Saratov State University
Research-Educational Institute of Optics & Biophotonics

Saratov Fall Meeting
SFM'12

XVI International School for Junior Scientists and Students on Optics, Laser Physics & Biophotonics

September 25 - 28, 2012
Saratov, Russia

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

Conference Secretary
Elina A. Genina,
Saratov State University

Workshops:

- Optical Technologies in Biophysics & Medicine XIV
- Coherent Optics of Ordered and Random Media XIII
- Laser Physics and Photonics XIV
- Spectroscopy and Molecular Modeling XIII
- Modern Optics XI
- Electromagnetics of Microwaves, Submillimeter & Optical Waves XII
- English as a Communicative Tool in the Scientific Community XI
- Workshop on Management of High Technologies Commercialization and Regional Innovation Systems IX
- Nanobiophotonics VIII
- Nonlinear Dynamics III
- Internet Biophotonics V
- Microscopic and Low-Coherence Methods in Biomedical and Non-Biomedical Applications V
- History, Methodology and Philosophy of the Optical Education V
- Telemedicine VII
- Low-dimensional structures II

Special events:

Russian-Chinese Workshop
“Biophotonics and Biomedical Optics”

Co-chairs: Qingming Luo, Britton Chance Center for Biomedical Photonics, HUST, P.R. China, and Valery V. Tuchin, Saratov State University

SPIE/OSA SHORT COURSE SESSION

Special session on P4L Saratov Cluster “Photonics for Diagnostics and Therapy” of Photonics4Life Consortium of EC FP7: Network of Excellence for Biophotonics

Special session on student reports awarded by the Russian Foundation on Innovations U.M.N.I.K. in Optics, Laser Physics, and Biophotonics

Organized by
N.G. Chernyshevsky Saratov State University
Institute of Precise Mechanics and Control, Russian Academy of Sciences
Research-Educational Institute of Optics and Biophotonics at Saratov State University
Research-Educational Center of Nonlinear Dynamics & Biophysics (REC-
006) of CRDF and Ministry of Education and Science of RF
International Research-Educational Center of Optical Technologies for Industry and Medicine “Photonics” at Saratov State University
Volga Region Center of New Information Technologies at Saratov State University
Biomedical Photonics Committee of Chinese Optical Society
University of Oulu, Finland
Saratov State Medical University
SPIE Student Chapter
OSA Student Chapter

In cooperation with
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Russian Society for Photobiology
Saratov Science Center of the Russian Academy of Sciences
Photonics4Life Consortium of EC FP7: Network of Excellence for Biophotonics
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SPE “Nanostructed Glass Technology” Ltd., Saratov

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Andreas Thoss, THOSS Media GmbH, Berlin, Germany
The main goal of the School and the Workshops is to involve junior researches and students in the field of recent developments and applications of laser and optical technologies in medicine and biology, coherent optics of random and ordered media, material and environmental sciences, nonlinear dynamics of laser systems, laser spectroscopy and molecular modeling. The main attention will be paid to discussion of fundamentals and general approaches of description of coherent, low-coherent, polarized, spatially and temporally modulated light interactions with inhomogeneous scattering media, photonic crystals, tissue phantoms, and various types of tissues in vitro and in vivo. Such effects as static and dynamic light scattering, Doppler effect, optoacoustic and optothermal interactions, mechanical stress, photodynamic effect, etc 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 spectroscopy of random and ordered tissue media will be presented.
SFM-12 will be organized as the morning plenary sessions, afternoon lecture and oral sessions and evening poster presentations. The original oral reports and posters will be presented by the junior scientists and students. Plenary lectures will be presented by well-recognized experts in the field.

Last year plenary speakers:
- **Mark Neil**, Department of Physics, Blackett Laboratory, Imperial College, UK: *Programmable Optics and Programming for Optics: Applications in Biophotonics*
- **Alexei A. Kamshilin**, Department of Applied Physics, University of Eastern Finland, Finland: *Blood Perfusion Visualization in Vivo by Synchronous Detection Technique*
- **Ilya Yanoslovsky**, Palomar Medical Technologies, Inc., USA: *Fractional Photothermolysis of Tissues as a New Paradigm in Laser Medicine*
- **Igor Meglinski**, Otago University, New Zealand: *Optical diagnostics of stress conditions of aquatic organisms in Baikal Lake*
- **Qingming Luo**, Britton Chance Center for Biomedical Photonics, P.R. China: *Optical Neuroimaging*
- **Alexander Shkurinov, Maxim Nazarov, Anatoly Khodan**, Moscow State University, Institute of Physical Chemistry and Electrochemistry RAS, Russia: From nano- to tera-: applications of the terahertz radiation for studies of artificial material nanosize structures
- **Martin Wolf**, University Hospital Zurich, Switzerland: *Clinical application of near-infrared spectroscopy and imaging in neonates*

Participants from 30 countries have located their papers on the meeting website: [http://optics.sgu.ru/SFM/](http://optics.sgu.ru/SFM/). 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 US $ 200 (includes Program, two short-courses, Welcome Party, 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 the Russian Foundation of Basic Research and other sponsors.
**Lodging**

Hotel “Slovakia” ashore the Volga river
http://slovakia.all-hotels.ru/

Hotel “Volga” in the downtown

Western style mini-hotel Bohemia in the downtown
http://www.bohemiahotel.ru
mail@bohemiahotel.ru

Student hostel “Volna” ashore the Volga river

**Culture program**

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

**Registration**

Electronic registration before **August 15, 2011**, at
http://optics.sgu.ru/SFM/ is required.

**Submission of Abstracts**

Each author is requested to submit a one-page abstract. Abstract must be uploaded to the Conference website http://optics.sgu.ru/SFM/ before **August 15, 2011**.

