PROGRESS IN BIOMEDICAL OPTICS AND IMAGING Vol. 23 No. 56

Saratov Fall Meeting 2021

Optical Technologies for Biology and Medicine

Elina A. Genina Valery V. Tuchin Editors

27 September – 1 October 2021 Saratov, Russian Federation

Sponsored by

Ministry of Science and Higher Education of the Russian Federation (Russian Federation) • Saratov State University (Russian Federation) • Russian Academy of Sciences (Russian Federation) • Optica • IEEE – Institute of Electrical and Electronics Engineers • Russian Technology Platform "The Medicine of the Future" (Russian Federation) • Russian Technology Platform "Photonics" (Russian Federation) • European Technology Platform "Photonics21" • Samara University (Russian Federation) • National Research Tomsk State University (Russian Federation) • Huazhong University of Science and Technologies (China) • Hainan University (China) • INJECT RME LLC, Saratov (Russian Federation) • LLC SPE Nanostructured Glass Technology, Saratov (Russian Federation) • artphotonics GmbH (Germany) • BioCommerce Ltd. (Russian Federation) • Research Center of Biotechnology RAS (Russian Federation) • Centro de Resquisas em Óptica e Fotônica (CEPOF) (Brazil) • Journal of Innovative Optical Health Sciences (China) • Journal PHOTONICS RUSSIA (Russian Federation) • Journal of Biomedical Photonics & Engineering (Russian Federation) • MDPI Journal Diagnostics (Switzerland)

Technical Cosponsor and Published by SPIE

Volume 12192

The papers 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. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIEDigitalLibrary.org.

The papers 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 these proceedings: Author(s), "Title of Paper," in *Optical Technologies for Biology and Medicine*, edited by Elina A. Genina, Valery V. Tuchin, Proc. of SPIE 12192, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 1605-7422

ISSN: 2410-9045 (electronic)

ISBN: 9781510653658

ISBN: 9781510653665 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2022 Society of Photo-Optical Instrumentation Engineers (SPIE).

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 fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center 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.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

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



Paper Numbering: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE at the time of publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online and print versions of the publication. SPIE uses a seven-digit CID article numbering system structured as follows:

- The first five 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.

Contents

νii Conference Committee хi Conference Organizers xiii Introduction OPTICAL TECHNOLOGIES FOR BIOLOGY AND MEDICINE 12192 02 Inverse problem for biological systems: mathematical model that allows the red cell size distribution to be measured [12192-3] 12192 03 Axotomy induce an increase in the expression of Pink1, Parkin and Cofilin in rat dorsal root ganglia [12192-4] 12192 04 Ultrastructural changes in the crayfish abdominal ganglia after axotomy [12192-5] 12192 05 Stimulation of heart pacemakers cells using pulsed infrared radiation [12192-7] 12192 06 Chelation of gadolinium with carbonized citric and folic acids [12192-8] 12192 07 Laser Doppler flowmetry in assessing the effect of liraglutide on microcirculation in rats with absolute insulin deficiency [12192-9] 12192 08 Implementation of data processing and visualization in low coherence interferometry system [12192-10] 12192 09 Chemometrics-assisted spectrophotometric determination of synthetic food colorants in "Strepsils" lozenges [12192-11] 12192 0A Digital diaphanoscopy in the diagnosis of maxillary sinus diseases for patients with different anatomical and gender features [12192-12] 12192 OB Comparative analysis of the influence of red laser and UHF radiation on the process of selforganization of the H2A and H2B histones [12192-14] 12192 0C Diagnostics of optical diffusion in the structural characterization of foamed polymers [12192-15] 12192 0D Laser-optical methods for monitoring the biomechanical properties of the anterior part of the eye [12192-16] 12192 OE Fluorescent and physiological indices of Tagetes patula plants treated with biological preparation of ekofus [12192-18]

12192 OF	Structural and morphological characteristics of barium-containing trycalcium phosphate powder and plasma coatings based on it [12192-19]
12192 0G	Study of correlation properties of GB-speckles generated for the SARS–CoV-2 gene "S" for characterization of differences between Delta and other variants [12192-20]
12192 OH	Study of the influence of induction-heat treatment on the morphology of titanium plasma-sprayed coatings $[12192\text{-}21]$
12192 OI	Evaluation of the influence of the matrix effects of blood and serum on the optical properties of luminescent quantum dots [12192-22]
12192 OJ	Comparison of wearable and bedside laser Doppler flowmetry and fluorescence spectroscopy monitors [12192-23]
12192 OK	Simultaneous detection of chlorosomal bacteriochlorophylls from green sulfur bacteria and phycobilins from cyanobacteria using synchronous fluorescence scans [12192-24]
12192 OL	Differentiation of lumpy skin disease virus and sheeppox virus strains using of GB-speckles, generated for the nucleotide sequences of the gene GPCR [12192-26]
12192 OM	Could the GB-speckles be used to study the evolution of Listeria monocytogenes? [12192-28]
12192 ON	Optimization of Airy beam profile to improve light-sheet microscopy illumination [12192-29]
12192 00	Analysis of cognitive evoked potentials to classificate patients with chronic pain [12192-30]
12192 OP	Automatical system for estimation of individual EEG characteristics based on recurrent analysis [12192-31]
12192 0Q	NIR spectroscopic immediate effects of irradiation on skin tissue: a comparison study of in vivo and ex vivo [12192-34]
12192 OR	In silico study of thermal field distribution in cell culture media irradiated with wavelengths of singlet oxygen generation (Invited Paper) [12192-35]
12192 OS	In vivo study on NIR light propagation in the human head [12192-37]
12192 OT	Methodology of microcirculatory-tssue systems multimodal optical diagnostics (Invited Paper) [12192-39]
12192 OU	Low-cost fabrication of PPIX liquid phantoms for use in fluorescence measurements [12192-40]
12192 OV	Detection of masked hypertension based on laser Doppler flowmeter measurements [12192-41]
12192 OW	Oscillation processes in synuclein-KO mouse skin microcirculation: a pilot study [12192-42]
12192 0X	Spectrophotometric study of chlorhexidine sorption by glauconite [12192-43]

12192 OY	Statistical and spectral properties of spatio-temporal skin temperature oscillations derived by sweat gland activity: thermal imaging exploration [12192-45]
12192 OZ	The novel photosensitizer galactose: lutetium (Lu)-phthalocyanine for photodynamic therapy in tumor-bearing mice $[12192-46]$
12192 10	Morphological changes in rat lung tissue during inhalation of e-cigarette liquid aerosol [12192-47]
12192 11	E-cigarette smoking vape impact on optical properties of porcine gingival mucosa measured ex vivo in the range from 200 to 800 nm $[12192-48]$
12192 12	Measurement of the refractive index of the gray matter of the cow's brain at wavelengths of 480-1550 nm when exposed to different temperatures. [12192-49]