

Saratov Fall Meeting 2014

**Optical Technologies in Biophysics
and Medicine XVI; Laser Physics
and Photonics XVI; and
Computational Biophysics**

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Editors

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- 1 Plenary Session I
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- 2 Plenary Session II
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- 3 Plenary Session III
Igor V. Meglinski, University of Oulu (Finland) and Otago University (New Zealand)
- 4 Plenary Session IV
Chia-Liang Cheng, National Dong Hwa University (Taiwan, China)
- 5 Plenary Session Internet Biophotonics
Valery V. Tuchin, N.G. Chernyshevsky Saratov State University (Russian Federation) and Institute of Precision Mechanics and Control (Russian Federation)
- 6 Invited Lecture/Oral Session Biophysics I
Kirill V. Larin, University of Houston (United States)
- 7 Invited Lecture/Oral Session Biophysics II
Alexander V. Priezzhev, Lomonosov Moscow State University (Russian Federation)

- 8 Oral Session Biophysics III
Ivan Fedosov, N.G. Chernyshevsky Saratov State University
(Russian Federation)
- 9 Oral Session Laser Physics and Photonics
Vladimir L. Derbov, N.G. Chernyshevsky Saratov State University
(Russian Federation)
- 10 Oral Session Computational Biophysics
Dmitry E. Postnov, N.G. Chernyshevsky Saratov State University
(Russian Federation)
- 11 Invited Lecture/Oral Session Microscopy and Low-Coherence
Methods
Kirill V. Larin, University of Houston (United States)
- 12 Joint Poster Session and Internet Discussion
Dmitry Agafonov, N.G. Chernyshevsky Saratov State University
(Russian Federation)
Ivan V. Fedosov, N.G. Chernyshevsky Saratov State University
(Russian Federation)

Introduction

The 2nd International Symposium on Optics and Biophotonics (Saratov Fall Meeting (SFM-14) was held 23–26 September 2014 in Saratov, Russia, with over 500 participants from Russia, United States, Canada, Europe, Asia, and Pacific Ocean countries. The symposium covered a wide range of modern problems of fundamental and applied optics, laser physics, photonics, and biomedical optics.

In the framework of the Symposium the following Conferences were organized:

- Optical Technologies in Biophysics and Medicine XVI
Elina A. Genina, Igor V. Meglinski, and Valery V. Tuchin, Chairs
- Laser Physics and Photonics XVI
Vladimir L. Derbov, Chair
- Spectroscopy and Molecular Modeling XV
Valentin I. Berezin, Lev M. Babkov, and Kirill V. Berezin, Chairs
- Nanobiophotonics X
Nikolai G. Khlebtsov, Chair
- Microscopic and Low-Coherence Methods in Biomedical and Non-Biomedical Applications VII
Kirill V. Larin, Chair
- Internet Biophotonics VII
Alexey N. Bashkatov, Ivan V. Fedosov, and Valery V. Tuchin, Chairs
- Nonlinear Dynamics V
Vadim S. Anishchenko, Chair
- Low-dimensional structures IV
Olga Glukhova, Chair
- Biomedical Spectroscopy
Vyacheslav I. Kochubey and Alexander B. Pravdin, Chairs
- Advanced Polarization Technologies in Biomedicine and Material Science
Igor V. Meglinski and Dmitry A. Zimnyakov, Chairs
- Computational Biophysics and Analysis of Biomedical Data
Dmitry E. Postnov, Chair

The main focus was on the discussion of fundamentals and general approaches to the description of coherent, low-coherent, polarized, spatially and temporally modulated light interactions with inhomogeneous absorbing media, photonic crystals, optical biopsy, tissue phantoms, and various types of tissues' properties, both in vitro and in vivo. Such effects as static and dynamic light scattering, Doppler, photo-acoustic and photo-thermal 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. New fundamental phenomena in quantum optics together with novel laser and fiber optical technologies were presented, as well as photonics of

micro- and nanostructures. Since the use of almost every measurement method or visualization technique raises the computational issues, the relevant state-of-the-art approaches were discussed in the framework of newly introduced conference on computational biophysics and data analysis.

SFM-14 was organized with morning plenary sessions, afternoon lecture and oral sessions, evening poster presentations, and internet discussion. Plenary lectures were presented by leading experts in different fields of science, and were listened to with 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.

The traditional specific feature of Saratov Fall Meetings is the Internet Session and one-day on-line discussion. In 2014, this Internet session included two plenary lectures, 13 invited lectures, and 41 internet reports.

The abstracts by the participants from United States, Russia, Denmark, Germany, Netherlands, Ireland, Italy, Finland, Poland, Israel, China, etc. (located at the meeting website: <http://sfm.eventry.org/symposium2014/internet>), were available during the meeting and will be available for a whole year until the next meeting.

A great number of the materials presented are the result of collaboration between research groups from different countries, supported by international scientific programs such as Photonics4Life, TEKES, SCOPES, RFBR-International, Chinese Optical Society, and others.

This volume includes papers presented at the Conferences on Optical Technologies in Biophysics and Medicine XVI, Laser Physics and Photonics XVI, Microscopic and Low-Coherence Methods in Biomedical and Non-Biomedical Applications VII, Nanobiophotonics X, Low-Dimensional Structures IV, Computational Biophysics and Analysis of Biomedical Data, and Internet Biophotonics VII.

It is a great pleasure and privilege for us to thank all of the authors for their contributions to SFM-14, especially to the internet lecturers for their exciting presentations.

The organizers of SFM-14 are grateful to all the sponsoring organizations and programs that efficiently supported this meeting, especially to: SPIE, The Optical Society (OSA), Russian Foundation for Basic Research, SPE Nanostructured Glass Technology Ltd. (Russian Federation), and Russian Technology Platforms "The Medicine of the Future" and "Photonics."

Elina A. Genina
Vladimir L. Derbov
Kirill V. Larin
Dmitry E. Postnov
Valery V. Tuchin

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