belarus)

Vladimir P. Ryabukho (SSU, IPM&C RAS, Saratov, Russia)

Alexander V. Gorokhov, (Samara State University, Samara, Russia)

Valery V. Tuchin (SSU, IPM&C RAS, Saratov, Russia)

Sergue I. Vinitsky (JINR, Dubna, Russia)

The main goal of the Conference is to involve junior researches and students in the field of recent developments and applications of laser physics and photonics. The main attention will be paid to discussion of the physical processes underlying the laser operation, new developments in laser design and applications, as well as the quantum and coherent properties of light and a wide scope of light-matter interaction problems, including both microscopic and macroscopic effects. Physics and technology of optical fibers and networks, photonic band-gap structures, optoelectronic and acoustooptical devices will be discussed.

Topics

The scientific program will include but is not restricted to the following topic areas:

- Physical processes in lasers, dynamics of laser systems
- Optical waveguides, fiber optics, optical networks
- Photonic band-gap structures
- Laser beam and pulse propagation, ultrafast optics
- Interaction of laser radiation with matter, nonlinear optics
- Quantum optics, photon statistics
- Acoustooptics
- Optoelectronics
- Photonics of low-dimensional structures
- Laser spectroscopy
- Coherence and holography

The preliminary list of sessions:

- Nonlinear dynamics in lasers and optical systems.
- Optical coherence and holography
- Nonlinear beam and pulse propagation, ultrafast optics
- New trends in computer modeling of lasers and optical systems
- Atom and quantum optics, optical devices for quantum computing,

photonics of exotic quantum systems

- Laser physics and applications
- Nonlinear optics
- Dynamics of atoms, molecules and quantum-dimensional systems in laser fields
- Band-gap structures and optical waveguides

Conference: Spectroscopy and Molecular Modeling XVII

Chairs

Lev M. Babkov, **Kirill V. Berezin,**
Saratov State University (Russia)

Secretary

Galina N. Ten
Saratov State University (Russia)

International Program Committee

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Kwansei Gakuin University, Japan

Lev M. Babkov,
Saratov State University, Russia

Michael D. Elkin
Saratov State Technical University, Russia

Lev A. Gribov,
Institutute named by V.I. Vernadskyi RAS, Moskow, Russia

Dmitry S. Umreiko,
Belarus State University, Minsk, Belarus

Nadezda A. Davydova,
Institute of Physics NAS of Ukraine, Kiev, Ukraine

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Saratov State University, Russia

Nikolai V. Burenin,
Institute of Applied Physics RAS, Moscow, Russia

Victor L. Furer,
Kazan Civil Engineer Academy, Kazan, Russia

Alexandr V Gorokhov,
Samara State University, Samara, Russia

We will discuss theoretical and experimental methods of spectroscopy and molecular modeling for study of structure and properties of atomic and molecular systems.

The program will include the following **topics**:

- IR spectroscopy
- Raman spectroscopy
- Fluorescence spectroscopy
- Atomic spectroscopy
- Molecular modeling (methodical aspects and applications)

Conference:
Electromagnetics of Microwaves, Submillimeter and Optical Waves XV

Chair

Michael V. Davidovich,
Saratov State University (Russia)

Secretaries

Dmitry A. Kolosov, Roman S. Muratov, Alexander N. Savin, Saratov State University (Russia)

International Program Committee

Alexander I. Nosich, Kharkov Institute of Radio-Engineering and Electronics, NAS Ukraine (Ukraine)

Nikita M. Ryskin, Saratov State University (Russia)

Igor S. Nefedov,
Aalto University, Espoo (Finland)

Georgi N. Georgiev, "Sts. Cyril and Methodius", Veliko Tirnovo, (Bulgaria);

Andrei D. Grigoriev;
St. Petersburg Electrotechnical University LETI (Russia)

Josef Modelsky,
Warsaw University of Technology (Poland)

Dmitry I. Trubetskov, Saratov State University (Russia)

Organizing Committee

Co-Chairs: **Nikita M. Ryskin,**
Saratov State University

Vladimir N. Titov, Saratov State University

The main goal the Conference is to discuss the recent developments and applications of laser, optical and electromagnetic technologies in engineering, medicine and biology, material and environmental sciences, nanotechnology, nonlinear dynamics, laser systems, laser spectroscopy and molecular modeling. The main attention will be paid to fundamentals and general approaches of description of nonlinear and nonstationary electromagnetics for optics, biomedicine, active and passive photonics and metamaterials, interactions with nonlinear media, inhomogeneous scattering media, photonic crystals, tissue phantoms, and various types of tissues *in vitro* and *in vivo*. Another trend is the nonlinear dynamic and electronics applications to various engineering and practice problems.

