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Optical Technologies in Biophysics and Medicine XIII

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Igor V. Meglinski
Editors

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Introduction

The Annual International Multidisciplinary School for Young Scientists and Students on Optics, Laser Physics and Biophotonics (Saratov Fall Meeting (SFM-11)) was held 27–30 September 2011 in Saratov, Russia, with about 500 participants from Russia, USA, Europe, and Asia. The meeting covered a wide range of modern problems of fundamental and applied optics, laser physics, photonics, and biomedical optics. SFM-11 also contained 13 international workshops:

- Special Session Dedicated to Memory of Britton Chance
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- Internet Biophotonics IV
Valery V. Tuchin, Chair
- Nonlinear Dynamics II
Vadim S. Anishchenko, Chair
- Low-Dimensional Structures
Olga E. Glukhova

A special event during the Meeting was the Russian-Chinese Seminar, with Qingming Luo and Valery V. Tuchin serving as chairs.

SFM-11 also featured a seminar on Telemedicine: Opportunities, Applications, Prospects VI (Elena V. Karchenova and Valery V. Bakutkin, chairs) and a Special Internet Session of European Network of Excellence for Biophotonics WP 5:

Software for Modeling and Data Analysis in Biophotonics (Valery V. Tuchin and Mark Neil, chairs).

The main goal of the School, Workshops, and Seminars is to involve young researchers 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. Primary attention was paid to discussion of fundamentals and general approaches of description of coherent, low-coherent, polarized, spatially and temporally modulated light interactions with inhomogeneous absorbing media, photonic crystals, tissue phantoms, and various types of tissues *in vitro* and *in vivo*. Such effects as static and dynamic light scattering, Doppler, optoacoustic and optothermal interactions, mechanical stress, photodynamic effect, etc., were 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 media were presented.

SFM-11 was organized as morning plenary sessions, afternoon lecture and oral sessions, and evening poster presentations and Internet discussion. The original oral reports and posters were presented by the junior scientists and students. Plenary lectures were listened with a great interest and discussed by the audience.

Plenary and Invited lectures, oral and poster presentations covered a wide area of tissue optics, spectroscopy and imaging, controlling of optical properties of tissues, as well as biophysical and photo-chemical aspects of photo and laser therapy. Besides this SPIE volume, a few special issues and sections of well-recognized peer-reviewed journals, such as *Optics and Spectroscopy* and *Quantum Electronics* will be published.

The SPIE/OSA short courses for students, engineers, scientists, and clinicians "Nonlinear morphofunctional imaging of tissues," by Prof. Francesco Pavone, European Laboratory for Nonlinear Spectroscopy and Department of Physics Sesto Fiorentino (Italy) and "Optical coherence tomography: imaging and sensing of tissues and cells," by Dr. Kirill V. Larin, University of Houston (USA), accompanied the conference. There were more than 50 attendees of each, mostly students, and were organized by Saratov University SPIE and OSA Student Chapters and supported by SPIE, OSA, and Saratov State University.

A unique feature of the Saratov Fall Meetings is the Internet Workshop and one-day on-line discussion. In 2011, this session has included the following plenary lectures: "Photoacoustic tomography: from cells to organs," by Prof. Lihong V. Wang, Washington University in St. Louis (USA); "In vivo 3D imaging of kidney microcirculation using Doppler OCT," by Prof. Yu Chen, Fischell Department of Bioengineering, University of Maryland (USA); and "Clinical application of near-

infrared spectroscopy and imaging in neonates," by Prof. Martin Wolf, University Hospital Zurich (Switzerland).

Participants from USA, Canada, Russia, Germany, Austria, Switzerland, Spain, Finland, Ireland, UK, Italy, Bulgaria, Poland, Ukraine, Belarus, China, Japan, Singapore, New Zealand and other countries have located their papers on the meeting website: <http://sfm.eventry.org/2011/internet>, which was available during the meeting and will be available for a whole year up to the next meeting.

A great number of presented materials are the result of collaboration between research groups from different countries supported by international scientific programs such as CRDF, PHOTONICS4LIFE, and others.

This volume includes papers presented on the Workshop on Optical Technologies in Biophysics and Medicine XIII. It is a great pleasure and privilege for the editors to thank all of the authors for their contributions to SFM-11, especially to the Internet lecturers for their exciting presentations.

The organizers of SFM-11 are grateful to all of the sponsoring organizations and programs that supported this meeting very effectively, especially to: SPIE, Optical Society of America; Russian Foundation for Basic Research; U.S. Civilian Research & Development Foundation for the Independent States of the Former Soviet Union (CRDF), grant REC-006; PHOTONICS4LIFE of FP7-ICT-2007-2 (№ 224014, 2008-2013); and Volga Region Center of New Information Technologies.

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