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Optical and Nano-Technologies for Biology and Medicine

Valery V. Tuchin
Elina A. Genina
Editors

23–27 September 2019
Saratov, Russian Federation

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Introduction

The Seventh International Symposium on Optics and Biophotonics (Saratov Fall Meeting, SFM19) was held in Saratov, Russia, 23–27 September 2019 with more than 500 participants from Russian Federation, United States, Canada, Europe, Asia and Pacific Ocean countries. It covered a wide range of modern problems of fundamental and applied optics, laser physics, photonics, and biomedical optics.

This volume includes selected papers of the following conferences and workshops organized in the framework of the symposium:

Optical Technologies in Biophysics & Medicine XXI
Elina A. Genina and Valery V. Tuchin (*Chairs*)
Nanobiophotonics XVI
Nikolai G. Khlebtsov (*Chair*)
Microscopic and Low-Coherence Methods in Biomedical and Non-Biomedical Applications XII
Kirill Larin (*Chair*)
Internet Biophotonics XII
Alexey N. Bashkatov, Ivan V. Fedosov, and Valery V. Tuchin (*Chairs*)
Low-Dimensional Structures X
Olga E. Glukhova (*Chair*)
Advanced Polarization and Correlation Technologies in Biomedicine and Material Science V
Dmitry A. Zimnyakov (*Chair*)
Biomedical Spectroscopy V
Vyacheslav I. Kochubey and Alexander B. Pravdin (*Chairs*)
Teraherz Optics and Biotechnologies II
Valeriy E. Karasik (*Chair*)

The main attention was paid to the discussion of fundamentals and general approaches of description of coherent, low-coherent, polarized, spatially and temporally modulated light interactions with inhomogeneous absorbing media, low-dimensional structures, tissues, and tissue phantoms in a wide spectral range from x-ray to terahertz. Optical properties of various tissues measured in vitro, ex vivo, and in vivo as well as optical biopsy techniques were under consideration. Static and dynamic light scattering in tissues, Doppler, photo-acoustic and photo-thermal laser-tissue interactions, including nanoparticle doped tissues and cells, light induced mechanical stress, photodynamic effects also 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.

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SFM19 was organized as the morning plenary sessions, afternoon lectures and oral sessions, evening poster presentations and Internet discussion. Plenary lectures delivered by leading experts in urgent fields of optical and laser life sciences were received by the attendees 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, problems of interaction of terahertz radiation with tissues and tissue-like materials, as well as biophysical and photochemical aspects of photo- and laser therapy.

In the framework of the symposium, a competition for the Best Student Poster Award was organized and supported by the SPIE FOCUS Program. Some papers of the winners are included in the volume.

The traditional specific feature of Saratov Fall Meetings is the Internet Session and one-day online discussion. In 2019, this Internet Session included 2 plenary lectures, 18 invited lectures, and 22 reports. The papers by the participants from United States, Canada, Russian Federation, Germany, France, Finland, Poland, Bulgaria, Israel, India, China, Taiwan etc., located at the meeting website: http://sfm.eventry.org/IB19/preliminary, were available during the meeting and will be available for a whole year till the next meeting.

This is a great pleasure and privilege for editors to thank all of the authors for their contributions to the symposium, especially to the plenary, invited, and Internet lecturers for their exciting presentations.

The organizers of SFM19 are grateful to all the sponsoring organizations and programs that efficiently supported this meeting, especially: Saratov State University (Russian Federation); Research Center of Biotechnology of the Russian Academy of Sciences (Russian Federation); SPIE – The International Society for Optical Engineering; The Optical Society; LLC SPE "Nanostructed Glass Technology" (Russian Federation); RME "INJECT" LLC (Russian Federation); AVESTA, Ltd. (Russian Federation); art photonics GmbH (Germany); and Becker & Hickl GmbH (Germany).

Elina A. Genina
Valery V. Tuchin

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