Topics

The scientific program will include but is not restricted to the following topic areas:

- Antennas and propagation
- General electromagnetic field theory
- Nonstationary electromagnetics, pulse generation and propagation
- Nonlinear electromagnetics and electronics
- Diffraction and scattering of waves
- Resonators, waveguides, transmission line discontinuities and units
- Microwave, millimeter, sub-millimeter and optical wave radio physics and electronics
- Electromagnetic methods in optics
- Electromagnetics in biomedical applications

- Electromagnetics for condensed and artificial media, metamaterials, photonic crystals, left-handed materials
- Nonlinear dynamics
- Sensors and measurements
- Boundary value problems and algorithms

Proceedings

Papers will be published in Conference Proceedings (in Russian and English) under the title **“Problems of Optical Physics and Biophotonics”** and in Saratov IEEE Chapter Proceedings under the title **“Modeling in applied electromagnetics and electronics”** which is the annual issue without additional charge. All papers will be subjected to the normal refereeing process for the journals. Manuscripts of papers to be published should be submitted not later than **November, 2016**.

The papers for **“Modeling in applied electromagnetics and electronics”** must be sent to Prof. Michael V. Davidovich DavidovichMV@info.sgu.ru in doc and pdf formats.

Conference:
Nanobiophotonics XII

Chair

Nikolai G. Khlebtsov,
Institute of Biochemistry and Physiology of Plants and Microorganisms, Russian Academy of Sciences, Saratov State University (Russia)

Secretary

Vitaly Khanadeev,
Institute of Biochemistry and Physiology of Plants and Microorganisms, Russian Academy of Sciences (Russia)

International Program Committee

Gleb Sukhorukov, School of Engineering and Materials Science, Queen Mary University of London (UK);**Dmitri Lapotko**, Rice University (USA); **Luis Liz-Marzán**, CIC biomaGUNE (Spain); **Alexey Yashchenok**, Max Planck Institute of Colloids and Interfaces Department of Interfaces Research Campus Potsdam-Golm (Germany); **Dmitry Gorin**, Educational Scientific Institute of Nanostructures and Biosystems, Nano and Biomedical Department, Saratov State University (Russia); **Vyacheslav Roldugin**, Institute of Physical Chemistry and Electrochemistry, Russian Academy of Sciences, Moscow (Russia), **Irina Goryacheva,** Saratov State University (Russia), **Lev Dykman**, Institute of Biochemistry and Physiology of Plants and Microorganisms, Russian Academy of Sciences, Saratov (Russia), **Vladimir Bogatyrev**, Institute of Biochemistry and Physiology of Plants and Microorganisms, Russian Academy of Sciences, Saratov State University (Russia); **Boris Khlebtsov**, Institute of Biochemistry and Physiology of Plants and Microorganisms, Russian Academy of Sciences, Saratov (Russia); **Olga Bibikova**, Saratov State University (Russia), Univ. of Oulu (Finland)

The main goal of the Conference is to present and discuss recent developments and applications of plasmonic nanostructures with controlled geometrical, optical, and surface chemical properties, as well as multifunctional nanocomposites conjugated to various molecular ligands. These topics are the subject of intensive studies and applications in biology and medicine. To date, this field has included genomics and biosensorics, immunoassays and clinical chemistry, phototherapy of cancer cells and tumors, targeted delivery of drugs and antigens, and optical bioimaging of cells and tissues with state-of-the-art nanophotonic detection systems. Multifunctional nanocomposites that combine therapeutic, diagnostic, and sensing modalities in a single nanostructure are widely used in a new field of nanobiotechnology called theranostics. Although the term theranostics has been employed for the first time quite recently, it is now rapidly growing and promising field at the crossroads of plasmonics and nanomedicine.

