

PROCEEDINGS OF SPIE

Biosensing and Nanomedicine VII

Hooman Mohseni
Massoud H. Agahi
Manijeh Razeghi
Editors

17–20 August 2014
San Diego, California, United States

Sponsored and Published by
SPIE

Volume 9166

Proceedings of SPIE 0277-786X, V. 9166

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

Biosensing and Nanomedicine VII, edited by Hooman Mohseni, Massoud H. Agahi, Manijeh Razeghi,
Proc. of SPIE Vol. 9166, 916601 · © 2014 SPIE · CCC code: 0277-786X/14/\$18 · doi: 10.1117/12.2081203

Proc. of SPIE Vol. 9166 916601-1

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 *Biosensing and Nanomedicine VII*, edited by Hooman Mohseni, Massoud H. Agahi, Manijeh Razezghi, Proceedings of SPIE Vol. 9166 (SPIE, Bellingham, WA, 2014) Article CID Number.

ISSN: 0277-786X

ISBN: 9781628411935

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 © 2014, 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/14/\$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 as 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

v *Authors*
vii *Conference Committee*

SESSION 1 NANO DRUG DELIVERY

- 9166 04 **Incorporation of photosensitizer hypericin into synthetic lipid-based nano-particles for drug delivery and large unilamellar vesicles with different content of cholesterol** [9166-3]
- 9166 05 **Targeting hepatocellular carcinoma with aptamer-functionalized PLGA/PLA-PEG nanoparticles (Invited Paper)** [9166-4]
- 9166 06 **Nanotechnology-based treatment for chemotherapy-resistant breast cancer** [9166-5]
- 9166 07 **Feedback-mediated cancer therapy: a FRET-based nanoreporter approach** [9166-6]
- 9166 0A **Controlling the intracellular fate of nano-bioconjugates: pathways for realizing nanoparticle-mediated theranostics (Invited Paper)** [9166-10]

SESSION 2 BIOSENSING I

- 9166 0H **Label free detection of phospholipids by infrared absorption spectroscopy** [9166-17]

SESSION 3 BIOSENSING II

- 9166 0L **Electron optics of nanoplasmonic metamaterials in bio/opto theranostics (Invited Paper)** [9166-19]
- 9166 0M **Improving the performance of silicon photonic rings, disks, and Bragg gratings for use in label-free biosensing (Invited Paper)** [9166-20]
- 9166 0N **Novel 3D plasmonic nano-electrodes for cellular investigations and neural interfaces** [9166-21]
- 9166 0O **The whispering gallery mode biosensor: label-free detection from virus to single protein (Invited Paper)** [9166-22]
- 9166 0Q **A portable surface plasmon resonance biosensor capable of phase interrogation in a large dynamic range (Invited Paper)** [9166-24]
- 9166 0R **Optofluidic cellular immunofunctional analysis by localized surface plasmon resonance (Invited Paper)** [9166-25]

SESSION 4 BIOSENSING III

- 9166 0T **Nanoscale fiber tip probe for biomedical sensing (Invited Paper) [9166-27]**
- 9166 0Z **Probing the nano-bio interface with nanoplasmonic optical probes (Invited Paper) [9166-33]**

POSTER SESSION

- 9166 11 **Effect of amine functionalized polyethylene on clay-silver dispersion for polyethylene nanocomposites [9166-35]**
- 9166 12 **Generation of reactive oxygen species from 5-aminolevulinic acid and Glutamate in cooperation with excited CdSe/ZnS QDs [9166-36]**
- 9166 13 **Enhancement of singlet oxygen production based on FRET between Coumarin tri-compound and CdSe/ZnS QDs [9166-37]**
- 9166 15 **Multivariate system of polarization tomography of biological crystals birefringence networks [9166-39]**
- 9166 16 **System of the phase tomography of optically anisotropic polycrystalline films of biological fluids [9166-40]**
- 9166 17 **Laser system of the autofluorescence polarimetry of cytological layers at an early stage of cancer detection [9166-41]**
- 9166 18 **Fluorescent biopsy of biological tissues in differentiation of benign and malignant tumors of prostate [9166-42]**
- 9166 19 **Statistical and fractal analysis of autofluorescent myocardium images in posthumous diagnostics of acute coronary insufficiency [9166-43]**
- 9166 1A **Polarization-correlation analysis of maps of optical anisotropy biological layers [9166-44]**
- 9166 1C **Optical pre-clinical diagnostics of the cervical tissues malignant changing [9166-46]**
- 9166 1D **Diagnostic value spectropolarimetry of blood plasma in patients with breast cancer [9166-47]**
- 9166 1E **Absorption spectra of adenocarcinoma and squamous cell carcinoma cervical tissues [9166-48]**
- 9166 1F **Dynamics of blood plasma by spectropolarimetry and biochemical techniques [9166-49]**

Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four 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.