**Proceedings**

Conference papers will be published as SPIE Proceedings (CD, SPIE Digital Library), Conference Proceedings (in Russian and English) under the title “Optical Physics and Biophotonics” and in Russian and International peer-reviewed journals: J. of Biophotonics, J. of Biomedical Optics, J. of Innovative Optical Health Sciences, Quantum Electronics (Russian/English), Applied Nonlinear Dynamics (Russian/English), Laser Physics (English), and Optics and Spectroscopy (Russian/English).

All papers will be subjected to the normal refereeing process for the journals. Manuscripts of papers should be submitted not later than **October 15, 2012**.

**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 are needed:

1. Passport 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: _______________

Please, send this information to secretary of the SFM-12
Elina A. Genina: eagenina@yandex.ru eagenina@optics.sgu.ru

**Important deadlines**

- Visa application support – information for official invitation letter, before **May 31, 2012**
- Submission of Abstracts – before **August 15, 2012**
- Registration – before **August 15, 2012**
- Hotel reservation – before **August 15, 2012**
- Conference fee – **September 25, 2012**
- Manuscripts submission – before **October 15, 2012**

SFM-12 webpage: http://optics.sgu.ru/SFM/

On behalf of the Organizing Committee of SFM'12 I have a pleasure in inviting you to attend this Meeting

Valery V. Tuchin
Workshop:  
Optical Technologies in Biophysics & Medicine XIV

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

Secretary
Elina A. Genina,  
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); 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); 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); Igor V. Meglminski, Univ. of Otago (New Zealand), Saratov State Univ. (Russia); Risto Myllyla, Univ. of Oulu (Finland); Maria Farsari, FORTH-IESL (Greece); Alexey 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 Workshop is to involve junior researches and students in the field of recent developments and applications of laser and optical technologies in medicine and biology. The main attention will be paid to discussion of fundamentals and general approaches of description 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 effects as static and dynamic light scattering, Doppler effect, photoacoustic and photothermal interactions, mechanical stress, photodynamic effect, etc 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
The education and scientific program will include the following 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
Workshop: Internet Biophotonics V

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

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Gert von Bally, University of Münster (Germany); Alexey N. Bashkatov, SSU (Russia); 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); Kirill V. Larin, Univ. of Houston (USA), Saratov State University; Martin Leahy, National Univ. of Ireland, Galway; Qingming Luo, Huazhong Univ. of Science and Technology (China); Igor V. Meglinski, Univ. of Otago (New Zealand), SSU (Russia); Roberto Pini, Ist. di Fisica Applicata, Sesto Fiorentino (Italy); Juergen Popp, Inst. of Photonic Technology, Jena (Germany); Alexander V. Priezzhev, Moscow State Univ. (Russia); 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)

The main goal of the Workshop is to involve international community of junior 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 15 years. In 2011 such presentations have included plenary lectures made by Lihong V. Wang, Washington University in St. Louis, USA: Photoacoustic Tomography: From Cells to Organs
Yu Chen, Fischell Department of Bioengineering, University of Maryland, USA: In vivo 3D imaging of kidney microcirculation using Doppler OCT
Lihong V. Wang, Washington University in St. Louis, USA: Photoacoustic Tomography: From Cells to Organs

Participants from 30 countries have located their papers on the meeting website: http://optics.sgu.ru/SFM/.

In 2012 we are expecting 3-4 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 junior researchers, post-docs and PhD students all over the world.

Topics
The education and scientific program will include the following 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
Workshop: Low-Dimensional Structures II

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Olga E. Glukhova, Saratov State University (Russia)

Secretary
Anna S. Kolesnikova, Saratov State University (Russia)

International Program Committee
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Irina V. Zaporotskova, Volgograd State University, Volgograd (Russia)

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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.

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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.
Workshop: Management of High Technologies Commercialization and Regional Innovation Systems IX

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

Secretary
Yulia S. Skibina, Saratov State University, SPE “Nanostructed Glass Technology” Ltd.

International Program Committee
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Robert Breault, Breault Research Organization, Arizona Optics Industry Association (USA)
Boris Reznik, BioRASI, Inc. (USA)
Natalya V. Romanova, Saratov State University (Russia)
Sergey N. Sokolov, INJECT Enterprise (Russia)

Stoyan Tanev, University of Southern Denmark, Denmark
Andreas Thoss, THOSS Media GmbH, Berlin, Germany

The workshop program will include the following topics:

- High technology’s commercialization, innovation management, high technologies and business, technologies of opening of the innovative companies, innovative business, transfer of technologies, financing of innovative activity, management of innovation risks, venture financing, education in the field of management in biophotonics and biotechnologies
- Development and monitoring of branch "road maps" as the basis for planning of regional branch clusters and innovation zones
- Actual priorities of the regional innovation policy
- Experience of IP commercialization and actual problems of Academy of Sciences, high schools, chambers of commerce and regional industrial company interaction
- Special session on student reports awarded by the Russian Foundation on Innovations U.M.N.I.K. in Optics, Laser Physics, and Biophotonics will be provided
Workshop:
Microscopic and Low-Coherence Methods in Biomedical and Non-Biomedical Applications V

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

Secretary
Georgy G. Akchurin,
Institute of Precise Mechanics and Control RAS, Saratov State University (Russia)

International Program Committee
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National Research Council (Canada)
Mary Dickinson,
Baylor College of Medicine (USA)
Christoph K. Hitzenberger,
University of Vienna (Austria)
Igor V. Megliinski,
University of Otago (New Zealand), Saratov State University (Russia)
Valery V. Tuchin,
Saratov State University, Institute of Precise Mechanics and Control RAS, (Russia); University of Oulu (Finland)
Ruikang K. Wang,
Univ. of Washington (USA)

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