Topics:

- Fabrication of plasmon-resonant NPs and nanostructures
- Multifunctional nanostructures for theranostics
- Composite nanostructured functional materials
- Optical properties of plasmon resonant NPs and nanostructures
- Physicochemical characterization of NPs and nanostructures
- Functionalization of NPs with biospecific macromolecules
- Nanoscale biosensors

- Chemical technologies based on nanoparticles
- Cell imaging with NP bioconjugates
- Photothermal and photodynamic therapy using nanocomposites
- Application of nanoparticles to the targeted drug delivery
- Uptake of NPs by cells
- Biodistribution and toxicity of NPs *in vitro* and *in vivo*
- Analytical applications of NPs and bioconjugates
- SERS with plasmonic nanostructures
- SERS tags as novel nanoprobes
- Quantum dots and its application

Conference:
Internet Biophotonics IX

Chairs

Alexey N. Bashkatov, Saratov National Research State University; National Research Tomsk State University (Russia)
Ivan V. Fedosov, Saratov State University (Russia)
Valery V. Tuchin, Saratov National Research State University; Institute of Precision Mechanics and Control RAS; National Research Tomsk State University, Russia

Secretary

Daria K. Tuchina, Saratov State University (Russia)

International Program Committee

Wei Chen, Univ. of Central Oklahoma (USA); **Cornelia Denz**, University of Münster (Germany); **Kishan Dholakia**, Univ. of St. Andrews (UK); **Paul M.W. French**, Imperial College of Science, Technology and Medicine (UK); **Elina A. Genina**, Saratov State University (Russia); **Mikhail Yu. Kirillin**, Institute of Applied Physics RAS, Nizhny Novgorod (Russia); **Kirill V. Larin**, Univ. of Houston (USA), SSU (Russia); **Martin Leahy**, National Univ. of Ireland, Galway; **Qingming Luo**, Huazhong Univ. of Science and Technology (China); **Roberto Pini**, Ist. di Fisica Applicata, Sesto Fiorentino (Italy); **Juergen Popp**, Inst. of Photonic Technology, Jena (Germany); **Alexander V. Priezzhev**, Moscow State Univ. (Russia); **Edik Rafailov**, Aston Univ. (UK); **Katarina Svanberg**, Lund Univ. Medical Laser Centre (Sweden); **Hugo Thienpont**, Vrije Univ. Brussel (Belgium); **Lihong Wang**, Washington Univ. in St. Louis (USA); **Ruikang K. Wang**, Univ. of Washington (USA); **Valery P. Zakharov**, Samara State Univ. (Russia)

The main goal of the Conference is to involve international community of researches and students in the field of recent developments of biophotonics via distant learning provided by the Internet facilities. SFM has a prolonged experience in organizing of Internet sessions during last 18 years. In 2015 such presentations have included plenary lectures made by ***Zhongping Chen***, University of California, Irvine (USA) and ***Gabriel Popescu***, University of Illinois at Urbana-Champaign, Beckman Institute for Advanced Science and Technology, IL (USA).
Participants from Australia, Bulgaria, Belarus, Belgium, Canada, China, Denmark, Finland, Germany, India, Iran, Ireland, Italy, New Zealand, Latvia, Russia, Slovakia, Portugal, Singapore, Switzerland, Turkey, UK, USA, Uzbekistan have located their papers at the meeting website: http://sfm.eventry.org/2015/internet.

In 2016 we are expecting 2-3 Internet Plenary lectures, 20-30 Internet invited lectures highlighting current research and recent progress in Biophotonics, which will be done by well-known experts, 30-40 Internet reports from post-docs and PhD students all over the world.

