Saratov State University (National Research University of Russia)

Research-Educational Institute of Optics & Biophotonics

Saratov Fall Meeting SFM'18–International Symposium

Optics and Biophotonics VI

September 25 - 29, 2018
Saratov, Russia

General Chair

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

General Secretary

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

Conferences and Workshops:

- Optical Technologies in Biophysics & Medicine XX (*E.A. Genina, V.V. Tuchin*)
- Laser Physics and Photonics XX (*V.L. Derbov*)
- Spectroscopy and Molecular Modeling XIX (*L.M. Babkov, K.V. Berezin*)
- Electromagnetics of Microwaves, Submillimeter&Optical Waves XVIII (*M.V. Davidovich*)
- Nanobiophotonics XIV (*N.G. Khlebtsov*)
- Internet Biophotonics XI (*A.N. Bashkatov, I.V. Fedosov, V.V. Tuchin*)
- Microscopic and Low-Coherence Methods in Biomedical and Non-Biomedical Applications XI (*K.V. Larin*)
- Nonlinear Dynamics VIX (*V.S. Anishchenko*)
- Low-dimensional structures VIII (*O.E. Glukhova*)
- Biomedical Spectroscopy V (*V.I. Kochubey, A.B. Pravdin*)
- Computational Biophysics andAnalysis of Biomedical Data V (*D.E. Postnov*)
- Advanced Polarization Technologies in Biomedicine and Material Science V (*D.A. Zimnyakov*)
- Laser and Optical Technologies for Brain Physiology and Pathology II (*O.V. Semyachkina-Glushkovskaya*)
- Terahertz Optics and Biotechnology (*V.E. Karasik, I.N. Dolganova, M. Skorobogatiy, K.I. Zaytsev*)
- Advanced Materials for Optics and Biophotonics I (*I.V. Reshetov, V.N.Kurlov, K.I. Zaytsev, S.O. Yurchenko*)

Co-located with:

XXII International School for Junior Scientists and Students on Optics, Laser Physics & Biophotonics (Saratov Fall Meeting SFM'17-School, September 24 - 28, 2018)

3rd School on ADFLIM (Advanced Fluorescence Imaging Methods)

Chairs: **Wolfgang Becker**, Becker & Hickl GmbH, Berlin, Germany

Alexander Savitsky, Bach Institute of Biochemistry, Research Center of Biotechnology of RAS, Russia

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

Russian-Germany Round-table on Societal Importance of Biophotonics: Innovation, Education and Networking

Chairs:

Jürgen Lademann, Charité-Universitätsmedizin Berlin, Germany

Jürgen Popp, Leibniz Institute of Photonic Technology, Jena.

Alexander Savitsky, Bach Institute of Biochemistry, Research Center of Biotechnology of RAS, Russia

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

Short Course Program

SPIE To be announced

OSA To be announced

Public lectures: To be announced

Plenary and invited speakers

Vincent P. Wallace
University of Western Australia

Graphene-based heterostructures and concepts of their terahertz and infrared applications
Victor I. Ryzhii
Russian Academy of Sciences, Bauman Moscow State Technical University

Superconducting Thin Film Nanostructures as Terahertz and Infrared Heterodyne and Direct Detectors
Grigory N. Goltsman
Moscow State Pedagogical University

Igor V. Reshetov
Sechenov First Moscow State Medical University

Vladimor S. Gorelik
Lebedev Physical Institute of RAS

Internet Plenary speakers

Ubiquitous THz photonics from ultra-high bit-rate communications to super-resolution non-destructive imaging
Maksim Skorobogatiy
Polytechnique Montreal

Photonic and Magnetic Nanoparticles for Health, Energy, and Biosensing

T. Randall Lee

University of Houston, USA

Ablation of retbindin alters flavin levels and leads to rod and cone photoreceptor degeneration

Muayyad Al-Ubaidi

University of Houston, USA

Nanoparticle-based gene therapy for ocular diseases

Muna Naash

University of Houston, USA

Organized by

Saratov State University (National Research University of Russia) (SSU)

