

## Foreword to the Special Issue on Optical Technologies in Biophysics and Medicine

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We are pleased to present the third issue of JIOHS, which focuses on optical technologies of diagnostics and therapy. These are selected papers presented during Saratov Fall Meeting — 1<sup>st</sup> International Symposium on Optics and Biophotonics (September 24–28, 2013, Saratov, Russia) in the framework of the Workshops: “Optical Technologies in Biophysics and Medicine,” “Nanobiophotonics,” and “Internet Biophotonics.” This issue includes nine representative papers that well characterize the major topics of SFM-13.

Improvement of noninvasive diffuse near-infrared spectroscopy of human brain requires the use of stable tissue phantoms with known characteristics. Wróbel and co-authors focus on the development of a plain-parallel multi-layered phantom with optical properties corresponding to the human head layers, such as skin, skull, and gray and white matter of the brain tissue.

Development of the spectral imaging module based on a double acousto-optical tunable filter and a specialized optical coupling system attachable to conventional rigid and flexible medical endoscopes is presented in the paper of Machikhin *et al.* The authors demonstrate the experimental validation of this imager on real biomedical objects.

Some papers are related to development of diagnostic methods of pathological processes in organism. So, comparative optical study of biofluids collected from patients with chronic kidney diseases has been carried out by Kuznetsov *et al.* Concentration change of endogenous visible fluorescence substance can be used in monitoring of hemodialysis procedure. The results of experimental investigations on the differences of hair structure of healthy mice and mice with malignant tumors are presented by Maryakhina *et al.* Differences can be detected at an early stage of the disease and used to improve optical techniques of biomedical diagnostics of cancer.

The development of novel medical technologies that can improve the results of treatment of different diseases is an important field of research. The antitumor efficiency of gold nanorod plasmonic photothermal therapy was evaluated by Bucharskaya *et al.* Photodynamic technology for the treatment of caries and gingivitis is proposed by Suetenkov *et al.*

Tissue optical clearing is the technique that enhances efficacy of optical diagnostic methods as well as laser treatment. The main topic of the paper by Liu and co-authors is the improvement of laser tattoo removal due to skin optical clearing with composition of PEG400 and Thiazone. Diffusion coefficients of optical clearing agents (glucose and glycerol) in myocardium tissue are evaluated by Tuchina *et al.*

The system of biosensors network supporting behavioral therapy for autistic children is presented by Jędrzejewska-Szczerska and co-authors. The system can be used to measure values of physiological parameters that are associated with changes in the emotional state.

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Overall, papers collected in this special issue demonstrate well the exciting potential of optical technologies for biomedical research, medical diagnostics and treatment.

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