Abouzeid, Abraham H., 06
Ahmed, Tahsin, 0H
Ahn, Wonmi, 0L
Alonova, Marina, 1E
Amin, Hayder, 0N
Arnold, S., 0O
Bachinskiy, V. T., 19
Barnes, Eugenia, 05
Berdondini, Luca, 0N
Berry, Keith, 0L
Betancourt, Tania, 05
Blake, Phillip, 0L
Blanco-Canosa, Juan B., 0A
Blascakova, Ludmila, 04
Bohn, Paul, 0H
Boichuk, T. M., 19
Bradburne, Christopher E., 0A
Chang, Yun-Hsiang, 0Q
Chen, Chih-Hang, 0Q
Chen, How-Foo, 0Q
Cheung, Karen C., 0M
Chrostowski, Lukas, 0M
Chuang, Hsin-Yuan, 0Q
Dantham, V. R., 0O
Dawson, Philip E., 0A
De Angelis, Francesco, 0N
DeJarnette, Drew, 0L
Delehanty, James B., 0A
Dipalo, Michele, 0N
Donzella, Valentina, 0M
Dubolazov, A. V., 1A
Dunklin, Jeremy, 0L
Duong, Hong Dinh, 12, 13
Fedoruk, Olexander, 1C
Feizpour, Amin, 0Z
Flueckiger, Jonas, 0M
Forcherio, Gregory T., 0L
Foster, Erick, 0H
Garazdiuk, M., 19
Grist, Samantha M., 0M
Gritsyuk, M. V., 17, 18
Gruia, Ion, 1C
Gruia, Maria, 1F
Holler, S., 0O
Hong, W., 0T
Howard, Scott S., 0H
Ibarra-A, M. C., 11
Ilashchuka, Tetjana, 1F
Ivashko, Pavlo, 1D, 1E
Jancura, Daniel, 04
Jang, Gyoung G., 0L
Joniova, Jaroslava, 04
Karachevtsev, A. O., 16
Keng, D., 0O
Khan, Aamir A., 0H
Khanehzar, Ali, 0Z
Khater, Yashika, 07
Khumwan, Pakapreud, 0M
Kirk, James, 0M
Kolchenko, V., 0O
Koval, G. D., 17
Kruk, Tetjana, 1D
Kulik, Pavel, 0M
Kulkarni, Ashish, 07
Kurabayashi, Katsuo, 0R
La Rocca, Rosanna, 0N
Ledezma-P, A. S., 11
Lee, Jee Won, 12, 13
Liang, F., 0T
Lisunova, Milana, 0L
Loncar, M., 0T
Maccione, Alessandro, 0N
Malerba, Mario, 0N
Marchuk, Y. F., 1A
Martinez-C, J. G., 11
Medintz, Igor L., 0A
Messina, Gabriele C., 0N
Miller, Sarah, 05
Minzer, O. P., 18, 19
Miskovsky, Pavol, 04
Motrich, A. V., 19, 1A
Mulroe, Brigid, 0O
Nadova, Zuzana, 04
Novakovskaya, O. Yu., 17, 18, 1A
Oh, Bo-Ram, 0R
Olar, O. V., 16
Pashkovskaya, N. V., 1A
Paspaley-Grbavac, M., 0O
Patel, Niravkumar R., 06
Pavlov, S. V., 15, 16
Peresunko, Olexander, 1D, 1E
Prasuhn, Duane E., 0A
Prydij, Olexander, 1F
Prysyazhnyuk, V. S., 1A
Quan, Q., 0T
Rachman, Ilya M., 06
Ramírez-V, E., 11
Ramos-V, L. F., 11

Ratner, Daniel, 0M
Reinhard, Björn M., 0Z
Rhee, Jong Il, 12, 13
Rodriguez-F, O. S., 11
Romero-G, J., 11
Roper, D. Keith, 0L
Sánchez-Valdes, S., 11
Sarkar, Suproteem K., 07
Savich, V. O., 15, 16
Schaak, D., 0T
Schmidt, Shon, 0M
Sengupta, Shiladitya, 07
Senn, Sean, 06
Shalabaeva, Victoria, 0N
Sidor, M. I., 17, 18
Simi, Alessandro, 0N
Sobko, O. V., 15, 16
Stewart, Michael H., 0A
Sureau, Franck, 04
Susumu, Kimihiro, 0A
Sutton, Melissa, 05
Talebi Fard, Sahba, 0M
Thompson, Emily R., 0M
Torchilin, Vladimir P., 06
Trifoniuk, L. I., 18
Ushakova, Olga, 1D
Ushenko, A. G., 15, 16
Ushenko, Yu. A., 17, 18, 1A
Vanchuliak, O. Ya., 19
Vigil, Genevieve, 0H
Voloshynska, Katerina, 1F
Voloshynskyi, Dmytro, 1C
Wang, Qian, 0M
Weigum, Shannon E., 05
Wu, Linxi, 0Z
Wu, WenXuan, 0M
Xu, Fangda, 0Z
Yermolenko, Sergey, 1C
Yu, X., 0Z
Zabolotna, N. I., 15, 16
Zelinska, Natalia, 1E
Zimnyakov, Dmitry, 1C

Conference Committee

Symposium Chairs

Satoshi Kawata, Osaka University (Japan)
Manijeh Razeghi, Northwestern University (United States)

Symposium Co-chairs

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

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)
Guilhem Gallot, Ecole Polytechnique (France)
Ryan M. Gelfand, University of Victoria (Canada)
David H. Gracias, Johns Hopkins University (United States)
Kimberly S. Hamad-Schifferli, Massachusetts Institute of Technology
(United States)
Keon Jae Lee, KAIST (Korea, Republic of)
Yu-Hwa Lo, University of California, San Diego (United States)
Ryan McClintock, Northwestern University (United States)
Omer G. Memis, Northwestern University (United States)
Masoud Panjehpour, Thompson Cancer Survival Center
(United States)
Adam T. Woolley, Brigham Young University (United States)
John M. Zavada, Polytechnic Institute of New York University
(United States)

Session Chairs

- 1 Nano Drug Delivery
Massoud H. Agahi, Harbor-UCLA Medical Center (United States) and
Cedars-Sinai Medical Center (United States)

- 2 Biosensing I
Ryan M. Gelfand, University of Victoria (Canada)
- 3 Biosensing II
Hooman Mohseni, Northwestern University (United States)
- 4 Biosensing III
Hooman Mohseni, Northwestern University (United States)
Manijeh Razeghi, Northwestern University (United States)