

PROCEEDINGS OF SPIE

Biosensing and Nanomedicine X

Hooman Mohseni
Massoud H. Agahi
Manijeh Razeghi
Editors

6–7 August 2017
San Diego, California, United States

Sponsored and Published by
SPIE

Volume 10352

Proceedings of SPIE 0277-786X, V. 10352

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

Biosensing and Nanomedicine X, edited by Hooman Mohseni, Massoud H. Agahi, Manijeh Razeghi,
Proc. of SPIE Vol. 10352, 1035201 · © 2017 SPIE · CCC code: 0277-786X/17/\$18 · doi: 10.1117/12.2296957

Proc. of SPIE Vol. 10352 1035201-1

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 SPIDigitalLibrary.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 *Biosensing and Nanomedicine X*, edited by Hooman Mohseni, Massoud H. Agahi, Manijeh Razeghi, Proceedings of SPIE Vol. 10352 (SPIE, Bellingham, WA, 2017) Seven-digit Article CID Number.

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

ISBN: 9781510611610
ISBN: 9781510611627 (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 © 2017, 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 0277-786X/17/\$18.00.

Printed in the United States of America.

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

**SPIE. DIGITAL
LIBRARY**

SPIDigitalLibrary.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

- v *Authors*
vii *Conference Committee*

PLASMONIC BIOSENSING II

- 10352 06 **Exploring plasmonic nanoantenna arrays as a platform for biosensing (Invited Paper)**
[10352-5]

BIO-IMAGING

- 10352 08 **An automatic holographic adaptive phoropter (Keynote Paper)** [10352-9]
10352 09 **Multimodal ophthalmic imaging using spectrally encoded scanning laser ophthalmoscopy and optical coherence tomography (Invited Paper)** [10352-10]

NOVEL BIOSENSING METHODS

- 10352 0E **Double emulsion electrospun nanofibers as a growth factor delivery vehicle for salivary gland regeneration** [10352-15]
10352 0F **Magnetoresistive biosensors for quantitative proteomics (Invited Paper)** [10352-16]
10352 0G **Micro-array isolation of circulating tumor cells (CTCs): the droplet biopsy chip** [10352-17]

NEURAL SENSING

- 10352 0H **Toward multi-area distributed network of implanted neural interrogators (Invited Paper)**
[10352-18]
10352 0I **Advances in flexible optrode hardware for use in cybernetic insects (Invited Paper)**
[10352-19]
10352 0L **Development of a high throughput single-particle screening for inorganic semiconductor nanorods as neural voltage sensor** [10352-22]
10352 0M **Shedding light to sleep studies (Invited Paper)** [10352-23]

BIO-INSPIRED MATERIALS AND SYSTEMS

- 10352 0P **On-demand drawing of high aspect-ratio, microsphere-tipped elastomeric micropillars**
[10352-26]

POSTER SESSION

- 10352 OR **Scale-selective polarimetry of the birefringence distribution of myocardium tissue**
[10352-28]
- 10352 OS **Wavelet analysis of myocardium polarization images in problems of diagnostic of necrotic changes** [10352-29]
- 10352 OT **Electrical characteristics of Graphene based Field Effect Transistor (GFET) biosensor for ADH detection** [10352-30]
- 10352 OU **System of Mueller matrix polarization correlometry of biological polycrystalline layers**
[10352-31]
- 10352 OV **Two-point Stokes vector parameters of object field for diagnosis and differentiation of optically anisotropic biological tissues** [10352-32]
- 10352 OW **Photochemically synthesized heparin-based silver nanoparticles: an antimicrobial activity study** [10352-33]
- 10352 OX **Jones matrix polarization-correlation mapping of biological crystals networks** [10352-34]
- 10352 OY **Surface enhanced Raman spectroscopy in the presence of hydroquinone assisted by gold nanorods** [10352-35]

