

PROCEEDINGS OF SPIE

Optical Sensors and Biophotonics III

Jürgen Popp
Dennis L. Matthews
Jie Tian
Chih-Chung Yang
Editors

13–16 November 2011
Shanghai, China

Cosponsored by
SPIE • IEEE Photonics Society • Optical Society of America • Chinese Optical Society
China Institute of Communications

Local Organizing Committee
Shanghai University

Best Student Paper Sponsors
RSoft Design Group • Thorlabs, Inc.

Published by
SPIE • Optical Society of America • IEEE Photonics Society

Volume 8311

Proceedings of SPIE, 0277-786X, v. 8311

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 Optical Sensors and Biophotonics III, edited by Jürgen Popp, Dennis L. Matthews, Jie Tian, Chih-Chung Yang, Proceedings of SPIE-OSA-IEEE Asia Communications and Photonics, SPIE Vol. 8311 (SPIE, Bellingham, WA, 2011) Article CID Number.

ISSN 0277-786X

ISBN 9780819489593

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

Optical Society of America

2010 Massachusetts Ave., N.W., Washington, D.C., 20036 USA

Telephone +1 202 223 8130 (Eastern Time) · Fax +1 202 223 1096

OSA.org

IEEE Photonics Society

445 Hoes Lane, Piscataway, New Jersey, 08855 USA

Telephone +1 732 562 8434 (Eastern Time) · Fax +1 732 562 8434

IEEE.org

Copyright © 2011, Society of Photo-Optical Instrumentation Engineers, Optical Society of America, and IEEE Photonics Society.

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/11/\$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

ix	<i>Symposium Committee</i>
xi	<i>Conference Committee</i>

SENSORS I

8311 02	Photonic crystal fibre Bragg grating based sensors: opportunities for applications in healthcare (Invited Paper) [8311-01] F. Berghmans, T. Geernaert, S. Sulejmani, H. Thienpont, Vrije Univ. Brussel (Belgium); G. Van Steenberge, B. Van Hoe, IMEC-Univ. Gent (Belgium); P. Dubruel, Univ. Gent (Belgium); W. Urbanczyk, Wroclaw Univ. of Technology (Poland); P. Mergo, Univ. Marii Curie-Sklodowskiej (Poland); D. J. Webb, Aston Univ. (United Kingdom); K. Kalli, Cyprus Univ. of Technology (Cyprus); J. Van Roosbroeck, FBGS International (Belgium); K. Sugden, Aston Univ. (United Kingdom) and Astasense Ltd. (United Kingdom)
8311 03	An improved low temperature sensing using PMMA coated FBG [8311-02] D. Sengupta, M. S. Shankar, P. S. Reddy, R. L. N. Sai Prasad, K. S. Narayana, P. Kishore, National Institute of Technology, Waranagal (India)
8311 05	Demodulation of a fiber Bragg grating sensor system based on a linear cavity multi-wavelength fiber laser [8311-04] S. Cong, Y. Sun, L. Pan, Y. Fang, J. Tian, Y. Yang, Y. Yong, Harbin Institute of Technology (China)
8311 06	An FBG sensor for strain and temperature discrimination at cryogenic regime [8311-05] D. Sengupta, M. S. Shankar, P. Kishore, P. S. Reddy, R. L. N. Sai Prasad, P. V. Rao, K. Srimannarayana, National Institute of Technology, Waranagal (India)

BEST STUDENT PAPER SESSION

8311 07	Fast and robust reconstruction approach for sparse fluorescence tomography based on adaptive matching pursuit [8311-06] Z. Xue, D. Han, J. Tian, Institute of Automation (China)
8311 08	Analysis of annular light propagation characteristics in random median [8311-07] Z. Peng, T. Shiina, Chiba Univ. (Japan)
8311 09	Kinetic study for the hybridization of 25-mer DNA by nonadiabatic tapered optical fiber sensor [8311-08] M. I. Zibaii, Z. Taghipour, Z. Saeedian, H. Latifi, M. Gholami, S. M. Hosseini, Shahid Beheshti Univ. (Iran, Islamic Republic of)
8311 0A	Temperature compensated long-period gratings for biochemical sensing applications [8311-09] S. Gao, Y. Zhang, A. P. Zhang, Zhejiang Univ. (China) and Zhejiang Normal Univ. (China)

