PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 7169

, "Front Matter: Volume 7169," Proc. SPIE 7169, Advanced Biomedical and Clinical Diagnostic Systems VII, 716901 (11 March 2009); doi: 10.1117/12.827224

Event: SPIE BiOS, 2009, San Jose, California, United States

PROGRESS IN BIOMEDICAL OPTICS AND IMAGING

Vol. 10 , No. 9

Advanced Biomedical and Clinical Diagnostic Systems VII

Anita Mahadevan-Jansen

Tuan Vo-Dinh

Warren S. Grundfest

Editors

25–26 January 2009

San Jose, California, United States

Sponsored and Published by

SPIE

Volume 7169

Proceedings of SPIE, 1605-7422, v. 7169

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

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 *Advanced Biomedical and Clinical Diagnostic Systems VII*, edited by Anita Mahadevan-Jansen, Tuan Vo-Dinh, Warren S. Grundfest, Proceedings of SPIE Vol. 7169 (SPIE, Bellingham, WA, 2009) Article CID Number.

ISSN 1605-7422

ISBN 9780819474155

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 © 2009, 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 1605-7422/09/\$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 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

ix Conference Committee

SESSION 1 BIOSENSING

- 7169 02 **Integrated point of care testing system based on low cost polymer biochips** [7169-01]
A. Brandenburg, F. Curdt, Fraunhofer Institute of Physical Measurement Techniques (Germany); J. Nestler, T. Otto, Fraunhofer Research Institution for Electronic Nano Systems (Germany); K. Wunderlich, D. Michel, Fraunhofer Institute for Biomedical Engineering (Germany)
- 7169 03 **Antibody fragment recognition layers for surface plasmon resonance biosensing: a parametric study** [7169-02]
A. Magalhães, Biosurfit SA (Portugal) and Instituto Superior Técnico (Portugal); S. Bordeira, A. C. Almeida, V. Fontes, M. J. L. Costa, Biosurfit SA (Portugal); L. P. Fonseca, Instituto Superior Técnico (Portugal); J. G. da Fonseca, Biosurfit SA (Portugal)
- 7169 05 **A sandwich assay for procalcitonin detection for POCT applications** [7169-04]
F. Baldini, Institute of Applied Physics, CNR (Italy); L. Bolzoni, Datamed S.r.L. (Italy); A. Giannetti, Institute of Applied Physics, CNR (Italy); M. Kess, P. M. Krämer, Helmholtz Zentrum München, Institute of Ecological Chemistry (Germany); E. Kremmer, Helmholtz Zentrum München, Institute for Molecular Immunology (Germany); G. Porro, Datamed S.r.L. (Italy); F. Senesi, C. Trono, Institute of Applied Physics, CNR (Italy)
- 7169 06 **The involvement of nitric oxide in the hemodynamic and metabolic state of the brain and small intestine** [7169-05]
M. Tolmasove, E. Barbiro-Michaely, A. Mayevsky, Bar-Ilan Univ. (Israel)

SESSION 2 OPTICAL SPECTROSCOPY

- 7169 08 **Clinical system model for monitoring the physiological status of jaundice by extracting bilirubin components from skin diffuse reflectance spectra** [7169-07]
A. S. Kumar, J. Clark, F. R. Beyette, Jr., Univ. of Cincinnati (United States)
- 7169 0A **Epithelial cancer detection by oblique-incidence optical spectroscopy** [7169-09]
A. Garcia-Urbe, K. C. Balareddy, J. Zou, Texas A&M Univ. (United States); K. K. Wang, Mayo Clinic (United States); M. Duvic, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); L. V. Wang, Washington Univ. in St. Louis (United States)
- 7169 0C **Support vector machine based classification of fast Fourier transform spectroscopy of proteins** [7169-11]
A. Lazarevic, D. Pokrajac, A. Marcano, N. Melikechi, Delaware State Univ. (United States)

SESSION 3 RAMAN SPECTROSCOPY

- 7169 0E **Image-guided near-infrared Raman spectroscopy for in vivo detection of gastric dysplasia** [7169-13]
Z. Huang, S. K. Teh, W. Zheng, National Univ. of Singapore (Singapore); K. Y. Ho, M. Teh, K. G. Yeoh, National Univ. of Singapore and National Univ. Hospital (Singapore)
- 7169 0G **Nonlinear Raman microspectroscopy: from research laboratory to clinical environment** [7169-15]
R. Arora, G. I. Petrov, V. V. Yakovlev, Univ. of Wisconsin-Milwaukee (United States)
- 7169 0H **Tissue imaging of myocardial infarct regions by a slit-scanning Raman microscope** [7169-16]
M. Ogawa, Y. Harada, Y. Yamaoka, Kyoto Prefectural Univ. of Medicine (Japan); K. Fujita, Osaka University (Japan); T. Takamatsu, Kyoto Prefectural Univ. of Medicine (Japan)
- 7169 0I **Urinary tract infection diagnosis and response to antibiotics using Raman spectroscopy** [7169-17]
E. Kastanos, Univ. of Nicosia (Cyprus); A. Kyriakides, K. Hadjigeorgiou, C. Pitris, Univ. of Cyprus (Cyprus)