Research-Educational Institute of Optics and Biophotonics, SSU

International Research-Educational 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

Tomsk State University (National Research University of Russia) (TSU), Russia

ITMO University (National Research University of Russia), Saint Petersburg, Russia

Bauman Moscow State Technical University, Russia

Institute of Solid State Physics of RAS, Russia

Biomedical Photonics Committee of Chinese Optical Society, China

SPIE Student Chapter, SSU

SPIE Student Chapter of Bauman Moscow State Technical University

SPIE Student Chapter of Institute of Solid State Physics of RAS, Chernogolovka

OSA Student Chapter, SSU

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

RME INJECT LLC, Saratov, Russia

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Nikolai G. Khlebtsov, Institute of Biochemistry and Physiology of Plants and Microorganisms of RAS

Yury V. Kistenev, Tomsk State University

Sergey A. Kozlov, ITMO University

Vyacheslav I. Kochubey, Saratov State University

Jürgen Lademann, Charité-

Universitätsmedizin Berlin, Germany

Kirill V. Larin,University of Houston, USA, Saratov State University, Tomsk State University

Martin Leahy, National University of Ireland, Galway, Ireland

Juergen Popp, Institute of Photonic Technology, Jena, Germany

Dmitry E. Postnov, Saratov State University

Alexander B. Pravdin, Saratov State University

Alexander V. Priezzhev, International Laser Center, Moscow State University

Igor V. Reshetov, Sechenov First Moscow State Medical University, Russia

Oxana V. Semyachkina-Glushkovskaya, Saratov State University, Russia

Alexander Savitsky, Bach Institute of Biochemistry, Research Center of Biotechnology of RAS

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Ilya V. Turchin, Insitute of Applied Physics of RAS, Nizhny Novgorod, Russia

Elena V. Zagaynova, Privolzhsky Research Medical University, Nizhny Novgorod, Russia

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Elena K. Volkova

Dmitry D. Yakovlev

Irina Yu. Yanina

Anastasiya A. Zanishevskaya

Kirill I. Zaytsev

Olga Zyuryukina

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.

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 "Saratov" in the downtown

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

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/

Hostel "Central"
http://www.travel.ru/hotel/russia/saratov/centralnyi/

Student hostel of SSU

Culture program

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

Pre-Registration

Please, fill up the registration form before **April 15, 2018** and e-mail it to Irina Yanina (School) irina-yanina@yandex.ru or

Polina Timoshina (Symposium)
timoshina2906@mail.ru

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/symposium2018/ before **April 15, 2018**.

Proceedings

Conference papers will be published as Conference Proceedings (in Russian and English) under the title "Optical Physics and Biophotonics", SPIE Proceedings,

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).*

SFM'18 attendees also encouraged to submit papers to SPIE Journals

J. of Biomedical Optics
https://www.spiedigitallibrary.org/journals/journal-of-biomedical-optics?SSO=1

J. of Medical Imaging
https://www.spiedigitallibrary.org/journals/journal-of-medical-imaging

J. of Neurophotonics

https://www.spiedigitallibrary.org/journals/neurophotonics

J. of Nanophotonics
https://www.spiedigitallibrary.org/journals/journal-of-nanophotonics

Last year Conference Proceedings:

https://spie.org/Publications/Proceedings/Volume/10336

http://spie.org/Publications/Proceedings/Volume/10337

http://optics.sgu.ru/_media/library/sfm2017.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, 2018**.