- 8311 OB **Refractive index measurement by fat long period grating sensor on a single mode optical fiber** [8311-10]
M. Kheiri, M. I. Zibaii, J. Sadeghi, H. Latifi, Shahid Beheshti Univ. (Iran, Islamic Republic of)
- 8311 OC **Sensitivity-enhanced refractive index sensor by using tapered thin-core fiber based inline Mach-Zehnder interferometer** [8311-11]
J. Shi, S. Xiao, M. Bi, Shanghai Jiao Tong Univ. (China)
- 8311 OD **Measurement of gas concentration by wavelength shift method with an EDFA fiber laser loop (Best Student Paper)** [8311-12]
H. Zhou, K. Guo, C. Yan, Zhejiang Univ. (China)
- 8311 OE **Precise, rugged spectrum-based calibration of distributed anti-Stokes Raman thermometry systems** [8311-27]
A. Datta, U. Gajendran, V. Srimal, D. Venkitesh, B. Srinivasan, Indian Institute of Technology Madras (India)

BIOPHOTONICS I

- 8311 OF **Plasmonic nanoparticles for bioanalytics and therapy at the limit (Invited Paper)** [8311-13]
T. Schneider, J. Wirth, F. Garwe, A. Csáki, W. Fritzsche, Institut für Photonische Technologien e.V. (Germany)
- 8311 OH **A highly sensitive biological detection substrate based on TiO₂ nanowires supporting gold nanoparticles** [8311-15]
Y. Zeng, H. Tan, X.-L. Cheng, R. Chen, Y. Wang, Shanghai Jiao Tong Univ. (China)
- 8311 OJ **Characterization and bioanalytical application of innovative plasmonic nanostructures (Invited Paper)** [8311-17]
D. Cialla, K. Weber, Institute of Physical Chemistry, Friedrich-Schiller-Univ. Jena (Germany) and Institut für Photonische Technologien e.V. (Germany); R. Boehme, Institute of Physical Chemistry, Friedrich-Schiller-Univ. Jena (Germany); U. Huebner, H. Schneidewind, M. Zeisberger, R. Mattheis, Institut für Photonische Technologien e.V. (Germany); J. Popp, Institute of Physical Chemistry, Friedrich-Schiller-Univ. Jena (Germany) and Institut für Photonische Technologien e.V. (Germany)
- 8311 OK **Preparation and analysis of the Au-SiO₂ multi-layer nanospheres as high SERS resolution substrate** [8311-18]
W. Tian, K. Wu, X. Cheng, X. Chen, R. Chen, Y. Wang, Shanghai Jiao Tong Univ. (China)
- 8311 OL **An optimized engineering design of imaging probe for time-resolved diffuse optical tomography system** [8311-19]
L. Chen, A. Hasnain, N. Chen, National Univ. of Singapore (Singapore)

SENSORS II

- 8311 ON **Photonic crystal fibers in biophotonics (Invited Paper)** [8311-21]
V. V. Tuchin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) and Institute of Precise Mechanics and Control, Russian Academy of Sciences (Russian Federation) and Univ. of Oulu (Finland); J. S. Skibina, A. V. Malinin, N.G. Chernyshevsky Saratov State Univ. (Russian Federation) and SPE Nanostructured Glass Technology, Ltd. (Russian Federation)