Topics:

- New photonic technologies for the analysis of cell and tissue processes
- Photonics for non- and minimally-invasive diagnosis and therapy
- Nanobiophotonics
- Optical micromanipulation of cells and particles
- Biosensors
- Modeling and data analysis in Biophotonics
- Clinical applications
- Tissue and blood optical clearing
- Tissue optics

Conference:
Optical Microscopy and Low-Coherence Methods in Biomedical and Non-Biomedical Applications IX

Chair

Kirill V. Larin,
University of Houston (USA),
Saratov State University (Russia)

Secretary

Georgy G. Akchurin,
Saratov State University,
Institute of Precise Mechanics and Control RAS

International Program Committee

Shoude Chang,
National Research Council, Canada

Mary Dickinson,
Baylor College of Medicine, USA

Christoph K. Hitzenberger,
University of Vienna, Austria

Igor V. Meglinski,
University of Otago, New Zealand,
Saratov State University, Russia

Konstantin Sokolov,
University of Texas MA Anderson Cancer Center, USA

Valery V. Tuchin,
Saratov State University, Institute of Precise Mechanics and Control RAS, Russia; University of Oulu, Finland

Alex I. Vitkin,
Ontario Cancer Institute / Princess Margaret Hospital, Canada

Ruikang K. Wang,
Univ. of Washington, USA

Valery Zakharov,
Samara State Aerospace University, Russia

Development of non- or minimally-invasive methods for imaging, monitoring, and quantification of different materials and processes are extremely important for many biomedical (including therapy, diagnostics, management, and advanced imaging of various devastating diseases) and non-biomedical applications (dimensional metrology, material research and non-destructive testing, art diagnostics, botany, microfluidics, data storage, and security applications). This workshop will put emphasis on two aspects of optical imaging: microscopy and low coherence interferometry.

Topics

The education and scientific program will include but is not restricted to the following topic areas:

- Optical microscopy
- Methods of Low Coherence Interferometry
- Optical Coherence Tomography
- Combinations of LCI/OCT with microscopy
- Biomedical applications of optical microscopy and LCI
- Non-biomedical applications of optical microscopy and LCI

Workshop:
Nonlinear Dynamics VII

Chair

Vadim S. Anishchenko,
Saratov State University (Russia)

Secretary

Anton V. Slepnev,
Saratov State University (Russia)

International Program Committee

Lutz Schimansky-Geier,
Jüergen Kurths,
Humboldt University, Berlin, Germany

Alexander Neiman,
Ohio University, USA

Igor Khovanov,
Warwick University, UK

Olga Sosnovtseva,
University of Copenhagen, Denmark

Alexander P. Chetverikov,
Alexey N. Pavlov,
Tatjana E. Vadivasova,
Alexey V. Shabunin,
Dmitry E. Postnov,
Saratov State University, Russia

The main goal of the Conference is to attract young scientists and students to the discussion of topical problems and results in the field of theoretical nonlinear dynamics with special attention to its application in the living systems, such as mathematical physiology, neuroscience and advanced time series analysis of biophysical and medical data.

The special attention will be given to the review of contemporary achievements in the field of research of dynamics of complex nonlinear systems, both deterministic and stochastic. It is planned to invite some leading experts for delivering plenary lectures and to present oral and poster contributions of young researchers, PhD students and graduate students.

Topics

The scientific program will include but is not limited to the following topic areas:

- Nonlinear Dynamics of Deterministic Finite-Dimensional and Distributed Systems
- Stability and Bifurcations
- Synchronization of Complex Processes
- Role of Fluctuations in Nonlinear Dynamics
- Diagnostics and Analysis of Physiological Rhythms
- Mathematical Modeling of Living Systems

Conference: Low-Dimensional Structures VI

Chair

Olga E. Glukhova,
Saratov State University, Russia

Secretaries

Anna S. Kolesnikova, Michael M. Slepchenkov, Vladislav V. Shunaev,
Saratov State University, Russia

International Program Committee

Ming-Fa Lin,
National Cheng Kung University, Tainan, Taiwan

Irina V. Zaporotskova,
Volgograd State University, Volgograd, Russia

Galina N. Maslyakova,
Saratov State Medical University named after V.I. Razumovsky, Saratov, Russia

Igor S. Nefedov,
Aalto University, Espoo, Finland

Nikolay I. Sinitsyn,
Institute of Radioengineering and Electronics (IRE) of RAS, Saratov, Russia

Gennadiy V. Torgashov,
Institute of Radioengineering and Electronics (IRE) of RAS, Saratov, Russia

We will discuss theoretical and experimental methods for studying of structure, properties (optical, electronic, etc.) and applications of the low-dimensional structures. We will discuss in detail a problem of the biomedical applications of low-dimensional structures as biomaterials. Also, within the workshop we will discuss different aspects of nanobiomechanics, molecular dynamics, nanobioelectronics.

