PROCEEDINGS OF SPIE

[SPIDigitalLibrary.org/conference-proceedings-of-spie](https://spiedigitallibrary.org/conference-proceedings-of-spie)

Front Matter: Volume 7563

, "Front Matter: Volume 7563," Proc. SPIE 7563, Dynamics and Fluctuations
in Biomedical Photonics VII, 756301 (10 March 2010); doi: 10.1117/12.858678

SPIE.

Event: SPIE BiOS, 2010, San Francisco, California, United States

PROGRESS IN BIOMEDICAL OPTICS AND IMAGING

Vol. 11, No. 16

Dynamics and Fluctuations in Biomedical Photonics VII

Valery V. Tuchin

Donald D. Duncan

Kirill V. Larin

Editors

23–25 January 2010

San Francisco, California, United States

Sponsored and Published by

SPIE

Volume 7563

Proceedings of SPIE, 1605-7422, v. 7563

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

The papers included in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. The papers published in these proceedings reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from this book:

Author(s), "Title of Paper," in *Dynamics and Fluctuations in Biomedical Photonics VII*, edited by Valery V. Tuchin, Donald D. Duncan, Kirill V. Larin, Proceedings of SPIE Vol. 7563 (SPIE, Bellingham, WA, 2010) Article CID Number.

ISSN 1605-7422

ISBN 9780819479594

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time) • Fax +1 360 647 1445

SPIE.org

Copyright © 2010, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 1605-7422/10/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

SPIDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc.

The CID number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID number.

Contents

vii *Conference Committee*

SESSION 1 TISSUE COMPLEX STRUCTURE ANALYSIS

- 7563 03 **Tissue viability imaging for quantification of skin erythema and blanching (Invited Paper)** [7563-02]
G. E. Nilsson, Linköping Univ. (Sweden); M. J. Leahy, Univ. of Limerick and RSCI (Ireland)
- 7563 04 **Tissue structural organization: measurement, interpretation, and modeling** [7563-03]
D. Duncan, Portland State Univ. (United States); D. Fischer, NASA Glenn Research Ctr. (United States); M. Daneshbod, Univ. of New Mexico (United States); S. Prahl, Providence St. Vincent Laser Ctr. (United States)
- 7563 05 **Image quality comparison of high-energy phase contrast x-ray images with low-energy conventional images: phantom studies** [7563-04]
M. Wong, Univ. of Oklahoma (United States); X. Wu, Univ. of Alabama at Birmingham (United States); H. Liu, Univ. of Oklahoma (United States)
- 7563 08 **Characterizing polarized autofluorescence of normal and benign tissues using singular value decomposition and wavelet transform** [7563-08]
A. H. Gharekhan, Gujarat Univ. (India); S. Arora, Univ. of Oxford (United Kingdom); A. N. Oza, Gujarat Univ. (India); M. B. Sureshkumar, The M. S. Univ. of Baroda (India); A. Pradhan, Indian Institute of Technology Kanpur (India); P. K. Panigrahi, Physical Research Lab. (India) and Indian Institute of Science Education and Research (India)
- 7563 09 **LED illumination effects on proliferation and survival of meningioma cellular cultures** [7563-12]
E. Solarte, H. Urrea, W. Criollo, O. Gutierrez, Univ. del Valle (Colombia)

SESSION 2 MICRO- AND NANOPARTICLE DYNAMICS

- 7563 0A **Medical application-oriented nanostructure design: physical basics and limitations (Invited Paper)** [7563-09]
L. D. Shvartsman, B. Laikhtman, The Hebrew Univ. of Jerusalem (Israel)
- 7563 0B **Quantification of microbubbles in blood with phase-sensitive SSOCT** [7563-10]
R. K. Manapuram, V. R. Manne, N. Sudheendran, E. F. Carbajal, Univ. of Houston (United States); K. V. Larin, Univ. of Houston (United States) and Saratov State Univ. (Russian Federation)