- 8311 0O **High temperature sensor properties of a specialty double cladding fiber** [8311-22]
T. Zhou, F. Pang, T. Wang, Shanghai Univ. (China)
- 8311 0P **Non-contact vibration sensor using bifurcated bundle glass fiber for real-time monitoring** [8311-24]
K. Putha, D. Dinakar, M. S. Shankar, K. Srimannarayana, P. Vengal Rao, D. Sengupta, P. S. Reddy, National Institute of Technology, Warangal (India)
- 8311 0Q **Multilongitudinal-mode fiber laser temperature sensor and its applications in the measurement of temperature dependence of fiber birefringence** [8311-26]
H. Zhang, B. Liu, Y. Liu, Nankai Univ. (China); Y. Miao, Tianjin Univ. of Technology (China); X. Chen, Nankai Univ. (China); Y. Liu, Shanghai Univ. (China)
- 8311 0R **Temperature compensated liquid level sensor using FBGs and a Bourdon tube** [8311-28]
D. Sengupta, M. S. Shankar, P. V. Rao, P. S. Reddy, R. L. N. Sai Prasad, P. Kishore, K. Srimannarayana, National Institute of Technology, Warangal (India)
- 8311 0S **Phase-sensitive OTDR system based on digital coherent detection** [8311-29]
Z. Pan, K. Liang, Q. Ye, H. Cai, R. Qu, Z. Fang, Shanghai Institute of Optics and Fine Mechanics (China)
- 8311 0T **High birefringence fiber loop mirror with polymer coating used as humidity sensor** [8311-30]
H. Liang, Y. Jin, Y. Zhao, China Jiliang Univ. (China)
- 8311 0U **Hybrid long period fiber grating for measuring refractive index and pressure in downhole application** [8311-31]
J. Sadeghi, M. I. Zibaii, M. Kheiri, A. Ahmadlou, H. Latifi, M. H. Ghezelaigh, Shahid Beheshti Univ. (Iran, Islamic Republic of)
- 8311 0X **A bio-aerosol detection technique based on tryptophan intrinsic fluorescence measurement** [8311-90]
S. Cai, P. Zhang, L. Zhu, Shanghai Institute of Optics and Fine Mechanics (China) and Graduate Univ. of Chinese Academy of Sciences (China); Y. Zhao, H. Huang, Shanghai Institute of Optics and Fine Mechanics (China)

BIOPHOTONICS II

- 8311 0Y **Quantitative DEC-MRI modeling on tumor diagnosis and treatment effect evaluation** [8311-32]
H. Wang, S. Bao, Peking Univ. (China)
- 8311 10 **Direct pumping of ultrashort Ti:sapphire lasers by a frequency doubled diode laser** [8311-34]
A. Müller, O. B. Jensen, Technical Univ. of Denmark (Denmark); A. Unterhuber, T. Le, A. Stingl, FEMTOLASERS Produktions GmbH (Austria); K.-H. Hasler, B. Sumpf, G. Erbert, Ferdinand-Braun-Institut (Germany); P. E. Andersen, P. M. Petersen, Technical Univ. of Denmark (Denmark)
- 8311 13 **Space variant deconvolution for optical coherence tomography** [8311-37]
R. Prashanth, S. Bhattacharya, Indian Institute of Technology Madras (India)

- 8311 15 **Multi-modality molecular imaging for gastric cancer research (Invited Paper)** [8311-39]
J. Liang, X. Chen, J. Liu, Xidian Univ. (China); H. Hu, Fourth Military Medical Univ. (China);
X. Qu, F. Wang, Xidian Univ. (China); Y. Nie, Fourth Military Medical Univ. (China)
- 8311 16 **All-semiconductor high-speed akinetic swept-source for OCT** [8311-86]
M. P. Minneman, J. Ensher, M. Crawford, Insight Photonic Devices, Inc. (United States);
D. Derickson, California Polytechnic State Univ. (United States)
- 8311 17 **Breast diseases detection and pseudo-coloring presentation for gray infrared breast images** [8311-42]
Z. Zahedi, Isfahan Univ. (Iran, Islamic Republic of); S. Sadri, Isfahan Univ. of Technology (Iran, Islamic Republic of); M. Soltani, M. Kavosh Tehrani, Isfahan Univ. (Iran, Islamic Republic of)

