PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 8723

, "Front Matter: Volume 8723," Proc. SPIE 8723, Sensing Technologies for Global Health, Military Medicine, and Environmental Monitoring III, 872301 (4 June 2013); doi: 10.1117/12.2031911

SPIE.

Event: SPIE Defense, Security, and Sensing, 2013, Baltimore, Maryland, United States

PROCEEDINGS OF SPIE

Sensing Technologies for Global Health, Military Medicine, and Environmental Monitoring III

Šárka O. Southern
Editor

29 April –1 May 2013
Baltimore, Maryland, United States

Sponsored and Published by
SPIE

Volume 8723

Proceedings of SPIE 0277-786X, V. 8723

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

Sensing Technologies for Global Health, Military Medicine, and Environmental Monitoring III, edited by Šárka O. Southern,
Proc. of SPIE Vol. 8723, 872301 · © 2013 SPIE · CCC code: 0277-786X/13/\$18 · doi: 10.1117/12.2031911

Proc. of SPIE Vol. 8723 872301-1

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 *Sensing Technologies for Global Health, Military Medicine, and Environmental Monitoring III*, edited by Šárka O. Southern, Proceedings of SPIE Vol. 8723 (SPIE, Bellingham, WA, 2013) Article CID Number.

ISSN: 0277-786X

ISBN: 9780819495143

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 © 2013, 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/13/\$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

vii Conference Committee

SESSION 1	GLOBAL HEALTH I: SALIVA: A NEW SAMPLE FOR DISEASE DIAGNOSTICS
8723 03	The oral-systemic connection: role of salivary diagnostics (Invited Paper) [8723-1] D. Malamud, New York Univ. (United States)
8723 09	Computing Tutte polynomials of contact networks in classrooms [8723-7] D. Hincapié, Univ. de Antioquia (Colombia); J. Ospina, Univ. EAFIT (Colombia)
SESSION 2	GLOBAL HEALTH II: SALIVA DIAGNOSTICS: FROM LAB TO MARKETPLACE
8723 0A	The proteome of human saliva (Invited Paper) [8723-9] T. J. Griffin, Univ. of Minnesota (United States)
8723 0D	Salivary proteome as an in vivo model to study breast cancer progression (Invited Paper) [8723-12] C. F. Streckfus, The Univ. of Texas Dental Branch at Houston (United States)
8723 0F	Emerging technologies for oral diagnostics: lessons from chronic graft-versus-host disease (Invited Paper) [8723-10] J. W. Mays, K. S. Ambatipudi, C. W. Bassim, J. E. Melvin, National Institute of Dental and Craniofacial Research (United States)
SESSION 3	MILITARY MEDICINE I: TRAUMATIC BRAIN INJURY AND PTSD
8723 0K	Traumatic brain injury in modern war (Invited Paper) [8723-18] G. S. F. Ling, J. Hawley, J. Grimes, C. Macedonia, J. Hancock, M. Jaffee, T. Dombroski, Uniformed Services Univ. of the Health Sciences (United States); J. M. Ecklund, Uniformed Services Univ. of the Health Sciences (United States) and Inova Fairfax Hospital (United States)
8723 0N	Cleveland Clinic intelligent mouthguard: a new technology to accurately measure head impact in athletes and soldiers [8723-61] A. Bartsch, S. Samorezov, Cleveland Clinic (United States)
8723 0O	Systems biomarkers as acute diagnostics and chronic monitoring tools for traumatic brain injury (Invited Paper) [8723-24] K. K. W. Wang, A. Moghieb, Z. Yang, Z. Zhang, Univ. of Florida (United States)
8723 0Q	A review of glutamate's role in traumatic brain injury mechanisms [8723-53] C. H. Good, U.S. Army Research Lab. (United States)

- 8723 OR **Circulating exosomes as new biomarkers for brain disease and injury** [8723-65]
M. W. Graner, Univ. of Colorado Denver (United States); L. M. Eppler, Univ. of Colorado Denver (United States) and Colorado State Univ. (United States); N. L. Dusto, A. M. Lencioni, M. Nega, M. Herring, B. Winston, H. Madsen, Univ. of Colorado Denver (United States); L. T. Bemis, Univ. of Minnesota, Duluth (United States); T. J. Anchordoquy, Univ. of Colorado Denver (United States)

