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Biophotonics: Photonic Solutions for Better Health Care

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Wolfgang Drexler
Valery V. Tuchin
Dennis L. Matthews
Editors

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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

xi	Conference Committee
xiii	Introduction

KEYNOTE SESSION

6991 02	Coherent optical imaging and guided interventions in breast cancer: translating technology into clinical applications (Keynote Paper) [6991-01] S. A. Boppart, Univ. of Illinois at Urbana-Champaign (USA) and Mills Breast Cancer Institute (USA); F. T. Nguyen, A. M. Zysk, E. J. Chaney, Univ. of Illinois at Urbana-Champaign (USA); J. G. Kotynek, U. J. Oliphant, F. J. Bellafiore, K. M. Rowland, P. A. Johnson, Univ. of Illinois at Urbana-Champaign (USA) and Mills Breast Cancer Institute (USA)
---------	---

SESSION 1 ADVANCED SPECTROSCOPY AND MICROSCOPY I

6991 06	Raman microscopic imaging of cells and applications monitoring the uptake of drug delivery systems [6991-100] C. Matthäus, T. Chernenko, Northeastern Univ. (USA); L. Quintero, Univ. of Puerto Rico, Mayagüez (Puerto Rico); L. Milan, A. Kale, M. Amiji, V. Torchilin, M. Diem, Northeastern Univ. (USA)
6991 08	Infrared imaging for tumor detection using antibodies conjugated magnetic nanoparticles [6991-07] A. Levy, I. Gannot, Tel Aviv Univ. (Israel)

SESSION 2 ADVANCED SPECTROSCOPY AND MICROSCOPY II

6991 0A	A multitechnique study of bacteriorhodopsin's photonics toward new optical devices [6991-09] M. Martin, M. Saab, T. Cloitre, E. Estephan, R. Legros, Groupe d'Etude des Semi-conducteurs, CNRS, Univ. Montpellier II (France); F. J. G. Cuisinier, Univ. Montpellier I (France); L. Zimányi, Univ. Montpellier I (France) and Biological Research Ctr. (Hungary); C. Gergely, Groupe d'Etude des Semi-conducteurs, CNRS, Univ. Montpellier II (France)
6991 0E	Identification of active fluorescence stained bacteria by Raman spectroscopy [6991-13] M. Krause, B. Beyer, C. Pietsch, Univ. of Jena (Germany); B. Radt, Carl Zeiss AG (Germany); M. Harz, P. Rösch, Univ. of Jena (Germany); J. Popp, Univ. of Jena (Germany) and Institute for Photonic Technology (Germany)

SESSION 3 ADVANCED SPECTROSCOPY AND MICROSCOPY III

6991 0G	A pupil tracking system for adaptive optics retinal imaging [6991-14] B. Sahin, National Univ. of Ireland, Galway (Ireland) and Imagine Eyes (France); F. Harms, B. Lamory, L. Vabre, Imagine Eyes (France)
---------	---

- 6991 OH **Speckle interferometric system to measure ocular microtremor** [6991-15]
J. P. Ryle, Univ. College Dublin (Ireland); M. Al-Kalbani, N. Collins, St. James's Hospital (Ireland); U. Gopinathan, Univ. College Dublin (Ireland) and Univ. Stuttgart (Germany); G. Boyle, D. Coakley, St. James's Hospital (Ireland); J. T. Sheridan, Univ. College Dublin (Ireland)

SESSION 4 OPTICAL COHERENCE TOMOGRAPHY

- 6991 OK **Combining confocal microscopy and optical coherence tomography for imaging in developmental biology** [6991-18]
A. Bradu, L. Ma, J. Bloor, A. Podoleanu, Univ. of Kent (United Kingdom)
- 6991 OO **An optical coherence tomography investigation of materials defects in ceramic fixed partial dental prostheses** [6991-22]
C. Sinescu, M. Negritiu, Victor Babeş Univ. of Medicine and Pharmacy of Timișoara (Romania); M. Hughes, A. Bradu, Univ. of Kent (United Kingdom); C. Todea, M. Rominu, Victor Babeş Univ. of Medicine and Pharmacy of Timișoara (Romania); P. L. Laissue, A. Gh. Podoleanu, Univ. of Kent (United Kingdom)

SESSION 5 OPTICAL FIBERS, ASSAYS, AND SENSORS I

- 6991 OP **A novel nanophotonics biosensor concept for rapid molecular diagnostics** [6991-23]
D. J. W. Klunder, M. M. J. W. van Herpen, A. Kolesnychenko, E. Hornix, N. Kahya, R. de Boer, Philips Research Europe (Netherlands); H. Stapert, Philips Corporate Technologies (Netherlands)
- 6991 OQ **Self-calibrated dynamical optical biochip system using surface plasmon resonance imaging: application to genotyping** [6991-24]
J. Hottin, J. Moreau, J. Spadavecchia, A. Bellemain, Lab. Charles Fabry de l'Institut d'Optique, Univ. Paris-Sud, CNRS (France); L. Lecerf, M. Goossens, INSERM, Univ. Paris 12 (France); M. Canva, Lab. Charles Fabry de l'Institut d'Optique, Univ. Paris-Sud, CNRS (France)
- 6991 OR **Development of cell-based quantitative evaluation method for cell cycle-arrest type cancer drugs for apoptosis by high precision surface plasmon resonance sensor** [6991-25]
T. Ona, H. Nishijima, A. Kosaijira, Kyushu Univ. (Japan); J. Shibata, System Instruments Co., Ltd. (Japan)

