# Reporters, Markers, Dyes, Nanoparticles, and Molecular Probes for Biomedical Applications XI

Samuel Achilefu Ramesh Raghavachari Editors

4–5 February 2019 San Francisco, California, United States

Sponsored and Published by SPIE

Volume 10893

Proceedings of SPIE, 1605-7422, V. 10893

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 XI, edited by Samuel Achilefu, Ramesh Raghavachari, Proc. of SPIE Vol. 10893, 1089301 © 2019 SPIE · CCC code: 1605-7422/19/\$18 · doi: 10.1117/12.2531289

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 SPIEDigital Library.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 XI, edited by Samuel Achilefu, Ramesh Raghavachari, Proceedings of SPIE Vol. 10893 (SPIE, Bellingham, WA, 2019) Seven-digit Article CID Number.

ISSN: 1605-7422

ISSN: 2410-9045 (electronic)

ISBN: 9781510624283

ISBN: 9781510624290 (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 \$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 1605-7422/19/\$18.00.

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**

vii ix	Authors Conference Committee
	IMAGING AND THERAPIES
10893 04	Acoustofluidic platform for in-channel immunoassays [10893-2]
	NEAR INFRARED PROBES
10893 07	Noninvasive point-of-care measurement of gastrointestinal permeability [10893-8]
	IT'S A NANOWORLD: APPLICATIONS USING NANOPARTICLES
10893 OF	Cell-based biosynthesis of linear protein nanoarrays [10893-16]
10893 0G	High-throughput activator sequence selection for silver nanocluster beacons [10893-18]
	FLUORESCENT PROBES FOR IMAGING
10893 OK	Imaging mitochondrial matrix viscosity in live cells via fluorescence lifetime imaging (FLIM) of fluorescent molecular rotors [10893-21]
10893 OL	Probing pheomelanin synthesis using thioflavin T fluorescence [10893-22]
	POSTER SESSION
10893 ON	Coating carbon nanotube/graphene hybrids with phospholipids [10893-24]
10893 00	Developing a user community in the photosciences: a website for spectral data and access to PhotochemCAD [10893-26]
10893 OR	Surface-active substance monolayer stability after its formation [10893-28]

10893 OS	A novel fluorescent gold nanoparticle inhibiting migration and invasion of tumor cells [10893-29]
10893 OT	Water purification using the pillared graphene owning the most mechanical strength [10893-30]
10893 OV	Interaction of new hybrid patch with blood vessels and heart layers [10893-32]
10893 OW	Regularities of the formation of a framework from a mixture of single-walled carbon nanotubes in a protein matrix based on albumin and collagen for tissue engineering [10893-33]
10893 OX	Molecular modeling of multilayer cellular and tissue engineering structures based on a wireframe of carbon nanotubes and protein matrix for restoring the tissues of the heart and blood vessels [10893-34]
10893 OY	Theoretical study of the interaction of the electromagnetic field of laser radiation with a mixture of single-walled carbon nanotubes in a protein matrix [10893-35]
10893 OZ	Predicting treatment outcome and enhancing immunotherapy with anti-PDL1 gold nanoparticles [10893-3]

### **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.

Asanov, K. R., OW Binkley, Michael M., 04 Birch, D. J. S., OL Byers, Derek E., 04 Chen, Yin-An, 0G Chen, Yu-An, 0G Chen, Yuan-I, 0G Cohen, Cyrille J., 0Z Cui, Mingyang, 04 Davy, A. D., OL Debreczeny, Martin P., 07 Dol, A. S., 0V

Dorshow, Richard B., 07 Dreiss, Cécile A., 0K Finkelstein, Ilya J., 0G Gerasimenko, A. Yu., 0V Gerovac, Benjamin J., 04 Glukhova, O. E., 0V, 0W, 0X, 0Y Glukhovskoy, Evgeny G., 0R

Guo, Yaxue, 00 Hall-Moore, Carla, 07 Hawkins, John A., 0G Holtzman, Michael J., 04 Ishikawa, Hiroaki, OF Ivanov, D. I., 0V Ivanov, E., 0N James, Arjuna L., 0K Johnson, J. R., 07 Jung, Cheulhee, 0G Keeler, Shamus P., 04 Kirillova, Irina V., OT

Kolesnikova, Anna S., ON, OR, OT

Kossovich, Leonid Yu., OT Kuo, Hung-Che, 0G Kuo, Yu-An, 0G

Li, Zeqing, OS

Lindsey, Jonathan S., 0O Liu, Yen-Liang, 0G

Madrid, Victor A., 0G Marshall, Wallace F., 0F Mazepa, Margarita M., 0N, 0T

Meacham, J. Mark, 04

Meir, Rinat, OZ Morozov, K. M., 0N Nguyen, Trung D., 0G Norcross, Ann Elizabeth, 00 Ostrovsky, N. V., ON

Petty, Jeffrey T., 0G Popovtzer, Rachela, OZ Pozharov, Mikhail V., OR Pu, Yang, OS Qin, Hongmin, OF Riley, I. Rochelle, 07 Rogers, Thomas E., 07 Rvbarski, James R., 0G Safonov, Roman A., OR Savostyanov, G. V., 0W Shaikh, Nurmohammad, 07 Shamalov, Katerina, OZ Shieh, Jeng-Jong, 07 Shinkarenko, Oksana A., 0R Shmygin, D. S., OW, OX Shunaev, V. V., 0V Slepchenkov, M. M., 0Y Steinmark, I. Emilie, OK Suhling, Klaus, OK Tang, Sindy K. Y., OF Taniguchi, Masahiko, 00 Tarr, Phillip I., 07 Tian, Jie, OF Xu, Hanmei, OS Xu, Zhen, 00 Xue, Jianpena, OS

Yahioglu, Gokhan, 0K

Yantis, Jennifer, 04

Yeh, Hsin-Chih, 0G

Zhao, Oliver S., 0G

Yu, Jefer E., OF

٧

## **Conference Committee**

#### Symposium Chairs

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

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

#### Symposium Co-chairs

**Jennifer K. Barton**, The University of Arizona (United States) **Wolfgang Drexler**, Medical University of Vienna (Austria)

#### **Program Track Chairs**

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

Richard B. Dorshow, MediBeacon Inc. (United States)
Jelena M. Janjic, Duquesne University (United States)
Hisataka Kobayashi, National Cancer Institute (United States)
Ashok Kumar Mishra, Indian Institute of Technology Madras (India)
Gabor Patonay, Georgia State University (United States)
Attila Tarnok, University Leipzig (Germany)

#### Session Chairs

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

- Spectroscopy and Imaging Richard B. Dorshow, MediBeacon Inc. (United States)
- 3 Near Infrared Probes Ramesh Raghavachari, U.S. Food and Drug Administration (United States)
- 4 Probes for Ultrasound and Photoacoustic Imaging Ramesh Raghavachari, U.S. Food and Drug Administration (United States)
- 5 It's a NanoWorld: Applications Using Nanoparticles **Hisataka Kobayashi**, National Cancer Institute (United States)
- 6 Fluorescent Probes for Imaging
  Mikhail Y. Berezin, Washington University School of Medicine in St.
  Louis (United States)