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 29, 2017) 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-18

Elina A. Genina: eagenina@yandex.ru

Important deadlines

Visa application support – information for official invitation letter, before April 15, 2018

Submission of Abstracts – before August 1, 2018

Registration – before August 1, 2018

Hotel reservation – before August 1, 2018

Conference fee – before September 25, 2018

Manuscripts submission – before November 1, 2018

SFM-18 webpage:
http://sfm.eventry.org/symposium2018/

On behalf of the Organizing Committee of SFM'18-Symposium VI have a pleasure in inviting you to attend this Meeting

Valery V. Tuchin

Conference:
Optical Technologies in Biophysics & Medicine XX

Chairs

Elina A. Genina, Saratov State University; Tomsk State University (Russia)

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

Secretary

Polina A. Timoshina,
Saratov State University (Russia)

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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, Tufts School of Engineering (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 (Ireland)

Qingming Luo, Huazhong Univ. of Sci. and Technol. (China)

Maria Farsari, FORTH-IESL (Greece)

Francesco S. Pavone, University of Florence (Italy)

Alexey P. Popov, Univ. of Oulu (Finland)

Juergen Popp, Inst. of Photonic Technology, Jena (Germany)

Alexander V. Priezzhev, Moscow State Univ. (Russia)

Lihong Wang, Caltech (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 XX

Chair

Vladimir L. Derbov, Saratov State University (Russia)

Secretary

Andrei I. Konukhov

Saratov State University (Russia)

Program Committee

Vladimir L. Derbov(Chair) (SSU, Saratov, Russia)

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Marian Marciniak(National Institute of Telecommunications, Poland)

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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
- Photonicband-gapstructures
- Laser beam and pulse propagation, ultrafast optics
- Interaction of laser radiation with matter, nonlinear optics
- Quantumoptics, photonstatistics
- Acoustooptics
- Optoelectronics
- Photonicsoflow-dimensionalstructures
- Laserspectroscopy
- Coherenceandholography

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 XIX

Chairs

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

Secretary

Galina N. Ten
Saratov State University (Russia)

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Lev M. Babkov,
Saratov State University, Russia

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Saratov State Technical University, Russia

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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

Tatiana G. Burova,
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 XVIII

Chair

Michael V. Davidovich,
Saratov State University (Russia)

Secretaries

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

Program Committee

Alexander I. Nosich, KharkovInstitute 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", VelikoTirnovo, (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, 2018**.

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 XIV

Chair

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

Secretary

Timofey E. Pylaev,
Institute of Biochemistry and Physiology of Plants and Microorganisms, RAS (Russia)

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, Scoltech, Saratov State University (Russia)

Vyacheslav Roldugin, Institute of Physical Chemistry and Electrochemistry, RAS, Moscow (Russia)

Irina Goryacheva, Saratov State University (Russia)

Lev Dykman, Institute of Biochemistry and Physiology of Plants and Microorganisms, RAS, Saratov (Russia)

Vladimir Bogatyrev, Institute of Biochemistry and Physiology of Plants and Microorganisms, RAS, Saratov State University (Russia)

Boris Khlebtsov, Institute of Biochemistry and Physiology of Plants and Microorganisms, RAS, Saratov (Russia)

Olga Bibikova, Saratov State University (Russia), Art photonics GmbH, Berlin, Germany

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
- Nanoscalebiosensors

- 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 XI

Chairs

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

Secretary

Daria K. Tuchina, Saratov State University (Russia)

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, National Research Council of Italy (CNR) (Italy)

Juergen Popp, Inst. of Photonic Technology, Jena (Germany)

Alexander V. Priezzhev, Moscow State Univ. (Russia)

Edik Rafailov, Aston Univ. (UK)

Lihong Wang, Caltech (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 20 years. 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 and other countries have located their papers at the meeting website: http://sfm.eventry.org/2018/internet.

In 2018 we are expecting 2Internet Plenary lectures, 10-15 Internet invited lectures highlighting current research and recent progress in Biophotonics, which will be done by well-known experts, 20 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
- Tissueoptics

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

Chair

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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 IX

Chair

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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
- StabilityandBifurcations
- SynchronizationofComplexProcesses
- Role of Fluctuations in Nonlinear Dynamics
- Diagnostics and Analysis of Physiological Rhythms
- Mathematical Modeling of Living Systems

Conference: Low-Dimensional Structures VIII

Chair

Olga E. Glukhova,
Saratov State University, Russia

Secretaries

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Saratov State University, Russia