- 7563 0C **Optical microscopy for nanoparticles temperature and velocity field visualization** [7563-11]
I. V. Fedosov, Saratov State Univ. (Russian Federation); I. S. Nefedov, Helsinki Univ. of Technology (Finland); B. N. Khlebtsov, Institute of Biochemistry and Physiology of Plants and Microorganisms (Russian Federation); V. V. Tuchin, Saratov State Univ. (Russian Federation) and Institute Precise Mechanics and Control (Russian Federation)

SESSION 3 BLOOD FLOW MEASUREMENT AND IMAGING

- 7563 0E **Laser Doppler flowmetry for assessment of tissue microcirculation: 30 years to clinical acceptance** [7563-14]
M. J. Leahy, Univ. of Limerick and RSCI (Ireland); G. E. Nilsson, Linköping Univ. (Sweden)
- 7563 0F **In vivo measurement of skin blood microcirculation using diffusing wave correlation technique** [7563-15]
I. Meglinski, Univ. of Otago (New Zealand) and Cranfield Univ. (United Kingdom); V. Kalchenko, A. Harmelin, Weizmann Institute of Science (Israel)

SESSION 4 BLOOD PERFUSION IMAGING

- 7563 0H **Comparison of scanning beam and whole field laser Doppler perfusion imaging (Invited Paper)** [7563-17]
W. Steenbergen, E. Hondebrink, Univ. of Twente (Netherlands); T. G. Van Leeuwen, Univ. of Twente (Netherlands) and Univ. of Amsterdam (Netherlands); M. J. Draijer, Univ. of Twente (Netherlands)
- 7563 0J **Noise analysis in laser speckle contrast imaging** [7563-19]
S. Yuan, Y. Chen, Univ. of Maryland, College Park (United States); A. K. Dunn, The Univ. of Texas at Austin (United States); D. A. Boas, Massachusetts General Hospital, Harvard Medical School (United States)

SESSION 5 SKIN OPTICS AND DYNAMICS

- 7563 0L **A gel-based skin and blood flow model for a Doppler optical coherence tomography (DOCT) imaging system (Invited Paper)** [7563-23]
K. Lawlor, M.-L. O'Connell, E. Jonathan, M. J. Leahy, Univ. of Limerick (Ireland)
- 7563 0M **Three-dimensional dynamics of temperature fields in phantoms and biotissue under IR laser photothermal therapy using gold nanoparticles and ICG dye** [7563-27]
G. G. Akchurin, A. G. Garif, Saratov State Univ. (Russian Federation) and Institute of Precise Mechanics and Control (Russian Federation); I. L. Maksimova, A. A. Skaptsov, Saratov State Univ. (Russian Federation); G. S. Terentyuk, First Veterinary Clinic (Russian Federation); B. N. Khlebtsov, N. G. Khlebtsov, Saratov State Univ. (Russian Federation) and Institute of Biochemistry and Physiology of Plants and Microorganisms (Russian Federation); V. V. Tuchin, Saratov State Univ. (Russian Federation) and Institute of Precise Mechanics and Control (Russian Federation)

- 7563 ON **Measuring Doppler-like power spectra and dermal perfusion using laser speckle contrast with multiple exposures** [7563-07]
O. B. Thompson, Industrial Research Ltd. (New Zealand) and Univ. of Auckland (New Zealand); M. K. Andrews, Industrial Research Ltd. (New Zealand)

