

Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications VIII

**Samuel Achilefu
Ramesh Raghavachari**
Editors

**15–16 February 2016
San Francisco, California, United States**

Sponsored by
Boston Electronics Corp. (United States)

Published by
SPIE

Volume 9723

Proceedings of SPIE, 1605-7422, V. 9723

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

Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications VIII
edited by Samuel Achilefu, Ramesh Raghavachari, Proc. of SPIE Vol. 9723, 972301
© 2016 SPIE · CCC code: 0277-786X/16/\$18 · doi: 10.1117/12.2239508

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 *Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications VIII*, edited by Samuel Achilefu, Ramesh Raghavachari, Proceedings of SPIE Vol. 9723 (SPIE, Bellingham, WA, 2016) Six-digit Article CID Number.

ISSN: 1605-7422

ISSN: 2410-9045 (electronic)

ISBN: 9781628419573

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 © 2016, 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 1605-7422/16/\$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 six-digit CID article numbering system structured as follows:

- 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.

Contents

v *Authors*
vii *Conference Committee*

NIR FLUORESCENCE FOR IMAGING

9723 04 **Noninvasive imaging of multiple myeloma using near infrared fluorescent molecular probe [9723-3]**

TWO PHOTON FLUORESCENT PROBES, SENSORS, AND TRACERS

9723 09 **NIR and MR imaging supported hydrogel based delivery system for anti-TNF alpha probiotic therapy of IBD [9723-8]**

9723 0A **Application of fluorescent tracer agent technology to point-of-care gastrointestinal permeability measurement [9723-9]**

FLUORESCENT PROBES AND TECHNIQUES FOR IMAGING

9723 0C **Optimization of input parameters of acoustic-transfection for the intracellular delivery of macromolecules using FRET-based biosensors [9723-11]**

NON-BLEACHING AND ULTRA-SMALL FLUORESCENT PROBES II: JOINT SESSION WITH CONFERENCES 9723 AND 9762

9723 0Q **Fluorescent silica nanoparticles containing covalently bound dyes for reporter, marker, and sensor applications [9723-26]**

9723 0S **Nanoparticle-enhanced x-ray therapy for cancer [9723-28]**

POSTER SESSION

9723 0U **Theoretical investigation of interaction between the set of ligands and α_7 nicotinic acetylcholine receptor [9723-31]**

9723 0V **Calculation of electron transfer in ruthenium-modified derivatives of cytochrome b562 [9723-32]**

9723 0X **Theoretical prediction of mutual influence between phospholipid and nanotube during their interaction [9723-34]**

- 9723 0Y **A dual function theranostic agent for near-infrared photoacoustic imaging and photothermal therapy** [9723-35]
- 9723 0Z **Synthesis and spectroscopic evaluation of PbS quantum dots emitting at 1300 nm for optimized imaging in optical window II** [9723-36]
- 9723 10 **High specificity ZnO quantum dots for diagnosis and treatment in bacterial infection** [9723-37]
- 9723 11 **Detection of MDR1 mRNA expression with optimized gold nanoparticle beacon** [9723-38]

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.

Akers, Walter J., 04
Aydı, Alexander P., 0Z
Bagia, Christina, 09
Beard, Matthew C., 0Z
Berezin, Mikhail Y., 0Z
Berlec, Ales, 09
Blair, Shane, 0Z
Bollerman-Nowlis, Alex, 04
Chapman, Gala, 0Q
Chernomordik, Boris D., 0Z
Crow, Sydney, 0Q
Dorshow, Richard B., 0A
Emer, Kyle, 0Q
Gach, Michael, 09
George, Thomas F., 0S
Glukhova, O. E., 0U, 0V, 0X
Gu, Yueqing, 10, 11
Hall-Moore, Carla, 0A
Hathi, Deep, 04
Henary, Maged, 0Q
Huang, Shuo, 0Y
Janjic, Bratislav M., 09
Janjic, Jelena M., 09
Jeric, Irenej, 09
Letfullin, Renat R., 0S
Liu, Lu S., 09
Patonay, Gabor, 0Q
Pramanik, Manojit, 0Y
Prytkova, T. R., 0U, 0V
Qian, Zhiyu, 10, 11
Rice, Colin E. W., 0S
Rogers, Thomas E., 0A
Shaikh, Nurmohammad, 0A
Shieh, Jeng-Jong, 0A
Shmygin, D. S., 0U
Shokeen, Monica, 04
Shunaev, V. V., 0V
Shung, K. Kirk, 0C
Slepchenkov, M. M., 0X
Strukelj, Borut, 09
Talcott, Michael, 0A
Tarr, Phillip I., 0A
Upputuri, Paul Kumar, 0Y
Wang, Mingfeng, 0Y
Wang, Yingxiao, 0C
Yoon, Sangpil, 0C
Zhang, Hairong, 0Z
Zhang, Min, 10
Zhou, Haiying, 04
Zhou, Qiumei, 11

Conference Committee

Symposium Chairs

James G. Fujimoto, Massachusetts Institute of Technology
(United States)

R. Rox Anderson, Wellman Center for Photomedicine, Massachusetts
General Hospital (United States) and Harvard School of Medicine
(United States)

Program Track Chairs

Paras N. Prasad, University at Buffalo (United States)

Dan V. Nicolau, McGill University (Canada)

Conference Chairs

Samuel Achilefu, Washington University School of Medicine in St. Louis
(United States)

Ramesh Raghavachari, U.S. Food and Drug Administration
(United States)

Conference Program Committee

Mingfeng Bai, University of Pittsburgh (United States)

Bohumil Bednar, Merck & Company, Inc. (United States)

Mikhail Y. Berezin, Washington University School of Medicine in
St. Louis (United States)

Richard B. Dorshow, MediBeacon, LLC (United States)

Paul M. W. French, Imperial College London (United Kingdom)

Yueqing Gu, China Pharmaceutical University (China)

Hisataka Kobayashi, National Cancer Institute (United States)

Jonathan T. C. Liu, University of Washington (United States)

Ashok Kumar Mishra, Indian Institute of Technology Madras (India)

D. Michael Olive, LI-COR Biosciences (United States)

Gabor Patonay, Georgia State University (United States)

Attila Tarnok, Universität Leipzig (Germany)

Yasuteru Urano, The University of Tokyo (Japan)

Session Chairs

- 1 NIR Fluorescence for Imaging

Ramesh Raghavachari, U.S. Food and Drug Administration
(United States)

- 2 Two Photon Fluorescent Probes, Sensors, and Tracers
Hisataka Kobayashi, National Cancer Institute (United States)
- 3 Fluorescent Probes and Techniques for Imaging
Richard B. Dorshow, MediBeacon, LLC (United States)
- 4 Imaging Beyond 1000 nm: Synthesis and Design
Mikhail Y. Berezin, Washington University School of Medicine in St. Louis (United States)
- 5 Imaging Beyond 1000 nm: Applications
Mikhail Y. Berezin, Washington University School of Medicine in St. Louis (United States)
- 6 Imaging Beyond 1000 nm: Fundamentals
Gabor Patonay, Georgia State University (United States)
- 7 Non-Bleaching and Ultra-Small Fluorescent Probes I: Joint Session with Conferences 9723 and 9762
Ramesh Raghavachari, U.S. Food and Drug Administration (United States)
Philip R. Hemmer, Texas A&M University (United States)
- 8 Non-Bleaching and Ultra-Small Fluorescent Probes II: Joint Session with Conferences 9723 and 9762
Ramesh Raghavachari, U.S. Food and Drug Administration (United States)
Philip R. Hemmer, Texas A&M University (United States)