Authors

Numbers in the index correspond to the last two digits of the seven-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first five digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Acosta-Torres, Laura Susana, 0W
Amirsolaimani, Babak, 08
Antonyuk, O., 0R, 0S
Arquitola, Amber M., 09
Ashe, Jeffrey, 0H
Bablumyan, Arkady, 08
Bodnar, G. B., 0R, 0S
Borton, David A., 0H
Bozic, Ivan, 09
Bozkurt, Alper, 0M
Cabrera Alonso, R., 0Y
Callahan, Dennis M., 0I
Castracane, James, 0E
Díaz-Torres, Luis Armando, 0W
Dieffenderfer, James, 0M
Dubolazov, O. V., 0U, 0V
El-Haddad, Mohamed T., 09
Foraida, Zahraa I., 0E
Galligan, Craig, 0H
González, Francisco Javier, 0Y
Gorsky, M. P., 0X
Grygoryshyn, P., 0U
Guevara, Edgar, 0Y
Hall, Drew A., 0F
Hamzah, Azrul Azlan, 0T
Hou, Xiaoxiao, 0H
Huang, Chih-Cheng, 0F
Ingargiola, Antonino, 0L
Joos, Karen M., 09
Khmaldze, Alexander, 0E
Kim, Jaeyoun, 0P
Krystal, Andrew, 0M
Kumar, Parshant, 0I
Kuo, Yung, 0L
Kushnerik, L., 0V
Larsen, Melinda, 0E
LeBlanc, John, 0I
Li, Jack, 0L
Li, Jianwei D., 09
Li, Qiang, 0P
Lissandrolo, Charles, 0I
Majlis, Burhanuddin Yeop, 0T
Malone, Joseph D., 09
Marchuk, Yu. F., 0V, 0X
Meglinskiy, I., 0V, 0X
Motrich, A. V., 0X
Olar, O. V., 0U
Panchapakesan, B., 0G
Park, Joonhyuck, 0L
Park, Kyoungwon, 0L
Patel, Shriji N., 09
Pavlyukovich, N., 0R, 0S
Pavlyukovich, O. V., 0R, 0S
Peerzada, Lubna N., 0E
Peyghambarian, N., 08
Peyman, Gholam, 08
Pidkamin, L. Y., 0X
Powell, Marc P., 0H
Prydiy, O. G., 0V
Ramírez Elías, Miguel G., 0Y
Register, Joseph, 0I
Rodríguez-Torres, María del Pilar, 0W
Sakhnovskiy, M. Yu., 0U
Salthouse, Christopher, 0I
Savidis, Nickolaos, 08
Schwiegerling, Jim, 08
Segura, Carlos, 0I
Selvarajan, Reena Sri, 0T
Sharikova, Anna, 0E
Shvadchak, Volodymyr, 0L
Sidor, M. I., 0X
Soltys, I. V., 0U
Tao, Yuankai K., 09
Toussaint, Kimani C., Jr., 06
Trifonyuk, L., 0V
Ushenko, O. G., 0X
Ushenko, V. O., 0R, 0S, 0U
Ushenko, Yu. O., 0R, 0S, 0V, 0X
Vanchuliak, O., 0R, 0S, 0U, 0X
Weiss, Shimon, 0L
Wheeler, Jesse, 0I
Zhou, Xiahao, 0F
Zhytaryuk, V. G., 0V

Conference Committee

Symposium Chairs

Harry A. Atwater Jr., California Institute of Technology (United States)
Nikolay I. Zheludev, Optoelectronics Research Centre
(United Kingdom) and Nanyang Technological University
(Singapore)

Symposium Co-chairs

James G. Grote, Air Force Research Laboratory (United States)
David L. Andrews, University of East Anglia (United Kingdom)

Conference Chairs

Hooman Mohseni, Northwestern University (United States)
Massoud H. Agahi, Harbor-UCLA Medical Center (United States) and
Cedars-Sinai Medical Center (United States)
Manijeh Razeghi, Northwestern University (United States)

Conference Program Committee

Gert Cauwenberghs, University of California, San Diego
(United States)
Philippe M. Fauchet, Vanderbilt University (United States)
Ryan M. Gelfand, CREOL, The College of Optics and Photonics,
University of Central Florida (United States)
David H. Gracias, Johns Hopkins University (United States)
Kimberly S. Hamad-Schifferli, Massachusetts Institute of Technology
(United States)
Yu-Hwa Lo, University of California, San Diego (United States)
Omer G. Memis, Northwestern University (United States)
Masoud Panjehpour, Thompson Cancer Survival Center
(United States)
Qimin Quan, Harvard University (United States)
Björn M. Reinhard, Boston University (United States)
Luisa Torsi, Università degli Studi di Bari Aldo Moro (Italy)
Adam T. Woolley, Brigham Young University (United States)
John M. Zavada, Polytechnic Institute of New York University
(United States)

Session Chairs

- 1 Plasmonic Biosensing I
Hooman Mohseni, Northwestern University (United States)
Stephanie Fraley, University of California, San Diego (United States)
- 2 Plasmonic Biosensing II
Iman Hassani Nia, Northwestern University (United States)
- 3 Bio-Imaging
Hooman Mohseni, Northwestern University (United States)
- 4 Novel Biosensing Methods
Srikanth Singamaneni, Washington University in St. Louis
(United States)
Drew Hall, University of California, San Diego (United States)
- 5 Neural Sensing
Hooman Mohseni, Northwestern University (United States)
- 6 Bio-Inspired Materials and Systems
David A. Borton, Brown University (United States)
Alper Bozkurt, North Carolina State University (United States)