

PROGRESS IN BIOMEDICAL OPTICS AND IMAGING

Vol. 10, No. 13

Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications IX

Israel Gannot

Editor

24–25 January 2009

San Jose, United States

Sponsored and Published by
SPIE

Volume 7173

Proceedings of SPIE, 1605-7422, v. 7173

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

Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications IX, edited by Israel Gannot,
Proc. of SPIE Vol. 7173, 717301 · © 2009 SPIE · CCC code: 1605-7422/09/\$18 · doi: 10.1117/12.825144

Proc. of SPIE Vol. 7173 717301-1

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 *Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications IX*, edited by Israel Gannot, Proceedings of SPIE Vol. 7173 (SPIE, Bellingham, WA, 2009) Article CID Number.

ISSN 1605-7422

ISBN 9780819474193

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.

The logo for SPIE Digital Library features the word "SPIE" in a bold, sans-serif font above the words "Digital Library" in a smaller, lighter font. To the right of the text is a stylized graphic consisting of three vertical bars of increasing height, resembling a bar chart or a signal waveform.

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

vii	<i>Conference Committee</i>
ix	<i>Introduction</i>

SESSION 1

- 7173 02 **Optical fibers in instrumental UV-analytics (Invited Paper)** [7173-36]
K.-F. Klein, Univ. of Applied Sciences Giessen-Friedberg (Germany); J. Mannhardt, J&M Analytische Mess-und Regeltechnik GmbH (Germany); M. Belz, World Precision Instruments, Inc. (United States); C. Gonschior, Univ. of Applied Sciences Giessen-Friedberg (Germany); H. S. Eckhardt, J&M Analytische Mess-und Regeltechnik GmbH (Germany)
- 7173 03 **Guided-mode resonance sensors for rapid medical diagnostic testing applications** [7173-01]
D. Wawro, Y. Ding, S. Gimlin, S. Zimmerman, C. Kearney, Resonant Sensors Incorporated (United States); K. Pawlowski, The Univ. of Texas Southwestern Medical Ctr. at Dallas (United States); R. Magnusson, The Univ. of Texas at Arlington (United States)
- 7173 04 **Nanoporous thin film platform for biophotonic sensors** [7173-02]
S. Alla, R. Solanki, Y. D. Mattley, H. Dabhi, M. R. Shahriari, Ocean Optics, Inc. (United States)
- 7173 05 **Polymer optical fiber tapers for biosensing applications** [7173-03]
R. Gravina, R. Bernini, IREA-CNR (Italy)

SESSION 2

- 7173 07 **Simulation and algorithm for photothermal imaging of tissue oxygen saturation** [7173-05]
M. Tepper, M. Ben-David, I. Gannot, Tel Aviv Univ. (Israel)
- 7173 08 **All-fiber optic confocal microscope with submicron depth resolution** [7173-06]
P. Nath, M. Buragohain, Gauhati Univ. (India); S. Sarkar, Univ. of Calcutta (India); P. Datta, K. C. Sarma, Gauhati Univ. (India)
- 7173 09 **Implantable optical biosensor for in vivo molecular imaging** [7173-07]
T. D. O'Sullivan, Stanford Univ. (United States); E. Munro, Univ. of Toronto (Canada); A. de la Zerda, N. Parashurama, R. Teed, Z. Walls, Stanford Univ. (United States); O. Levi, Univ. of Toronto (Canada); S. S. Gambhir, J. S. Harris, Jr., Stanford Univ. (United States)

SESSION 3

- 7173 0B **Advanced confocal fiber-optic imaging and sensing approaches** [7173-09]
D.-H. Kim, U.S. Food and Drug Administration (United States); J. U. Kang, Johns Hopkins Univ. (United States); I. K. Ilev, U.S. Food and Drug Administration (United States)

- 7173 0D **Inner wall coated hollow core waveguide SERS probe** [7173-12]
C. Shi, C. Lu, C. Gu, L. Tian, R. Newhouse, S. Chen, J. Z. Zhang, Univ. of California, Santa Cruz (United States)
- 7173 0E **Study of laser-induced damage to large core silica fiber by Nd:YAG and Alexandrite lasers** [7173-13]
X. Sun, J. Li, A. Hokansson, D. Whelan, OFS (United States); M. Clancy, Candela Corp. (United States)

SESSION 4

- 7173 0G **Fabrication of SiO₂/Ag/SiO₂/Ag hollow glass fiber for infrared transmission** [7173-14]
K.-R. Sui, X.-S. Lin, X.-W. Zhu, Y. Shi, Fudan Univ. (China); K. Iwai, Sendai National College of Technology (Japan); M. Miyagi, Sendai National College of Technology (Japan) and Miyagi National College of Technology (China)
- 7173 0H **250 μ m inner diameter hollow waveguide for Er:YAG laser radiation** [7173-15]
M. Němec, H. Jelínková, Czech Technical Univ. in Prague (Czech Republic); M. Miyagi, K. Iwai, Sendai National College of Technology (Japan); Y. Matsuura, Tohoku Univ. (Japan)
- 7173 0I **Two-photon in vivo flow cytometry using a fiber probe** [7173-16]
Y. C. Chang, J. Y. Ye, T. P. Thomas, Z. Cao, A. Kotlyar, E. R. Tkaczyk, J. R. Baker, Jr., T. B. Norris, Univ. of Michigan (United States)
- 7173 0J **Miniature Fresnel-based fiber optic pressure sensors for human disc pressure measurement** [7173-17]
W.-C. Huang, N.-F. Chiu, National Taiwan Univ. (Taiwan); C.-C. Chiang, P.-K. Tsai, National Kaohsiung Univ. of Applied Sciences (Taiwan); J.-L. Wang, National Taiwan Univ. (Taiwan)