BIOPHOTONICS III

- 8311 18 **Multiple-pinhole SPECT/CBCT system and its application on animal model on tumor (Invited Paper)** [8311-40]
S. Bao, J. Li, Peking Univ. (China)
- 8311 1B **A Raman spectroscopic approach for the cultivation-free identification of microbes (Invited Paper)** [8311-44]
P. Rösch, S. Stöckel, S. Meisel, U. Münchberg, S. Kloß, D. Kusic, W. Schumacher, Institute of Physical Chemistry, Friedrich-Schiller-Univ. Jena (Germany); J. Popp, Institute of Physical Chemistry, Friedrich-Schiller-Univ. Jena (Germany) and Institut für Photonische Technologien e.V. (Germany)
- 8311 1C **Line-scan focal modulation microscopy for rapid imaging of thick biological specimens** [8311-45]
S. P. Chong, S. Pant, N. Chen, National Univ. of Singapore (Singapore)

BIOPHOTONICS IV

- 8311 1H **Effective of diode laser on teeth enamel in the teeth whitening treatment** [8311-50]
U. Klunboot, K. Arayathanikul, R. Chitaree, N. Emarat, Mahidol Univ. (Thailand) and Chiang Mai Univ. (Thailand)
- 8311 1I **Optical design and development of near-range compact lidar** [8311-51]
T. Shiina, Chiba Univ. (Japan)

POST-DEADLINE PAPERS: JOINT SESSION WITH CONFERENCE 8308

- 8311 1R **Research on bio-aerosol monitoring based on normalized fluorescence voltage** [8311-94]
P. Zhang, Shanghai Institute of Optics and Fine Mechanics (China) and Graduate Univ. of Chinese Academy of Sciences (China); Y. Zhao, Shanghai Institute of Optics and Fine Mechanics (China); Y. Xiao, S. Cai, Shanghai Institute of Optics and Fine Mechanics (China) and Graduate Univ. of Chinese Academy of Sciences (China); H. Huang, Shanghai Institute of Optics and Fine Mechanics (China)

POSTER SESSION

- 8311 1S **FBG sensor for physiologic monitoring in M-health application** [8311-23]
C. C. Lee, K. Hung, W.-M. Chan, Y. K. Wu, S.-O. Choy, P. Kwok, The Open Univ. of Hong Kong (Hong Kong, China)
- 8311 1T **Evolution of polarization-dependent properties in circular birefringent fiber Bragg gratings and potential application for magnetic field sensing** [8311-25]
Y. Su, B. Zhang, H. Zhou, Z. Ye, PLA Univ. of Science and Technology (China); M. Wang, Unit 73041, PLA (China); Y. Li, PLA Univ. of Science and Technology (China)
- 8311 20 **Analysis of bandwidth-reduced local oscillator in Brillouin optical time domain reflectometry** [8311-63]
Y. Hao, Shanghai Institute of Optics and Fine Mechanics (China) and Zhengzhou Univ. of Light Industry (China); Q. Ye, Z. Pan, H. Cai, R. Qu, Shanghai Institute of Optics and Fine Mechanics (China)
- 8311 21 **All-solid birefringent hybrid photonic crystal fiber based interferometric sensor for measurement of strain and temperature** [8311-64]
B. Gu, Technical Univ. of Denmark (Denmark) and Zhejiang Univ. (China); W. Yuan, Technical Univ. of Denmark (Denmark); A. P. Zhang, Zhejiang Univ. (China); O. Bang, Technical Univ. of Denmark (Denmark)
- 8311 22 **A low-cost photonic biosensor built on a polymer platform** [8311-65]
L. Wang, Dalian Univ. of Technology (China) and Univ. Gent (Belgium); V. Kodeck, S. Van Vlierberghe, Univ. Gent (Belgium); J. Ren, J. Teng, X. Han, X. Jian, Dalian Univ. of Technology (China); R. Baets, G. Morthier, Univ. Gent (Belgium); M. Zhao, Dalian Univ. of Technology (China)
- 8311 24 **Study on the orientation of pigment in thylakoid based on polarization technique** [8311-67]
L. Lu, Nanjing Agricultural Univ. (China) and Nanjing Univ. of Science & Technology (China); C. Han, X. Ni, X. Luo, Nanjing Univ. of Science & Technology (China)
- 8311 25 **Novel technique and algorithm of signal interrogation in multi-channel fiber Bragg sensing system** [8311-68]
J. Bi, X. Zhang, Y. Wang, X. Xin, Q. Zhang, Y. Liu, Beijing Univ. of Posts and Telecommunications (China)
- 8311 26 **Temperature characteristics of high birefringence photonic crystal fiber filled with liquid** [8311-69]
T. Wu, L. Wang, Z. Wang, S. Hu, Beijing Univ. of Technology (China)
- 8311 27 **Experimental investigation on pulse light stimulated Brillouin scattering in the optical fiber** [8311-70]
X. Li, H. Gong, S. Li, J. Wang, China Jiliang Univ. (China)
- 8311 29 **FBG moisture sensor system using SOA-based fiber laser with temperature compensation** [8311-72]
L. Han, L. Wang, N. Fang, H. Cui, Z. Huang, Shanghai Univ. (China)
- 8311 2A **An optical fiber humidity sensor based on optical absorption** [8311-73]
B. Wang, Shanghai Univ. (China); F. Zhang, Shanghai Univ. (China) and Shandong Univ. (China); F. Pang, T. Wang, Shanghai Univ. (China)

