PROCEEDINGS OF SPIE

Smart Biomedical and Physiological Sensor Technology XXI

Brian M. Cullum Douglas Kiehl Eric S. McLamore Editors

22–23 April 2024 National Harbor, Maryland, United States

Sponsored and Published by SPIE

Volume 13059

Proceedings of SPIE 0277-786X, V. 13059

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

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 SPIEDigitalLibrary.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 *Smart Biomedical and Physiological Sensor Technology XXI*, edited by Brian M. Cullum, Douglas Kiehl, Eric S. McLamore, Proc. of SPIE 13059, Seven-digit Article CID Number (DD/MM/YYYY); (DOI URL).

ISSN: 0277-786X

ISSN: 1996-756X (electronic)

ISBN: 9781510674363

ISBN: 9781510674370 (electronic)

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA Telephone +1 360 676 3290 (Pacific Time)

SPIE.org

Copyright © 2024 Society of Photo-Optical Instrumentation Engineers (SPIE).

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 fees. To obtain permission to use and share articles in this volume, visit Copyright Clearance Center 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.

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: A unique citation identifier (CID) number is assigned to each article in the Proceedings of SPIE 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

Conference Committee

NOVEL MATERIALS SENSING

	NOVEL MATERIALS SENSING
13059 02	Multiwavelength spectral photon detection system with 10.9nm resolution capable of perform data stream at 420Gs/s [13059-1]
13059 03	Dielectric energy storage materials for space sensors: effect of processing on the performance [13059-4]
13059 04	Studies of multifunctional $Bi_{12}GeO_{20}$ compound synthesized by chemical route [13059-5]
13059 05	Flux growth of optical sensor zinc selenide crystals [13059-6]
	FUTURE OF INDIVIDUAL CARE AND MONITORING
13059 06	Quantifying knowledge: medical applications of radar aging through the lens of bibliometrics [13059-11]
13059 07	Inkjet-printed 2-D conductors for electromyography (EMG) electrodes in biosensing applications [13059-7]
13059 08	Functional connectivity differences between cocaine users and healthy controls: an fMRI study [13059-9]
13059 09	Extracting functional connectivity signatures in substance use disorder using energy landscape analysis [13059-8]
13059 0A	Exploring connections between auditory hallucinations and language model structures and functions [13059-10]
	SERS BIOSENSING FOR DEFENSE AND HEALTH
13059 OB	Exploring MOF-based micromotors as SERS sensors (Invited Paper) [13059-17]
13059 OC	Label-free surface-enhanced Raman scattering (SERS) and machine learning for biological analysis [13059-19]

POSTER SESSION

13059 OD	Harnessing data and satellites for early malaria warning: a global health imperative [13059-20]
13059 OE	Advancements in pathogen detection: the integration of SERS and LSPR technologies in handheld clinical diagnostics [13059-21]

Conference Committee

Symposium Chairs

Tien Pham, The MITRE Corporation (United States) **Douglas R. Droege**, L3Harris Technologies, Inc. (United States)

Symposium Co-chairs

Ann Marie Raynal, Sandia National Laboratories (United States) **Ravi Ravichandran**, BAE Systems (United States)

Program Track Chair

Latasha Solomon, DEVCOM Army Research Laboratory (United States)

Conference Chairs

Brian M. Cullum, University of Maryland, Baltimore County (United States)

Douglas Kiehl, Eli Lilly and Company (United States) **Eric S. McLamore**, Clemson University (United States)

Conference Program Committee

Alper Bozkurt, North Carolina State University (United States)
Jonathan C. Claussen, Iowa State University of Science and
Technology (United States)

Matthew B. Coppock, DEVCOM Army Research Laboratory (United States)

Sudhir Dahal, Thermo Fisher Scientific Inc. (United States)

Andrew M. Fales, U.S. Food and Drug Administration (United States)

Mikella E. Farrell, DEVCOM Army Research Laboratory (United States)

Ellen L. Holthoff, Assistant Secretary of the Army for Acquisition,

Logistics, and Technology (United States)

Ilko K. Ilev, U.S. Food and Drug Administration (United States)

Yong Lin Kong, The University of Utah (United States)

Kamdeo D. Mandal, Indian Institute of Technology (BHU), Varanasi (India)

T. Joshua Pfefer, U.S. Food and Drug Administration (United States)Narsingh Bahadur Singh, University of Maryland, Baltimore County (United States)

Pietro Strobbia, University of Cincinnati (United States)

Michael Weinrich, Eunice Kennedy Shriver National Institute of Child Health and Human Development (United States) Sheng Xu, University of California, San Diego (United States)