SESSION 4 MULTI-MODALITY

- 7169 0J **In vivo fluorescence hyperspectral imaging of oral neoplasia** [7169-18]
D. Roblyer, Rice Univ. (United States); C. Kurachi, Univ. of São Paulo (Brazil); A. M. Gillenwater, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); R. Richards-Kortum, Rice Univ. (United States)
- 7169 0M **An optical biopsy system with miniaturized Raman and spectral imaging probes: in vivo animal and ex vivo clinical application studies** [7169-21]
H. Sato, T. Suzuki, B. B. Andriana, S. Morita, A. Maruyama, H. Shinzawa, Optical Biopsy Development Research Unit, RIKEN (Japan); Y. Komachi, G. Kanai, Machida Endoscope Co., Ltd. (Japan); N. Ura, Soma Opto Co., Ltd. (Japan); K. Masutani, Micro Science Co., Ltd. (Japan); Y. Matsuura, Tohoku Univ. (Japan); M. Toi, Kyoto Univ. (Japan); T. Shimosegawa, Tohoku Univ. (Japan); Y. Ozaki, Kwansei-Gakuin Univ. (Japan)
- 7169 0N **A MEMS-based handheld confocal microscope with Raman spectroscopy for in vivo skin cancer diagnosis** [7169-22]
C. L. Arrasmith, Montana State Univ., Bozeman (United States); C. A. Patil, Vanderbilt Univ. (United States); D. L. Dickensheets, Montana State Univ., Bozeman (United States); A. Mahadevan-Jansen, Vanderbilt Univ. (United States)
- 7169 0O **Combining optical coherence tomography with fluorescence molecular imaging: towards simultaneous morphology and molecular imaging** [7169-23]
S. Yuan, M. Lai, Univ. of Maryland, College Park (United States); C. A. Roney, National Institutes of Health (United States); J. Jiang, Thorlabs, Inc. (United States); Q. Li, Univ. of Maryland, College Park (United States); H. Ma, A. Cable, Thorlabs, Inc. (United States); R. M. Summers, National Institutes of Health (United States); Y. Chen, Univ. of Maryland, College Park (United States)

- 7169 0P **Measurement of the local muscular metabolism by time-domain near infrared spectroscopy during knee flex-extension induced by functional electrical stimulation** [7169-24]
D. Contini, L. Spinelli, A. Torricelli, S. Ferrante, A. Pedrocchi, Politecnico di Milano (Italy); F. Molteni, Ospedale Valduce (Italy); G. Ferrigno, R. Cubeddu, Politecnico di Milano (Italy)

SESSION 5 IMAGING WITH OPTICAL COHERENCE TOMOGRAPHY

- 7169 0Q **Automated contact lens measurement using optical coherence tomography** [7169-25]
B. R. Davidson, J. K. Barton, The Univ. of Arizona (United States)
- 7169 0R **Development of an integrated endoscopic device for multiplexed low coherence interferometry (LCI) measurements of microbicide gel thickness** [7169-26]
T. K. Drake, F. Robles, M. DeSoto, M. H. Henderson, D. F. Katz, A. Wax, Duke Univ. (United States)
- 7169 0S **Laparoscopic optical coherence tomographic imaging of human ovarian cancer** [7169-27]
L. P. Hariri, The Univ. of Arizona (United States); G. T. Bonnema, College of Optical Sciences, The Univ. of Arizona (United States); K. Schmidt, The Univ. of Arizona (United States); V. Korde, A. M. Winkler, College of Optical Sciences, The Univ. of Arizona (United States); K. Hatch, The Univ. of Arizona (United States); M. Brewer, Univ. of Connecticut, Farmington (United States); J. K. Barton, College of Optical Sciences, The Univ. of Arizona (United States) and The Univ. of Arizona (United States)