- 8311 2B **Single-mode tapered optical fiber for temperature sensor based on multimode interference** [8311-74]
S. Zhu, F. Pang, T. Wang, Shanghai Univ. (China)
- 8311 2C **Linear birefringence and imperfect quarter wave plate effects on optic-fiber current sensor** [8311-75]
Y. Ding, Y. Dong, Shanghai Jiao Tong Univ. (China); J. Zhu, Jiangsu Junlong Power Technology Co., Ltd. (China); B. Zheng, D. Zhang, W. Hu, Shanghai Jiao Tong Univ. (China)
- 8311 2D **Wireless fiber laser sensor combining photonic generation beat frequency demodulation technology** [8311-76]
S. Liu, Heilongjiang Univ. (China) and Nanjing Univ. (China); R. Gu, Nanjing Univ. (China); X. Yu, Heilongjiang Univ. (China); Z. Yin, X. Chen, Nanjing Univ. (China)
- 8311 2E **Application research of distributed optical fiber temperature sensor in power system** [8311-77]
C. Hu, J. Wang, Z. Zhang, S. Jin, Y. Jin, China Jiliang Univ. (China)
- 8311 2F **DAQ application of PC oscilloscope for chaos fiber-optic fence system based on LabVIEW** [8311-78]
M. Lu, N. Fang, L. Wang, Z. Huang, X. Sun, Shanghai Univ. (China)
- 8311 2H **Twist sensor by using a pressure-induced birefringence single mode fiber based Sagnac Interferometer** [8311-80]
H. Liang, Y. Jin, Y. Zhao, J. Wang, China Jiliang Univ. (China)
- 8311 2I **Fabrication of fiber-optic EFPI with double-layer SU-8 diaphragm** [8311-81]
D. Ding, N. Chen, Q. Guo, Z. Chen, S. Liu, F. Pang, T. Wang, Shanghai Univ. (China)
- 8311 2J **Design and simulation of label-free biosensor based on the dynamic distributed feedback laser emission** [8311-82]
F. Gao, Xiamen Univ. (China); L. Chen, Xiamen Univ. (China) and Zhejiang Univ. (China); X. Wang, S. Li, Z. Cai, Xiamen Univ. (China)
- 8311 2K **Fiber Bragg grating dynamic demodulation based on non-equilibrium interferometry** [8311-83]
Q. Yu, Z. Jing, W. Peng, X. Zhang, Y. Liu, C. Xing, H. Li, W. Yao, Dalian Univ. of Technology (China)
- 8311 2L **Surface-enhanced Raman scattering spectra of tomato epidermis on gold/ silver sol active substrate** [8311-84]
W. Zhang, Z. Chen, N. Chen, L. Hu, H. Zhu, S. Liu, Q. Guo, Shanghai Univ. (China)
- 8311 2M **Hepatocellular carcinoma cells Raman spectra with gold and silver colloid as SERS substrate** [8311-85]
H. Zhu, S. Liu, L. Hu, W. Zhang, C. Qian, Z. Chen, N. Chen, Shanghai Univ. (China)