SESSION 4 MILITARY MEDICINE II: PHYSIOLOGY OF EXTREME ENVIRONMENTS

- 8723 OS **High-altitude physiology: lessons from Tibet (Invited Paper)** [8723-29]
P. D. Wagner, T. S. Simonson, Univ. of California, San Diego (United States); G. Wei, Qinghai Univ. School of Medicine (China); H. Wagner, Univ. of California, San Diego (United States); T. Wuren, M. Yan, G. Qin, R. Ge, Qinghai Univ. School of Medicine (China)
- 8723 OX **Exercise science: research to sustain and enhance performance** [8723-32]
J. E. Wingo, Univ. of Alabama (United States)
- 8723 OY **Energy-aware activity classification using wearable sensor networks** [8723-33]
B. Dong, A. Montoye, R. Moore, K. Pfeiffer, S. Biswas, Michigan State Univ. (United States)

SESSION 5 SENSING PLATFORMS: FROM LAB TO MARKETPLACE

- 8723 10 **Continuous, real-time bioimaging of chemical bioavailability and toxicology using autonomously bioluminescent human cell lines** [8723-35]
T. Xu, The Univ. of Tennessee (United States); D. M. Close, 490 BioTech Inc. (United States); J. D. Webb, S. L. Price, The Univ. of Tennessee (United States); S. A. Ripp, 490 BioTech Inc. (United States) and The Univ. of Tennessee (United States); G. S. Sayler, The Univ. of Tennessee (United States) and 490 BioTech Inc. (United States)
- 8723 11 **Peptide-mediated cellular delivery of semiconductor quantum dots (Invited Paper)** [8723-36]
K. B. Gemmill, U.S. Naval Research Lab. (United States); M. Muttenthaler, The Scripps Research Institute (United States); J. Delehanty, J. Deschamps, K. Susumu, M. Stewart, U.S. Naval Research Lab. (United States); P. Dawson, The Scripps Research Institute (United States); A. Huston, I. Medintz, U.S. Naval Research Lab. (United States)
- 8723 13 **SdAb heterodimer formation using leucine zippers (Invited Paper)** [8723-38]
E. R. Goldman, G. P. Anderson, U.S. Naval Research Lab. (United States); P. A. Brozozog-Lee, Nova Research, Inc. (United States); D. Zabetakis, U.S. Naval Research Lab. (United States)
- 8723 15 **Liquid intake monitoring through breathing signal using machine learning** [8723-39]
B. Dong, S. Biswas, Michigan State Univ. (United States)

SESSION 6 ENVIRONMENTAL MONITORING

- 8723 17 **Determination of soil ionic concentration using impedance spectroscopy (Invited Paper)** [8723-52]
G. Pandey, R. Kumar, R. J. Weber, Iowa State Univ. (United States)
- 8723 18 **Discrimination of airborne material particles from light scattering (TAOS) patterns (Invited Paper)** [8723-41]
G. F. Crosta, Univ. degli Studi di Milano-Bicocca (Italy); Y.-L. Pan, G. Videen, U.S. Army Research Lab. (United States); K. B. Aptowicz, West Chester Univ. of Pennsylvania (United States); R. K. Chang, Yale Univ. (United States)
- 8723 19 **Assessing satellite AOD based and WRF/CMAQ output PM2.5 estimators (Invited Paper)** [8723-64]
L. Cordero, Y. Wu, B. M. Gross, F. Moshary, The City College of New York (United States)
- 8723 1A **Optical remote sensing a potential tool for forecasting malaria in Orissa, India** [8723-42]
M. Nizamuddin, K. Akhand, L. Roytman, The City College of New York (United States); F. Kogan, M. Goldberg, National Environmental Satellite, Data, and Information Service (United States)

POSTER SESSION

- 8723 1B **Application of the diffusion-convection equation to modeling the infection by histoplasma-capsulatum** [8723-46]
S. A. Jaime, Univ. EAFIT (Colombia)
- 8723 1C **Processing of medical images using Maple** [8723-45]
V. Toro Betancur, Univ. EAFIT (Colombia)
- 8723 1D **The toxic effects of flame retardants: a gene expression study in elucidating their carcinogenicity** [8723-49]
M. Vagula, A. Al-Dhumani, S. Al-Dhumani, A. Mastro, Gannon Univ. (United States)
- 8723 1E **Study of effects of radio-wave frequency radiation emitted from cellular telephones on embryonic development of *danio rerio*** [8723-48]
M. Vagula, R. Harkless, Gannon Univ. (United States)
- 8723 1F **Refining environmental satellite data using a statistical approach** [8723-47]
M. Z. Rahman, LaGuardia Community College (United States); L. Roytman, The City College of the City Univ. of New York (United States); A. H. Kadik, LaGuardia Community College (United States)
- 8723 1G **Generalized mathematical-computational-electronic model of MPTP- induced Parkinsonism** [8723-44]
D. Jaramillo Raquejo, Univ. EAFIT (Colombia)
- 8723 1H **Bioinspired polarization navigation sensor for autonomous munitions systems** [8723-56]
G. C. Giakos, T. Quang, T. Farrahi, A. Deshpande, C. Narayan, S. Shrestha, Y. Li, M. Agarwal, The Univ. of Akron (United States)

