## **PROCEEDINGS OF SPIE**

# Optics in Health Care and Biomedical Optics IX

Qingming Luo Xingde Li Ying Gu Yuguo Tang Dan Zhu Editors

21–23 October 2019 Hangzhou, China

Sponsored by SPIE COS—Chinese Optical Society

Cooperating Organizations

Tsinghua University (China) • Peking University (China) • University of Science and Technology of China (China) • Zhejiang University (China) • Tianjin University (China) • Beijing Institute of Technology (China) • Beijing University of Posts and Telecommunications (China) • Nankai University (China) • Changchun University of Science and Technology (China) • University of Shanghai for Science and Technology (China) • Capital Normal University (China) • Huazhong University of Science and Technology (China) • Beijing Jiaotong University (China) • China Jiliang University (China) • Shanghai Institute of Optics and Fine Mechanics, CAS (China) • Changchun Institute of Optics, Fine Mechanics and Physics, CAS (China) • Institute of Semiconductors, CAS (China) • Institute of Optics and Electronics, CAS (China) • Institute of Physics, CAS (China) • Shanghai Institute of Technical Physics, CAS (China) • China Instrument and Control Society (China) • Japan Optical Society (Japan) • Korea Optical Society (Korea, Republic of) • Australia Optical Society (Australia) • Singapore Optical Society (Singapore) • European Optical Society

Supporting Organizations China Association for Science and Technology (CAST) (China) Department of Information of National Nature Science Foundation, China (NSFC) (China)

Published by SPIE

Volume 11190

Proceedings of SPIE 0277-786X, V. 11190

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

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 Optics in Health Care and Biomedical Optics IX, edited by Qingming Luo, Xingde Li, Ying Gu, Yuguo Tang, Dan Zhu, Proceedings of SPIE Vol. 11190 (SPIE, Bellingham, WA, 2019) Seven-digit Article CID Number.

ISSN: 0277-786X ISSN: 1996-756X (electronic)

ISBN: 9781510630970 ISBN: 9781510630987 (electronic)

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 © 2019, 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 \$21.00 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 0277-786X/19/\$21.00.

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:** Proceedings of SPIE follow an e-First publication model. A unique citation identifier (CID) number is assigned to each article 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

- ix Authors
- xii Symposium Committees
- xviii Conference Committee

#### TRANSLATIONAL OPTICAL TECHNIQUES FOR CLINICAL MEDICINE I

11190 06 Ratiometric autofluorescence lifetime imaging system standardization and application for head and neck cancer [11190-4]

#### TRANSLATIONAL OPTICAL TECHNIQUES FOR CLINICAL MEDICINE II

11190.08Research on automatic identification based on IVOCT images of coronary plaque (Invited<br/>Paper) [11190-6]

#### NANOBIOPHOTONICS AND SENSORS

- 11190 OH Multiplexing of distributed temperature sensing achieved by nanoparticle-doped fibers [11190-16]
- 11190 01 Development of robust fiber laser source based on parametric frequency conversion for use in CARS microscopy [11190-17]

#### **BIOMEDICAL SPECTROSCOPY**

- 11190 OJ Label-free imaging of lymph nodes with stimulated Raman scattering microscopy [11190-18]
- 11190 OK Single human platelet study using surface-enhanced Raman spectroscopy as a perspective tool for antiplatelet therapy effectiveness prediction [11190-19]
- 11190 0N Surface-enhanced Raman spectroscopy of degranulation response to C48/80 in mast cells [11190-22]

#### ADVANCED OPTICAL IMAGING TECHNIQUES

- 11190 OR Imaging depth extension of optical coherence tomography by optical clearing method in vitro rabbit eye [11190-26]
- 11190 0U **3-D super-resolution localization microscopy using deep-learning method** [11190-29]
- 11190 OW Beam-shifting optical coherence tomography for speckle reduction and flow rate measurement [11190-31]
- 11190 OY Fan-shaped tracker (FsT) for particle trajectory reconstruction [11190-33]

#### **OPTICAL THERANOSTICS I**

- 1119013 **Two-photon excitation fluorescence lifetime imaging microscopy and spectroscopy for cancer** detection [11190-38]
- 1119015 The heavy atom effect on thiadiazolo[3,4-g]quinoxaline derivatives as novel photosensitizers for photodynamic therapy [11190-40]

#### **OPTICAL THERANOSTICS II**

- 1119016 Preliminary study of sonodynamic effects of a novel water soluble chlorin [11190-41]
- 1119019 Optical regulation of stem-cell differentiation by femtosecond-laser photostimulation [11190-44]
- 111901A LED-based portable light source for photodynamic therapy [11190-45]

#### TISSUE OPTICS/LASER-TISSUE INTERACTION

111901C Simulation of near-infrared light propagation through the thorax of a neonate: addressing the optimisation of source and detector positions for measuring lung oxygen content in preterm infants [11190-47]