SESSION 6 IMAGING AND MICROSCOPY

- 7169 0X **Toward automated detection of malignant melanoma** [7169-32]
B. Huang, Memorial Sloan-Kettering Cancer Ctr. (United States) and Massachusetts Institute of Technology (United States); D. S. Gareau, Memorial Sloan-Kettering Cancer Ctr. (United States) and Oregon Health & Science Univ. (United States)
- 7169 0Y **Fluorescence confocal mosaicing microscopy of basal cell carcinomas ex vivo: demonstration of rapid surgical pathology with high sensitivity and specificity** [7169-33]
D. S. Gareau, J. K. Karen, S. W. Dusza, M. Tudisco, K. S. Nehal, M. Rajadhyaksha, Memorial Sloan-Kettering Cancer Ctr. (United States)
- 7169 11 **Identification and classification of human neural stem cells by infrared spectroscopic imaging** [7169-31]
G. Steiner, S. Küchler, E. Koch, R. Salzer, G. Schackert, M. Kirsch, Dresden Univ. of Technology (Germany)

SESSION 7 IMAGING AND DIAGNOSIS

- 7169 12 **Narrow band imaging of tumors using gold nanoshells** [7169-36]
P. Puvanakrishnan, J. Park, The Univ. of Texas at Austin (United States); P. Diagaradjane, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); J. A. Schwartz, C. L. Coleman, K. L. Gill-Sharp, K. L. Sang, J. D. Payne, Nanospectra Biosciences, Inc. (United States); S. Krishnan, The Univ. of Texas M.D. Anderson Cancer Ctr. (United States); J. W. Tunnell, The Univ. of Texas at Austin (United States)

7169 14 **Real-time co-registered imaging using a novel hand-held optical imager** [7169-38]
S. J. Erickson, S. Regalado, J. Ge, A. Godavarty, Florida International Univ. (United States)

7169 15 **Computer-aided classification of rheumatoid arthritis in finger joints using frequency domain optical tomography** [7169-39]
C. D. Klose, H. K. Kim, Columbia Univ. (United States); U. Netz, Charité Universitätsmedizin Berlin (Germany); S. Blaschke, P. A. Zwaka, G. A. Müller, Georg-August Univ. Göttingen (Germany); J. Beuthan, Charité Universitätsmedizin Berlin (Germany); A. H. Hielscher, Columbia Univ. (United States)

SESSION 8 IMAGING AND PERFUSION/BLOOD VESSELS

7169 16 **Quantitative assessment of autonomic dysreflexia with combined spectroscopic and perfusion probes** [7169-40]
J. C. Ramella-Roman, A. Pfefer, The Catholic Univ. of America (United States); J. Hidler, National Rehabilitation Hospital (United States)

7169 17 **A remote approach to measure blood perfusion from the human face** [7169-41]
J. Zheng, S. Hu, A. S. Echiadis, V. Azorin-Peris, P. Shi, V. Chouliaras, Loughborough Univ. (United Kingdom)

7169 18 **Validation of the performance of a practical blood vessel imaging system to facilitate vessel punctures** [7169-42]
N. J. Cuper, R. M. Verdaasdonk, R. de Roode, Univ. Medical Ctr. Utrecht (Netherlands)

7169 19 **Functional assessment of hand vasculature using infrared and laser speckle imaging** [7169-43]
A. M. Gorbach, H. Wang, B. Wiedenbeck, National Institutes of Health (United States); W. Liu, Naval Medical Research Ctr. (United States); P. D. Smith, National Institutes of Health (United States); E. Elster, Naval Medical Research Ctr. (United States)

SESSION 9 IMAGING AND IMAGE ANALYSIS

7169 1A **Role of collagen in terahertz absorption in skin** [7169-44]
P. Tewari, Univ. of California, Los Angeles (United States); M. O. Culjat, Univ. of California, Los Angeles (United States) and Univ. of California, Santa Barbara (United States); Z. D. Taylor, J. Y. Suen, Univ. of California, Los Angeles (United States) and Univ. of California, Santa Barbara (United States); B. O. Burt, Univ. of California, Los Angeles (United States); H. Lee, E. R. Brown, Univ. of California, Los Angeles (United States) and Univ. of California, Santa Barbara (United States); W. S. Grundfest, Univ. of California, Los Angeles (United States); R. S. Singh, Univ. of California, Los Angeles (United States) and Univ. of California, Santa Barbara (United States)

7169 1B **Illuminants as visualization tool for clinical diagnostics and surgery** [7169-45]
M. Litorja, S. W. Brown, C. Lin, Y. Ohno, National Institute of Standards and Technology (United States)