POSTER SESSION

- 7563 OO **Analysis and modification of estimate error in optical properties measurement with the double-integrating-spheres system** [7563-20]
C. Li, Q. Wang, Z. Shi, Tianjin Univ. (China); Y. Luo, Jinan Univ. (China); H. Zhao, K. Xu, Tianjin Univ. (China)
- 7563 OP **Study on optical clearing effects by using tissue-like phantom** [7563-21]
J. Jiang, W. Chen, Q. Gong, Tianjin Univ. (China); R. K. Wang, Oregon Health & Science Univ. (United States); K. Xu, Tianjin Univ. (China)
- 7563 OR **Study of the structural dynamics of proteins by the method of energy transfer** [7563-24]
A. G. Melnikov, Saratov State Univ. (Russian Federation)
- 7563 OS **A study of renal blood flow regulation using the discrete wavelet transform** [7563-25]
A. N. Pavlov, O. N. Pavlova, Saratov State Univ. (Russian Federation); E. Mosekilde, O. V. Sosnovtseva, Technical Univ. of Denmark (Denmark)
- 7563 OU **OCT monitoring of diffusion of water and glycerol through tooth dentine in different geometry of wetting** [7563-29]
N. A. Trunina, V. V. Lychagov, Saratov State Univ. (Russian Federation); V. V. Tuchin, Saratov State Univ. (Russian Federation) and Institute of Precise Mechanics and Control (Russian Federation)
- 7563 OV **Fat tissue staining and photodynamic/photothermal effects** [7563-30]
V. V. Tuchin, Saratov State Univ. (Russian Federation) and Institute of Precise Mechanics and Control (Russian Federation); G. B. Altshuler, Palomar Medical Technologies, Inc. (United States); I. Yu. Yanina, V. I. Kochubey, G. V. Simonenko, Saratov State Univ. (Russian Federation)
- 7563 OW **Tissue viability (TiVi) imaging: utility in assessment of rapid changes in the cutaneous microvasculature** [7563-32]
P. M. McNamara, Univ. of Limerick (Ireland); J. O'Doherty, Royal Surrey County Hospital (Ireland); M.-L. O'Connell, B. W. Fitzgerald, Univ. of Limerick (Ireland); C. D. Anderson, G. E. Nilsson, Linköping Univ. (Sweden); M. J. Leahy, Univ. of Limerick (Ireland)
- 7563 OX **Qualitative optical evaluation of malignancies related to cutaneous phototype** [7563-33]
E. Borisova, L. Avramov, Institute of Electronics (Bulgaria); P. Pavlova, Technical Univ. Sofia (Bulgaria); E. Pavlova, National Oncological Medical Ctr. (Bulgaria); P. Troyanova, Univ. Hospital Queen Jovanna (Bulgaria)

Author Index

Conference Committee

Symposium Chairs

James G. Fujimoto, Massachusetts Institute of Technology (United States)
R. Rox Anderson, Wellman Center for Photomedicine, Massachusetts General Hospital (United States) and Harvard School of Medicine (United States)

Program Track Chairs

Steven L. Jacques, Oregon Health & Science University (United States)
William P. Roach, Air Force Research Laboratory (United States)

Conference Chairs

Valery V. Tuchin, Saratov State University (Russian Federation)
Donald D. Duncan, Oregon Health & Science University (United States)
Kirill V. Larin, University of Houston (United States)

Program Committee

Vadim S. Anischenko, Saratov State University (Russian Federation)
Wei R. Chen, University of Central Oklahoma (United States)
Joseph P. Culver, Washington University School of Medicine in St. Louis (United States)
Jingying Jiang, Tianjin University (China)
Sean J. Kirkpatrick, Oregon Health & Science University (United States)
Jürgen M. Lademann, Charité Universitätsmedizin Berlin (Germany)
Martin J. Leahy, University of Limerick (Ireland)
Hong Liu, University of Oklahoma (United States)
Qingming Luo, Huazhong University of Science and Technology (China)
Igor V. Meglinski, Univ. of Otago (New Zealand) and Cranfield University (United Kingdom)
Vladislav Y. Toronov, Ryerson University (Canada)
Lihong V. Wang, Washington University in St. Louis (United States)
Ruikang Wang, Oregon Health & Science University (United States)
Vladimir P. Zharov, University of Arkansas for Medical Sciences (United States)
Dmitry A. Zimnyakov, Saratov State University (Russian Federation)

Session Chairs

Keynote Presentation

Valery V. Tuchin, Saratov State University (Russian Federation)

- 1 Tissue Complex Structure Analysis
Martin J. Leahy, University of Limerick (Ireland)
- 2 Micro- and Nanoparticle Dynamics
Martin J. Leahy, University of Limerick (Ireland)
- 3 Blood Flow Measurement and Imaging
Wiendelt Steenbergen, Universiteit Twente (Netherlands)
- 4 Blood Perfusion Imaging
Ruikang K. Wang, Oregon Health & Science University (United States)
- 5 Skin Optics and Dynamics
Kirill V. Larin, University of Houston (United States)