Methods of optical bioimaging and neuroimaging are rapidly evolving and penetrate both to experimental laboratories and clinics. Among their advantages are non-invasiveness and abilities varying from multiscale image acquisition to functional real-time imaging.

This Special Issue presents a collection of papers contributed by the leading groups in bio- and neuro-imaging depicting their state-of-the-art results discussed at “Optical Bioimaging” and “Neuroimaging and Neurodynamics” Conferences being parts of the Second International Symposium “Topical Problems of Biophotonics – 2009”.


The Symposium was held in July 2009 by the Institute of Applied Physics of the Russian Academy of Sciences together with the Nizhny Novgorod Medical Academy, the University of Nizhny Novgorod, Gycom Ltd. and the Government of Nizhny Novgorod Region. About 250 participants from around the world exchanged their views on the recent developments in this fascinating field of science. The Symposium included four parallel topical conferences “Optical Bioimaging”, “Nanobiophotonics”, “Neuroimaging and Neurodynamics” and “Terahertz Diagnostics and Treatment”. As is seen from the titles, the symposium has covered a broad spectrum of topics.

The range of issues addressed at the meeting was explicitly represented by the plenary talks given by Paras Prasad (USA), Vladislav Panchenko (Russia), Bruce Tromberg (USA), Antoine Triller (France), Xi-Cheng Zhang (USA), Hiro-o Hamaguchi (Japan), Svyatoslav Medvedev (Russia), Claude Boccara (France), Derek Abbott (Australia), and Matthew Larkum (Switzerland).

The conference in optical bioimaging reviewed state-of-the-art in optical coherence tomography, multiphoton fluorescence microscopy, optical diffuse tomography, diffuse fluorescence tomography, PDT, biophotonics methods for medicine of the future.

The main topics of the neuroimaging conference were new approaches to functional brain imaging, optical neuroimaging, modeling of neurons and synapses in functional networks and modeling of system level phenomena including activity patterns, synchronization and neural control.
The nanobiophotonics conference was focused on the advanced methods, new technologies, materials and devices for nanobiophotonics: Raman spectroscopic techniques for the analysis of complex biological systems, coherent Raman microscopy, photonic crystals for biosensing, fluorescent proteins for multicolor whole-body cellular imaging, laser based transfection of cells. Terahertz imaging, biomolecular spectroscopy, detection of dangerous drugs and atmospheric pollution, and other actual issues were discussed at the terahertz imaging and diagnostics workshop.

The general opinion was that the meeting was very fruitful and the tradition of holding it regularly should be continued.

The Third International Symposium “Topical Problems of Biophotonics – 2011” will be held in the second half of July, 2011.

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Mikhail Yu. Kirillin is a researcher at the Laboratory of Biophotonics of the Institute of Applied Physics of Russian Academy of Sciences. He received his Ph.D. from the Physics Department of Moscow State University in 2006 and his Dr. Sc. (Tech.) from the University of Oulu in 2008. His scientific interests include optics of biotissues and other scattering media, image formation in tomography systems including optical coherence and diffusive modalities, techniques for optical clearing and contrast enhancement in tomography images, as well as theoretical description and numerical simulations of light transport in scattering media.

Karsten König studied physics in Rostock, received his diploma, Ph.D. and habilitation degrees at the Friedrich Schiller University Jena, Germany. He worked at the Institute of Laser Technologies in Medicine at Ulm, at the Beckman Laser Institute in Irvine/UCI, at the Institute for Molecular Biotechnology in Jena and at the Medical Faculty of the University Jena. He is currently Full professor and Chair of the Department of Microsystems at the Faculty of Mechatronics & Physics at the Saarland University in Saarbrücken. Prof. König is co-founder of the spin-off company JenLab GmbH.

Natalia M. Shakhova graduated from the Nizhny Novgorod Medical Academy in 1980. She received her Ph.D. degree in 1996 and degree of Dr. of Sciences in Medicine in 2005. Natalia Shakhova is a Leading Scientist of IAP RAS and Professor of Nizhny Novgorod State Medical Academy. Her scientific interests include oncogynecology, endoscopy, laser medicine and optical bioimaging. She has more than 60 publications. In 1999 she was awarded a State Prize of Russian Federation in Science and Technology.

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