The workshop program will include following **topics**:

- synthesis technology of the low-dimensional structures (nanofilms, nanocoating, nanotubes, nanowires, graphene, fullerenes);
- atomic framework and properties of the low-dimensional structures and their research methods;
- low-dimensional structures in external fields;
- biomedical and non-biomedical applications of low-dimensional structures;
- investigation of mechanisms for lipid-protein complexes diffusion into intima of arteries: biomechanical modeling, molecular modeling, 3D-computational modeling;
- atomic-force microscopy for topology of the endothelium surface.

Conference:

Computational Biophysics and Analysis of Biomedical Data III

Chair:

Dmitry E. Postnov,
Saratov State University (Russia)

Secretary:

Elena S. Stukhina,
Saratov State University (Russia)

International Program Committee:

Alexander Neiman,
Ohio University, USA

Olga Sosnovtseva,
University of Copenhagen, Denmark

Oxana Semiachkina-Glushkovskaya,
Saratov State University, Russia

Anatoly Skripal,
Saratov State University, Russia

Boris Bezruchko
Saratov State University, Russia

The mathematical modeling and numerical simulation are the powerful tools for modern research. Together with advanced techniques of experimental data analysis they provide a solid computational basis for both experimental and theoretical studies in biophysics and medicine.

Recently introduced term "Biosimulation" incorporates the variety of mathematical modeling approaches and techniques and becomes the powerful tool for biomedical research and drug development. It implies different modeling levels ranging from phenomenological one to detailed description of biochemical processes and used both to reveal some basic physical mechanisms and to predict the quantitative features of processes in living systems.

The rapid development of optical and non-optical techniques for visualization and measurement results in considerable increase of attributed flows of raw data. Thus there is the need for continuous grows of capability of data processing, both quantitative (computational performance) and qualitative (adaptive and problem-specific data pre-processing). The GPU (graphics processor unit) based techniques of parallel computing becomes the popular solution providing the high performance at reasonable costs. However, it requires the adaptation of existent and the development of new computational algorithms for filtering and spatial-temporal patterns detection.

The advanced data processing is now capable to provide the insight in structural features of source system, such as interaction of internal rhythms, coupling between system components, or casualty of events. In this field, the development, validation and application of both temporal and spatial complexity measures is highly relevant, such as multimodal wavelet analysis, chirplets, fractality measurement, etc.

The main goal of the Conference is to provide the platform for discussion of the listed topics in the framework of Saratov Fall Meeting with special attention to task-specific, rather than generic aspects. The later mean that the contributions based on experimental studies showing the need for computational support are also appreciated.

Topics

The scientific program will include but is not restricted to the following topic areas:

- Mathematical Modeling of Biochemical and Physiological Processes
- Advanced Time Series Analysis for Biomedical Applications
- Computational Neuroscience
- Dynamical Patterns in Experimental Physiology
- GPU Computing in Processing of Biomedical Data
- Complexity measures, coupling and rhythm detection techniques

Workshop:

Advanced Polarization Technologies in Biomedicine and Material Science III

Chairs:

Igor V. Meglinski,

University of Oulu, Finland; Saratov State University, Russia

Dmitry A. Zimnyakov,

Yuri Gagarin Saratov State Technical University; Institute of Precise Mechanics and Control RAS, Russia

Secretary:

Elena A. Isaeva,

Yuri Gagarin Saratov State Technical University, Russia

International Program Committee:

Robert R. Alfano,
CCNY, USA

Stefan Andersson-Engels,
Tyndall National Institute, Cork, Ireland

Oleg V. Angelsky,
Chernivtsi National University, Ukraine

Victor N. Bagratashvili,
Inst. of Laser and Information Technologies RAS, Russia)

Claude Boccara,
ESPCI, France

Alexander V. Bykov,
Univ. of Oulu, Finland

Alexander V. Doronin,
Yale University, New Haven, CT, USA

Steven L. Jacques,
Oregon Health Sciences Univ., USA

Alexey P. Popov,
Univ. of Oulu, Finland

Alexander P. Sviridov,
Inst. of Laser and Information Technologies RAS, Russia

Valery V. Tuchin,
Saratov National Research State University, Institute of Precision Mechanics and Control RAS, National Research Tomsk State University, Russia

Olga V. Ushakova
Yuri Gagarin Saratov State Technical University of Saratov, Russia

Alexander G. Ushenko
Chernivtsi National University, Ukraine

Lihong Wang,
California Institute of Technology, CA, USA

The main goals of the Conference are:

- to present the recent results and achievements in the area of light polarization probes of random media;

- to discuss the fundamental aspects of polarized coherent and non-coherent light propagation in scattering and absorbing media with complex structure;

- to discuss the possible applications of spectral-polarization and coherence-domain techniques for morphological and functional diagnostics in biomedicine and for characterization of micro- and nanostructured dispersive media and composite materials in material science;

- to involve young scientists and student to the active and creative work in the fields of fundamental and applied optics, laser physics, and photonics.

Topics

The scientific program will include but is not restricted to the following topic areas:

- fundamentals of polarized light propagation in random media and interrelations between the coherence and polarization properties of light waves – traditional approaches and new sights;

- basic principles and applications of singular optics and theory of optical vortices;
- polarized light in biomedicine – from simple devices to sophisticated applications;
- design and practical use of polarization-based probes and sensors in various areas of modern science and technology;
- double refraction, optically active, and chiral homogeneous and heterogeneous natural and artificial media;
- resonant light-matter interactions at nanometer scale and their manifestations in polarization properties of scattered light;
- analytical and numerical approaches to simulation of polarized light propagation in multiple scattering random media.

Conference:

Biomedical Spectroscopy III

Chairs:

Vyacheslav I. Kochubey,

Saratov State University, Russia

Alexander B. Pravdin,

Saratov State University, Russia

Secretary:

Elena K. Volkova,

Saratov State University, Russia

International Program Committee:

Ekaterina G. Borisova,
Institute of Electronics, BAS, Bulgaria

Dmitry A. Gorin,
Saratov State University, Russia

Gennady V. Melnikov,
Yuri Gagarin State Technical University of Saratov, Russia

Yukihiro Ozaki,
Kwansei Gakuin University, Japan

Alexander M. Saletsky,
Lomonosov Moscow State University, Russia

Dzmitry Shcharbin,
Institute of Biophysics and

Cell Engineering of NASB, Belarus

Andre Skirtach,
Ghent University, Belgium

The scope of the Conference covers the diversity of spectroscopic modalities as applied to the study of bioobjects, including human body, and modern and continuously renovated biomaterials. The Conference subjects are also relevant to the fundamentals of acquisition of reliable spectral data from optically inhomogeneous objects of complex chemical composition and applications of spectroscopic standard practice and expedients in environmental science. We expect to see on the agenda, among the reports and discussions in the audience of peers, authoritative reviews of current research and recent progress addressed in their form of presentation to advanced undergraduate and postgraduate university students.

Topics

The scope and content of the Conference Scientific Program may cover, but in no way is restricted to, the following topic areas:

- Spectral characteristics of nanoparticles and nanostructures used in optical diagnostics and theranostics;
- Spectroscopic issues in optical biopsy;
- Nano- and molecular probes;
- Laser spectroscopy of bioobjects and biomaterials;
- Spectroscopic techniques for environment monitoring;
- Pitfalls and remedies in spectroscopic measurements;
- *In vivo* and *in vitro* measurements;
- Spectroscopy of random and ordered media;
- Polarization spectroscopy;
- Spectroscopic measurements on tissue phantoms.