Author Index

Symposium Committees

Honorary General Chairs

Tingye Li, AT&T Laboratories (retired) (United States)
Bingkun Zhou, Tsinghua University (China)

General Chairs

Jian-Jun He, Zhejiang University (China)
Ken-ichi Kitayama, Osaka University (Japan)
Xingde Li, Johns Hopkins University (United States)

Technical Program Chairs

Perry Shum, Nanyang Technological University (Singapore)
Yikai Su, Shanghai Jiao Tong University (China)
Arthur Chiou, National Yang-Ming University (Taiwan, China)

Local Organizing Committee

Yunqi Liu, Shanghai University (China)
Ronghui Qu, Shanghai Institute of Optics and Fine Mechanics (China)
Tingyun Wang, Shanghai University (China)
Xiaobei Zhang, Shanghai University (China)

Steering Committee Chairs

Ming-Jun Li, Corning USA
John Zyskind, Oclaro, Inc.

Steering Committee Members

Sailing He, Zhejiang University (China)
Peter Kaiser, Telcordia Technologies (retired)
Connie Chang-Hasnain, University of California, Berkeley (United States)
Chongcheng Fan, Tsinghua University (China)
Mao Qian, WRI-Fiberhome (China)
Xiaomin Ren, Beijing University of Posts & Telecommunications (China)

Conference Committee

Conference Chair

Jürgen Popp, Institute of Physical Chemistry,
Friedrich-Schiller-Universität Jena (Germany) and Institut für
Photonische Technologien e.V. (Germany)

Conference Cochairs

Dennis L. Matthews, UC Davis Medical Center (United States)
Jie Tian, Institute of Automation (China)
Chih-Chung Yang, National Taiwan University (Taiwan, China)

Program Committee

Peter E. Andersen, Technical University of Denmark (Denmark)
Jing Bai, Tsinghua University (China)
Shanglian Bao, Peking University (China)
Feng Cao, Fourth Military Medical University (China)
Chen-Yuan Dong, National Taiwan University (Taiwan, China)
Feng Gao, Tianjin University (China)
Chau-Hwang Lee, Research Center for Applied Sciences (Taiwan, China)
Pengcheng Li, Britton Chance Center for Biomedical Photonics (China)
Jimin Liang, Xidian University (China)
Thomas G. Mayerhöfer, Institut für Photonische Technologien e.V. (Germany)
Malini C. Olivo, National University of Ireland, Galway (Ireland)
Francesco S. Pavone, Università degli Studi di Firenze (Italy)
Henricus J. C. M. Sterenborg, Erasmus MC (Netherlands)
Hwa-Yaw Tam, The Hong Kong Polytechnic University (Hong Kong, China)
Hugo Thienpont, Vrije Universiteit Brussel (Belgium)
Valery V. Tuchin, N.G. Chernyshevsky Saratov State University (Russian Federation)

Session Chairs

- 1 **Sensors I**
Valery V. Tuchin, N.G. Chernyshevsky Saratov State University (Russian Federation)

- 2 Best Student Paper Session
Jürgen Popp, Institute of Physical Chemistry,
Friedrich-Schiller-Universität Jena (Germany) and Institut für
Photonische Technologien e.V. (Germany)
- 3A Biophotonics I
Thomas G. Mayerhöfer, Institut für Photonische Technologien e.V.
(Germany)
Wolfgang Fritzsche, Institut für Photonische Technologien e.V.
(Germany)
- 3B Sensors II
Francis Berghmans, Vrije Universiteit Brussel (Belgium)
- 4 Biophotonics II
Jie Tian, Institute of Automation (China)
Shanglian Bao, Peking University (China)
- 5 Biophotonics III
Jimin Liang, Xidian University (China)
Ara Ghazaryan, National Taiwan University (Taiwan, China)
- 6 Biophotonics IV
Igor Meglinski, University of Otago (New Zealand)
Roberto Pini, Istituto di Fisica Applicata Nello Carrara (Italy)