SESSION 5

- 7173 0L **Evaluation of the CritiView in pig model of abdominal aortic occlusion and graded hemorrhage** [7173-10]
A. Mayevsky, Bar-Ilan Univ. (Israel) and CritiSense Ltd. (Israel); S. Preisman, Tel Aviv Univ. (Israel); P. E. Willenz, D. Castel, Sheba Medical Ctr. (Israel); A. Perel, Tel Aviv Univ. (Israel); D. Givony, N. Dekel, L. Oren, E. Pewzner, CritiSense Ltd. (Israel)
- 7173 0M **Optical wire guided lumpectomy: frequency domain measurements** [7173-19]
A. L. Dayton, Oregon Health & Science Univ. (United States); V. T. Keränen, Univ. of Oulu (Finland); S. A. Prah, Oregon Health & Science Univ. (United States)
- 7173 0N **The effect of dielectric absorption on the transmission characteristics of terahertz hollow fibers** [7173-20]
X.-L. Tang, Y.-W. Shi, Fudan Univ. (China); Y. Matsuura, Tohoku Univ. (Japan); K. Iwai, Sendai National College of Technology (Japan); M. Miyagi, Sendai National College of Technology (Japan) and Miyagi National College of Technology (Japan)

- 7173 0O **Hollow core waveguides for radiation delivery and sensing: Monte Carlo, ray tracing computer simulation** [7173-21]
I. Steinberg, E. Kaplan, M. Ben-David, I. Gannot, Tel Aviv Univ. (Israel)

SESSION 6

- 7173 0P **In-bed fibre optic breathing and movement sensor for non-intrusive monitoring** [7173-23]
Z. Chen, J. T. Teo, X. Yang, Institute for Infocomm Research (Singapore)
- 7173 0Q **Fabrication of hollow optical fiber with a vitreous film for CO₂ laser light delivery** [7173-24]
K. Iwai, Sendai National College of Technology (Japan); M. Miyagi, Sendai National College of Technology (Japan) and Miyagi National College of Technology (Japan); Y.-W. Shi, X.-S. Zhu, Fudan Univ. (China); Y. Matsuura, Tohoku Univ. (Japan)
- 7173 0R **Simultaneous irradiation of Er:YAG and Ho:YAG lasers for efficient ablation of hard tissues** [7173-25]
T. Watanabe, Tohoku Univ. (Japan); K. Iwai, Sendai National College of Technology (Japan); Y. Matsuura, Tohoku Univ. (Japan)

SESSION 7

- 7173 0T **Noninvasive subsurface analyzing technique using multiple miniaturized Raman probes** [7173-27]
Y. S. Yamamoto, Kwansei-Gakuin Univ. (Japan) and RIKEN (Japan); Y. Komachi, Machida Endoscope Co., Ltd. (Japan); H. Shinzawa, A. Maruyama, B. B. Andriana, RIKEN (Japan); Y. Matsuura, Tohoku Univ. (Japan); Y. Ozaki, Kwansei-Gakuin Univ. (Japan); H. Sato, RIKEN (Japan)
- 7173 0W **Wide range force feedback for catheter insertion mechanism for use in minimally invasive mitral valve repair surgery** [7173-30]
R. Ahmadi, Concordia Univ. (Canada); S. Sokhanvar, Massachusetts Institute of Technology (United States); M. Packirisamy, J. Dargahi, Concordia Univ. (Canada)
- 7173 0Y **Mode field perturbations and numerical aperture broadening due to angular misalignment in multimode fiber coupling** [7173-37]
A. Rose, Photonics Research Corp. (United States); K. Johnston, Luminart Labs. LLC (United States); K.-F. Klein, Univ. of Applied Sciences Giessen-Friedberg (Germany); B. Catanzaro, CFE Services (United States); L. De Taboada, Photothera (United States)

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 School of Medicine (United States)

Program Track Chairs

Tuan Vo-Dinh, Duke University (United States)

Anita Mahadevan-Jansen, Vanderbilt University (United States)

Conference Chair

Israel Gannot, Tel Aviv University (Israel)

Program Committee

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

Karl-Friedrich Klein, Fachhochschule Giessen-Friedberg (Germany)

Pierre Lucas, The University of Arizona (United States)

Yuji Matsuura, Tohoku University (Japan)

Urs Utzinger, The University of Arizona (United States)

Session Chairs

Session 1

Israel Gannot, Tel Aviv University (Israel)

Session 2

Ronald W. Waynant, U.S. Food and Drug Administration (United States)

Session 3

Pierre Lucas, The University of Arizona (United States)

Session 4

Karl-Friedrich Klein, Fachhochschule Giessen-Friedberg (Germany)

Session 5

Yuji Matsuura, Tohoku University (Japan)

Session 6

James A. Harrington, Rutgers University (United States)

Session 7

Pierre Lucas, The University of Arizona (United States)

Introduction

I am pleased to introduce this proceedings volume from the *Optical Fibers and Sensors for Medical Diagnostics and Treatment Applications* conference held in San Jose, California for the last time in January, 2009.

This year we have a lot of interesting papers ranging from fiber based delivery devices to optical sensors for in vivo applications and very sensitive sensors for very low quantities of biological and chemical substances. The papers represent a spectrum of groups from the Academy and from Industry, from the U.S. and almost all continents. The presentations triggered excellent discussions which I am sure will lead to potential collaborations. The fruits of those will no doubt be seen at our next meeting in the new location in San Francisco in January, 2010.

I am looking forward to seeing you all there.

Israel Gannot