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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.Wewill discuss in detail aproblemof the biomedical applicationsof low-dimensionalstructures asbiomaterials. 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 V

Chair:

Dmitry E. Postnov,
Saratov State University (Russia)

Secretary:

Elena S. Stukhina,
Saratov State University (Russia)

Program Committee:

Alexander Neiman,
Ohio University, USA

Olga Sosnovtseva,
University of Copenhagen, Denmark

OxanaSemiachkina-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 V

Chairs:

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

Program Committee:

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Tyndall National Institute, Cork, Ireland

Oleg V. Angelsky,
Chernivtsi National University, Ukraine

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

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ESPCI, France

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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 State University, Institute of Precision Mechanics and Control RAS, 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 V

Chairs:

Vyacheslav I. Kochubey,

Saratov State University, Russia

Alexander B. Pravdin,

Saratov State University, Russia

Secretary:

Elena K. Volkova,

Saratov State University, Russia

Program Committee:

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

Dmitry A. Gorin, Scoltech, 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 Conferencecovers 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.

Workshop:

Laser and Optical Technologies for Brain Physiology and Pathology II

Chairs:

Oxana V. Semyachkina-Glushkovskaya
Saratov State University, Russia

Ekaterina Galanzha,
University of Arkansas for Medical Sciences, USA
Valery V. Tuchin,
Saratov State University, Russia

Secretary:

Ekaterina Zinchenko

Saratov State University, Russia

Program Committee:

Viacheslav Artyushenko, art photonics, Germany

Ekaterina Borisova, Institute of Electronics, BAS, Bulgaria

Denis Bragin, University of New Mexico, Albuquerque, USA

Vyacheslav Kalchenko, Weizmann Institute of Science, Israel

Juergen Kurths, Humboldt University, Germany

Qingming Luo, Huazhong Univ. of Sci. and Technol., China

Teemu Myllylä, University of Oulu, Oulu, Finland

Alexey Pavlov, Saratov State Technical University, Russia

Edik Rafailov, Aston Institute of Photonic Technologies, UK

Alla Salmina, Krasnoyarsk State Medical University, Krasnoyarsk, Russia

Sergey Sokolovsky, Aston Institute of Photonic Technologies, UK

Vladislav Yu. Toronov, Ryerson University, Canada

Tatyana Yakusheva, Washington University, USA

Dan Zhu, Huazhong Univ. of Sci. and Technol., China

The main goal of the Workshop is to present and discuss the application of innovative laser and optical technologies in the clinical and basic studies of brain physiology and pathophysiology.
The main attention will be paid to discussion of applications of optoelectronics, laser speckle imaging, optical coherent tomography, fluorescent, confocal and multiphoton microscopy, NIRS, MRI, modeling and mathematical analysis in the study of:

- Cerebral blood flow
- Cerebral lymphatics
- Blood-brain barrier
- Brainoncology
- Brain trauma
- Neurodegenerative diseases
- Stroke

Topics

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

- Lasers and optical technologies in the study of lymphatics of central nervous system;
- Optical techniques for the analysis in vivo the blood-brain barrier function;
- Models ex vivo of blood-brain barrier;
- Photodynamic therapy in the brain oncology;
- Laser Doppler and coherent-domain methods for the analysis of cerebral circulation;
- Mathematical methods and modeling of patho- and physiology of cerebral vessels;
- Photoacoustic imaging and in vivo cytometry
- Multiphotonopticalimaging
- Optogenetics
- Raman, NIR, MIR and THz imaging of brain tumor margins

Conference:

Terahertz Optics and Biophotonics

Chairs:

Valeriy E. Karasik,
Bauman Moscow State Technical University, Russia

Irina N. Dolganova,
Institute of Solid State Physics of RAS, Russia
Bauman Moscow State Technical University, Russia

Maksim Skorobogatiy,
Polytechnique Montréal, Canada

Kirill I. Zaytsev,
Prokhorov General Physics Institute of RAS, Russia
Bauman Moscow State Technical University, Russia

Secretary:

Nikita V. Chernomyrdin,
Prokhorov General Physics Institute of RAS, Russia
Bauman Moscow State Technical University, Russia

Program Committee:

Olga P. Cherkasova,
Institute of Laser Physics of SB RAS, Russia

Barbara Michela Giuliano,
Max-Planck-Institut für Extraterrestrische Physik, Germany

Alexei Ivlev,
Max-Planck-Institutfür Extraterrestrische Physik, Germany

Vladimir N. Kurlov,
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Igor V. Minin,
Siberian State Academy of Geodesy, Russia

Oleg V. Minin,
Siberian State Academy of Geodesy, Russia

Dmitry S. Ponomarev,
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Igor V. Reshetov,
Sechenov First Moscow State Medical University, Russia

Victor I. Ryzhii,
Bauman Moscow State Technical University, Russia

Olga A. Smolyanskaya,
ITMO University, Russia

Vincent Patrick Wallace,
University of Western Australia, Australia

Stanislav O. Yurchenko,
Bauman Moscow State Technical University, Russia

The scope of the Conference includes recent developments in terahertz (THz) science and technology for biomedical applications.

Main topics will cover fundamental and applied aspects, such as computational and experimental problems of THz technology, THz spectroscopy and imaging systems, development and fabrication of THz optical and electronic components, interaction of THz radiation with living tissues and cells.

Special attention will be paid to application of THz technology in noninvasive, least invasive and intraoperative diagnosis of tumors and malignancies.

Topics

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

- Fundamental problems of terahertz sources and detectors;

- Terahertz waveguides and fiber optics technology;
- Interaction of terahertz radiation with biological and chemical objects;
- Application of terahertz waves for medical treatment and control of physical processes;
- Terahertz *in vivo* and *in vitro* spectroscopy of biomedical samples;
- Terahertz high-resolution spectroscopy;
- Study of biochemical processes by terahertz technology;
- Terahertz technologies for medical diagnosis

Conference:

Advanced Materials for Optics and Biophotonics I

Chairs:

Igor V. Reshetov,
Sechenov First Moscow State Medical University, Russia

Vladimir N. Kurlov,
Institute of Solid State Physics of RAS, Russia

Kirill I. Zaytsev,
Prokhorov General Physics Institute of RAS, Russia
Bauman Moscow State Technical University, Russia

Stanislav O. Yurchenko,
Bauman Moscow State Technical University, Russia

Secretary:

Gleb M. Katyba,
Institute of Solid State Physics of RAS, Russia

Program Committee:

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ART Photonics, Germany

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Bauman Moscow State Technical University, Russia

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Lebedev Physical Institute of RAS, Russia

Valery E. Karasik,
Bauman Moscow State Technical University, Russia

Yusef D. Khesuani,
3D Bioprinting Solutions, Russia

Gennady A. Komandin,
Prokhorov General Physics Institute of RAS, Russia

Vladimir A. Lazarev,
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Maksim Skorobogatiy,
Polytechnique Montréal, Canada

Igor E. Spector,
Prokhorov General Physics Institute of RAS, Russia

Vincent Patrick Wallace,
University of Western Australia, Australia

The scope of the Conference includes recent developments of novel advanced materials of optics and biophotonics.

Main topics will cover recent developments in the area of novel materials, which feature advanced optical performance along with high chemical resistance and inertness to blood and human body fluids, and which are applied in instruments for medical diagnosis, therapy, surgery and implantation.

Special attention would be paid to the modern problems of tissue transplantation, colloidal systems in biology and medicine, cell spheroids and 3D bioprinting, the use of artificial tissues in a clinical practice.

Topics

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

- Novel technologies for fabrication of advanced materials for optics and biophotonics;
- Prospective materials for biology and medicine;
- Advanced materials for implants;
- Modern instruments for medical diagnosis, therapy and surgery relying on the advanced materials;
- Problems of tissue transplantation;
- Biofriendly materials with advanced optical performance;
- Cell spheroids and 3D bioprinting;
- Advanced colloidal systems for applications in biology and medicine.