- 8723 1I **Polymer nanostructure materials for space defense applications** [8723-55]
G. C. Giakos, T. Farrahi, C. Narayan, S. Shrestha, T. Quang, D. Bandopadhyay, A. Karim,
Y. Li, A. Deshpande, D. Pingili, The Univ. of Akron (United States)
- 8723 1J **Integrative paradigms bridging defense and bioscience** [8723-54]
S. Shrestha, G. C. Giakos, A. Deshpande, T. Quang, C. Narayan, T. Farrahi, Y. Li,
J. Petermann, A. Blinzler, S. Marotta, The Univ. of Akron (United States)

Author Index

Conference Committee

Symposium Chair

Kenneth R. Israel, Major General (USAF Retired) (United States)

Symposium Cochair

David A. Whelan, Boeing Defense, Space, and Security (United States)

Conference Chair

Šárka O. Southern, Gaia Medical Institute (United States)

Conference Cochairs

Daniel Malamud, New York University (United States)

Mark A. Mentzer, U.S. Army Research Laboratory (United States)

Isaac Rodriguez-Chavez, National Institute of Dental and Craniofacial Research (United States)

Conference Program Committee

Samuel N. Cheuvront, U.S. Army Research Institute of Environmental Medicine (United States)

James Delehanty, U.S. Naval Research Laboratory (United States)

Theresa G. Evans-Nguyen, Draper Laboratory (United States)

Peter Kiesel, Palo Alto Research Center, Inc. (United States)

Baochuan Lin, U.S. Naval Research Laboratory (United States)

Igor Medintz, U.S. Naval Research Laboratory (United States)

Christopher Myers, Naval Health Research Center (United States)

Richard M. Ozanich, Pacific Northwest National Laboratory (United States)

Ava M. Puccio, University of Pittsburgh Medical Center (United States)

Steven A. Ripp, The University of Tennessee (United States)

Albert Skip Rizzo III, The University of Southern California (United States)

Kim E. Sapsford, U.S. Food and Drug Administration (United States)

Shadrian B. Strong, Johns Hopkins University Applied Physics Laboratory (United States)

David E. Wolf, Radiation Monitoring Devices, Inc. (United States)

Aurel Ymeti, Ostendum R&D BV (Netherlands)

David T. Wong, University of California, Los Angeles (United States)

Session Chairs

- 1 Global Health I: Saliva: A New Sample for Disease Diagnostics
Sárka O. Southern, Gaia Medical Institute (United States)
Isaac Rodriguez-Chavez, National Institute of Dental and Craniofacial Research (United States)
Daniel Malamud, New York University (United States)
- 2 Global Health II: Saliva Diagnostics: From Lab to Marketplace
Jacqueline W. Mays, National Institute of Dental and Craniofacial Research (United States)
Charles F. Streckfus, The University of Texas Dental Branch at Houston (United States)
Timothy J. Griffin, University of Minnesota, Twin Cities (United States)
- 3 Military Medicine I: Traumatic Brain Injury and PTSD
Jason S. Hawley, Uniformed Services University of the Health Sciences (United States)
Kevin K.W. Wang, University of Florida (United States)
- 4 Military Medicine II: Physiology of Extreme Environments
Peter D. Wagner, University of California, San Diego (United States)
Virginia E. Wotring, NASA Johnson Space Center (United States)
Sárka O. Southern, Gaia Medical Institute (United States)
- 5 Sensing Platforms: From Lab to Marketplace
Kelly B. Gemmill, U.S. Naval Research Laboratory (United States)
Ellen Goldman, U.S. Naval Research Laboratory (United States)
- 6 Environmental Monitoring
Ratnesh Kumar, Iowa State University (United States)
Giovanni Franco Crosta, Università degli Studi di Milano-Bicocca (Italy)