PROGRESS IN BIOMEDICAL OPTICS AND IMAGING
Vol. 21 No. 41

Label-free Biomedical Imaging and Sensing (LBIS) 2020

Natan T. Shaked
Oliver Hayden
Editors

1–4 February 2020
San Francisco, California, United States

Sponsored and Published by
SPIE

Volume 11251

Proceedings of SPIE, 1605-7422, V. 11251

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 *Label-free Biomedical Imaging and Sensing (LBIS) 2020*, edited by Natan T. Shaked, Oliver Hayden, Proceedings of SPIE Vol. 11251 (SPIE, Bellingham, WA, 2020) Seven-digit Article CID Number.

ISSN: 1605-7422
ISSN: 2410-9045 (electronic)

ISBN: 9781510632653
ISBN: 9781510632660 (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

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.

SPIE. DIGITAL LIBRARY
SPIEDigitalLibrary.org

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

vii *Authors*
ix *Conference Committee*

SPONTANEOUS RAMAN I

11251 03 **Detection of the differentiation state of salivary gland organoids for tissue engineering by Raman spectroscopy** [11251-2]

11251 04 **1064 nm Raman microscopy using a multifocal excitation pattern** [11251-3]

SPECTROSCOPY AND SCATTERING I

11251 0B **Spectral phasor analysis of autofluorescence responses from cells embedded in turbid media containing collagen** [11251-10]

AUTOFLUORESCENCE, NONLINEAR, AND MULTIPHOTON IMAGING

11251 0D **Assessment of neuropathology of Alzheimer's disease brain with high-resolution, label-free multi-harmonic generation microscopy** [11251-13]

11251 0F **Multispectral characterisation of mesenchymal stem/stromal cells: age, cell cycle, senescence, and pluripotency** [11251-15]

11251 0G **Label-free investigation of human collagen morpho-mechanics by correlative SHG, Brillouin, and Raman microscopy** [11251-17]

11251 0J **Ex vivo assessment of the optical characteristics of human brain and tumour tissue** [11251-19]

PLASMONICS AND BIOSENSORS

11251 0Q **Label-free imaging of exosomes using depth scanning correlation (DSC) interferometric microscopy (Invited Paper)** [11251-27]

11251 0R **Optical biosensing of mycobacterium tuberculosis for point-of-care diagnosis** [11251-28]

POLARIZATION AND DARK-FIELD

11251 0Y **Instant polarized light microscopy for real-time wide-field visualization of collagen architecture** [11251-35]

11251 0Z **GRIN lens based polarization endoscope: from conception to application** [11251-36]

11251 10 **How to choose and optimize a classifier for your polarimetric imaging data** [11251-37]

COHERENT RAMAN

11251 19 **Why nonlinear Raman microspectroscopy is more than just a gimmick?** [11251-46]

SPONTANEOUS RAMAN II

11251 1E **Raman hyperspectral imaging of transferrin-bound iron in T47D and MDA-MB-231 breast cancer cells** [11251-52]

11251 1F **Multimodal, label-free histopathology for improving the diagnosis of Hirschsprung disease** [11251-53]

HOLOGRAPHY AND PHASE MICROSCOPY I

11251 1K **Effect of partial coherent illumination on Fourier ptychography** [11251-58]

HOLOGRAPHY AND PHASE MICROSCOPY II

11251 1V **Speckle-free quantitative phase microscopy using pseudo-thermal light source for label-free imaging of biological cells and tissues with high temporal phase stability and spatial phase sensitivity** [11251-69]

HOLOGRAPHY AND PHASE MICROSCOPY IV

11251 1Y **Epi-mode tomographic quantitative phase imaging in thick scattering samples (Invited Paper)** [11251-71]

11251 1Z **Computational imaging of label-free cells using lens-less digital holography** [11251-72]

11251 22 **Digital holographic microscopy (DHM) and transport of intensity (TIE) phase imaging of live cells** [11251-75]

POSTER SESSION

11251 23 **Scanning offset-emission hyperspectral microscopy (SOHM) of waveguiding in single ZnO nanorod** [11251-76]

11251 24 **Study of the red blood cell aggregation by coherent anti-Stokes Raman spectroscopy** [11251-77]

11251 26 **Prostate cancer epithelial mesenchymal transition by TGF-β1 exposure monitored with a photonic crystal biosensor** [11251-79]

11251 2J **Enhancement of label-free biosensing of cardiac troponin I** [11251-93]

11251 2K **Deep learning cell segmentation in chondrocyte viability assessment using nonlinear optical microscopy** [11251-94]

11251 2N **Ultrafast plasmonic and real-time label-free polymerase chain reaction** [11251-99]

11251 2P **Raman spectroscopy and gold thin film for biosensing and detection** [11251-92]