- 7169 1C **Image analysis software for following progression of peripheral neuropathy** [7169-46]
T. Epplin-Zapf, Lickenbrock Technologies, LLC (United States) and Washington Univ. in St. Louis (United States); C. Miller, S. Larkin, E. Hermesmeier, J. Macy, Lickenbrock Technologies, LLC (United States); M. Pellegrini, S. Luccarelli, G. Staurengi, Univ. degli Studi di Milano (Italy); T. Holmes, Lickenbrock Technologies, LLC (United States)
- 7169 1D **Interactive brain shift compensation using GPU-based programming** [7169-47]
S. van der Steen, H. J. Noordmans, R. Verdaasdonk, Univ. Medical Ctr. Utrecht (Netherlands)

POSTER SESSION

- 7169 1E **Visible and near infrared autofluorescence and hyperspectral imaging spectroscopy for the investigation of colorectal lesions and detection of exogenous fluorophores** [7169-20]
K. R. Koh, T. C. Wood, R. D. Goldin, G.-Z. Yang, D. S. Elson, Imperial College London (United Kingdom)
- 7169 1F **Spinning wave plate design for retinal birefringence scanning** [7169-48]
K. Irsch, Johns Hopkins Univ. School of Medicine (United States) and Univ. of Heidelberg (Germany); B. I. Gramatikov, Y.-K. Wu, D. L. Guyton, Johns Hopkins Univ. School of Medicine (United States)
- 7169 1G **A fluorescence diagnostic system detecting cancer-specific enzymatic activities: preliminary results** [7169-49]
T. Beck, H. Stepp, Univ. Clinic Munich (Germany); R. Wittig, M. Böhl, P. Schubert, R-Biopharm AG (Germany); S. Henkenjohann, M. Sauer, Bielefeld Univ. (Germany); A. Dürkop, Univ. of Regensburg (Germany); C. Betz, A. Johansson, Univ. Clinic Munich (Germany)
- 7169 1I **Protein profile study of clinical samples using laser induced fluorescence as the detection method: case of malignant and normal cervical tissues** [7169-51]
G. Karemore, Univ. of Copenhagen (Denmark) and Nordic Bioscience A/S (Denmark); S. N. Raja, L. Rai, V. B. Kartha, S. Chidangil, Manipal Univ. (India)
- 7169 1J **One- and two-photon time-resolved fluorescence of visible and near-infrared dyes in scattering media** [7169-52]
R. Esposito, C. Altucci, R. Velotta, Univ. Federico II (Italy); G. M. Gaeta, M. Lepore, Seconda Univ. di Napoli (Italy)
- 7169 1L **Stroboscopic wide-field optical coherence gated imaging** [7169-54]
W. J. Choi, J. Na, J. Eom, B. H. Lee, Gwangju Institute of Science and Technology (Republic of Korea)
- 7169 1M **Antenna configurations for ultra wide band radar detection of breast cancer** [7169-55]
R. C. Conceição, M. O'Halloran, M. Glavin, E. Jones, National Univ. of Ireland Galway (Ireland)

- 7169 1N **An approach to the correspondence problem in the 1D optical transducers tracking system**
[7169-56]
Q. Wen, J. Wu, Tsinghua University (China); H. Tao, Univ. of California, Santa Cruz (United States); G. Wang, D. Ye, Tsinghua University (China)

Author Index

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 Medical School (United States)

Program Track Chairs

Tuan Vo-Dinh, Duke University (United States)
Anita Mahadevan-Jansen, Vanderbilt University (United States)

Conference Chairs

Anita Mahadevan-Jansen, Vanderbilt University (United States)
Tuan Vo-Dinh, Duke University (United States)
Warren S. Grundfest, University of California, Los Angeles (United States)

Session Chairs

- 1 Biosensing
Maurice C. Alders, Universiteit van Amsterdam (Netherlands)
- 2 Optical Spectroscopy
Laura Marcu, University of California, Davis (United States)
- 3 Raman Spectroscopy
Tuan Vo-Dinh, Duke University (United States)
- 4 Multi-Modality
Stephen A. Boppart, University of Illinois at Urbana-Champaign (United States)
- 5 Imaging with Optical Coherence Tomography
Jennifer K. Barton, The University of Arizona (United States)
- 6 Imaging and Microscopy
Jianan Y. Qu, Hong Kong University of Science and Technology (Hong Kong, China)
- 7 Imaging and Diagnosis
Warren S. Grundfest, University of California, Los Angeles (United States)

- 8 Imaging and Perfusion/Blood Vessels
 Georges A. Wagnieres, Ecole Polytechnique Fédérale de Lausanne
 (Switzerland)
- 9 Imaging and Image Analysis
 Steven C. Gebhart, Oncoscope, Inc. (United States)