

Dynamics and Fluctuations in Biomedical Photonics XII

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Editors

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- 6 Functional Imaging and Spectroscopy
Martin J. Leahy, National University of Ireland, Galway (Ireland)
- 7 Cerebral Haemodynamics
Anna N. Yaroslavsky, University of Massachusetts Lowell
(United States)

Introduction

This proceedings volume is from *Dynamics and Fluctuations in Biomedical Photonics XII*, held on February 7 through 8, 2015, at the SPIE Photonics West Conference in San Francisco, California. It was a three-day meeting featuring 33 oral presentations and a joint one-day poster session of 12 poster presentations from leading international research groups.

The goal of the conference was to gather essentially different groups of leading researchers such as biophysicists, medical doctors and physicians, mathematicians, and optical and laser engineers, together with students to report the current state of the art and to facilitate future progress in the development of optical and laser technologies based on dynamics and fluctuations approaches (such as laser-speckle, speckle-based coherence imaging, microcirculation analysis using various optical techniques and methods, dynamics of molecular diffusion, including nanoparticles, etc.) towards biomedical science and clinical applications. These approaches should be useful for diagnosis and therapy of devastating life-threatening diseases such as those of the heart, cancer, vascular, mental illness, and many others that manifest as a breach of the living organism's immune systems at the level of molecule, cell, organ, or organism as a whole. We hope that proceedings of this conference will contribute to the development of such interdisciplinary fields of science and applications as dynamics and structures of living systems, biomedical optics and laser medicine, and that it will be useful to scientists, medical doctors, engineers and students.

The conference was organized into several sessions: Speckle Technologies (chaired by Prof. Wang); Tissue and Cell Dynamics I and II (chaired by Profs. Larin and Tuchin); Clinical Imaging and Evaluation (chaired by Prof. Lademann); Optical Clearing and Biomechanics (chaired by Prof. Larin); Functional Imaging and Spectroscopy (chaired by Prof. Leahy); and Cerebral Hemodynamics (chaired by Prof. Yaroslavsky). Most of the sessions featured invited presentations.

The conference kicked off with an invited lecture by Prof. Vyacheslav Kalchenko from Weizmann Institute of Science (Israel) entitled "Multi-modal imaging approach for functional quantitative visualization of acute vascular reaction." Prof. Kalchenko presented original work on visualizing vasculature of subcutaneous tissues and the brain completely noninvasively. This presentation drew significant attention from the audience and resulted in wide coffee break discussion.

It is also necessary to note invited lectures given by Leonid D. Shvartsman from The Hebrew Univ. of Jerusalem (Israel), Juergen M. Lademann from Charité Universitätsmedizin Berlin (Germany), Wei-Chuan Shih from University of Houston (United States), Dan Zhu from Huazhong University of Science and Technology (China), Bruce J. Tromberg from Beckman Laser Institute and Medical Clinic (United States), Jessica C. Ramella-Roman from Florida International University

(United States), and Elizabeth M. Hillman from Columbia University (United States). These talks provided a nice overview of recent advances in multiple fields.

The oral sessions and corresponding poster session featured many presentations that described different methods and techniques developed and applied to study complex problems of dynamics and fluctuations in biological systems on the scale ranging from cell to the whole body. The reader is encouraged to browse the table of contents for this issue to learn the full scope of the conference.

The conference chairs would like to thank the members of the Technical Program Committee for their help in organizing the conference. We sincerely appreciate the support of the SPIE and conference staff. Finally, we would like to thank all of the conference attendees and manuscript authors for their contributions and participation, especially invited speakers, who helped to make this meeting a success.

Valery V. Tuchin
Kirill V. Larin
Martin J. Leahy
Ruikang K. Wang