#### MULTIMODAL BIOMEDICAL IMAGING

- 111901G Toward artifact-free reconstruction of photoacoustic computed tomography images [11190-51]
- 111901N Ultrahigh-resolution stimulation by femtosecond laser reveals existence and regulation mechanism of nuclear Ca<sup>2+</sup> store [11190-58]

#### 111901R Computer-aided classification system for early endometrial cancer of co-registered photoacoustic and ultrasonic signals [11190-63] 11190 IS Fluorescence spectroscopy study of protoporphyrin IX in tissue-like phantoms [11190-64] Automatic detection of leukemia cells by 2D light scattering microfluidic cytometry and deep 11190 IT learning [11190-65] 1119010 A cost-effective time-gated fluorescence imaging system and its bioimaging applications [11190-66] 111901V High-speed intravascular photoacoustic imaging with blood flushing [11190-68] 111901W Model-based back-projection method in photoacoustic tomography for improved tangential resolution [11190-69] 11190 1X Continuous infrared laser irradiation decreased membrane capacitance of neuron cell [11190-70] Rapid cell phase imaging using quantitative interferometric microscopy with fast shearing 111901Y phase unwrapping method [11190-71] 111901Z Study on polarization distribution characteristics of polarized light in scattering media [11190-72] 11190 22 Determination of photoacoustic glucose characteristic wavelengths based on synergy interval partial least square algorithm [11190-75] 11190 24 Label-free discrimination of hepatoma cells based on Raman spectroscopy and multivariate statistical algorithms [11190-77] 11190 25 Calibration method of spectral domain OCT system based on characteristic wavelength of light source [11190-78] 11190 26 Swept source polarization-sensitive OCT with fiber-based polarization-diversity detection unit [11190-79] 11190 2A Label-free light scattering microfluidic cytometry using dual-channel 3D hydrodynamic focusing [11190-83] 11190 2B Determination of cancer cells induced by secretagogues based on fluorescence resonance energy transfer [11190-84]

POSTER SESSION

11190 2D Simulation of spatial and temporal distribution of singlet oxygen in port wine stain during vascular targeted photodynamic therapy [11190-86]

11190 2F	Non-invasive 3D real time observation of physiological traits during the embryonic development of insects [11190-88]
11190 2G	Photoacoustic signal classification for in vivo photoacoustic flow cytometry based on support vector machine [11190-89]
11190 2	Study on processing of infrared thermogram of ankle soft tissue injury with LDA based on DCT transform [11190-91]
11190 2J	Graphene oxide based FRET probe for mast cell degranulation [11190-92]
11190 2K	Super-resolution ultrasound imaging implemented by SOFI in radio-frequency domain [11190-93]
11190 2L	In vitro study of myocardial fiber structure imaging by Mueller optical coherence tomography [11190-94]
11190 2M	Super-resolution x-ray luminescence optical tomography imaging [11190-95]
11190 2N	Identification of macrophages in breast tumor microenvironment using label-free multiphoton microscopy [11190-96]
11190 20	Multiphoton imaging of normal breast lobules, pleomorphic invasive lobular carcinoma, and classic invasive lobular carcinoma [11190-97]
11190 2Q	Multiphoton imaging of perineural invasion in breast cancer [11190-99]
11190 2R	Space-time adaptive precision imaging [11190-100]
11190 2T	Carotid atherosclerosis detection using photoacoustic imaging system [11190-102]
11190 20	Identifying pulmonary Cryptococcus neoformans infection by serum surface-enhanced Raman spectroscopy [11190-103]
11190 2V	Application of fluorescence lifetime imaging in skin cancer diagnosis [11190-104]
11190 2X	Detection of singlet oxygen luminescence in skin phantom based on optical fiber detection [11190-106]
11190 2Z	Characterization of human coronary atherosclerotic plaque using spectrum- and time- resolved multiphoton microscopy [11190-108]
11190 32	Research on ischemia-reperfusion injury of rat kidney using optical coherence tomography [11190-111]
11190 37	DDeep3M-based neuronal cell counting in 2D large-scale images [11190-117]
11190 38	Finite element modeling of mechanical properties of cancer cells [11190-118]

- 11190 3A UV-LED device effectively increases serum levels of 25(OH)D3 in osteoporosis rats [11190-120]
- 11190 3C Laser speckle correlation imaging with optical clearance for blood flows [11190-122]
- 11190 3D Tracking of intracellular doxorubicin-Cu complexes with FLIM technique [11190-123]
- 11190 3E Compressed sensing with a novel sparse-sampled camera for spectral domain optical coherence tomography [11190-124]
- 11190 3KA fast reconstruction method for super-resolution localization microscopy with gOMP<br/>[11190-130]