SESSION 6 OPTICAL FIBERS, ASSAYS, AND SENSORS II

- 6991 OT **New optical analyzer for ¹³C-breath test** [6991-27]
H. Harde, M. Dressler, G. Helmrich, Helmut-Schmidt-Univ. (Germany); M. Wolff, H. Groninga, PAS-Tech Gasanalytik GmbH (Germany)
- 6991 OU **Quality limiting factors of imaging endoscopes based on optical fiber bundles** [6991-28]
N. Ortega-Quijano, J. L. Arce-Diego, F. Fanjul-Vélez, Univ. of Cantabria (Spain)

- 6991 0V **Fluorescence and absorbance measurements for chromatographic analysis using a miniaturized micro-optical detection unit** [6991-29]
S. Van Overmeire, H. Ottevaere, G. Desmet, H. Thienpont, Vrije Univ. Brussel (Belgium)

SESSION 7 ADVANCED SPECTROSCOPY AND MICROSCOPY IV

- 6991 0W **How to measure slow diffusion in yeast cell membranes (Invited Paper)** [6991-30]
J. Ries, Technische Univ. Dresden (Germany); C. Klose, MPI for Molecular Cell Biology and Genetics (Germany); C. Walch-Solimena, Max Planck Society (Germany); P. Schwille, Technische Univ. Dresden (Germany)
- 6991 0X **Confocal light scattering and absorption spectroscopic microscopy** [6991-31]
L. Qiu, E. Vitkin, S. Salahuddin, M. M. Zaman, C. Andersson, S. D. Freedman, E. B. Hanlon, I. Itzkan, L. T. Perelman, Harvard Univ. (USA)

SESSION 8 ADVANCED SPECTROSCOPY AND MICROSCOPY V

- 6991 10 **Determination of the integral refractive index of cells in suspension by digital holographic phase contrast microscopy** [6991-34]
S. Kosmeier, B. Kemper, P. Langehanenberg, I. Bredebusch, J. Schnekenburger, A. Bauwens, G. von Bally, Univ. Münster (Germany)
- 6991 11 **Non-invasive dry mass determination and monitoring at the single cell level with digital holographic microscopy** [6991-35]
B. Rappaz, Ecole Polytechnique Fédérale de Lausanne (Switzerland); E. Cano, Swiss Institute for Experimental Cancer Research (Switzerland); J. Kühn, T. Colomb, C. Depeursinge, P. J. Magistretti, Ecole Polytechnique Fédérale de Lausanne (Switzerland); P. Marquet, Ctr. de Neurosciences Psychiatriques, CHUV (Switzerland)
- 6991 12 **Biological samples observed with diffractive tomographic microscopy** [6991-36]
B. Simon, M. Debailleul, V. Georges, O. Haeberlé, Univ. of Haute-Alsace (France); V. Lauer, Lauer Microscopie (France)
- 6991 13 **Dynamically monitoring the gene expression of dual fluorophore in the cell cycle with quantitative spectrum analysis** [6991-37]
J.-Y. Lee, T.-Y. Wu, I.-J. Hsu, Chung Yuan Christian Univ. (Taiwan)
- 6991 14 **Contrast mechanisms and signal epidection in THG microscopy of scattering tissues** [6991-38]
N. Olivier, D. Débarre, E. Beaurepaire, Lab. for Optics and Biosciences, Ecole Polytechnique, CNRS INSERM (France)

SESSION 9 PHOTONIC THERAPIES

- 6991 17 **Predictive analysis of photodynamic therapy applied to esophagus cancer** [6991-41]
F. Fanjul-Vélez, M. del Campo-Gutiérrez, N. Ortega-Quijano, J. L. Arce-Diego, Univ. of Cantabria (Spain)

- 6991 18 **Optical Doppler tomography for monitoring vascularization during photodynamic therapy of skin cancer lesions** [6991-42]
J. Thomsen, Technical Univ. of Denmark (Denmark); N. Bendsøe, K. Svanberg, Lund Univ. Hospital (Sweden); S. Andersson-Engels, Lund Univ. (Sweden); T. M. Jørgensen, L. Thrane, H. E. Larsen, F. Pedersen, P. E. Andersen, Technical Univ. of Denmark (Denmark)
- 6991 19 **Potential of systemic photosensitizers for PDT of skin malignancies** [6991-43]
C. M. Philipp, U. Müller, P. Urban, H.-P. Berlien, Elisabeth Klinik (Germany)
- 6991 1A **Improved tumour response by laser light treatment** [6991-44]
G. Graszew, Max-Delbrueck-Ctr. for Molecular Medicine (Germany) and Charité - Univ. Medicine Berlin (Germany); J. Smith, Max-Delbrueck-Ctr. for Molecular Medicine (Germany); S. Rakowsky, T. A. Roelofs, P. M. Schlag, Max-Delbrueck-Ctr. for Molecular Medicine (Germany) and Charité - Univ. Medicine Berlin (Germany); U. Stein, Charité - Univ. Medicine Berlin (Germany) and Max-Delbrueck-Ctr. for Molecular Medicine (Germany)

POSTER SESSION

- 6991 1B **Improved design of a laser scanning system for food analysis applications** [6991-46]
W. Meulebroeck, Vrije Univ. Brussel (Belgium); P. Berghmans, Best n.v. (Belgium); H. Thienpont, Vrije Univ. Brussel (Belgium)
- 6991 1C **Quasi-simultaneous OCT/confocal imaging** [6991-47]
I. Trifanov, M. Hughes, Univ. of Kent (United Kingdom); R. B. Rosen, New York Eye and Ear Infirmary (USA); A. Podoleanu, Univ. of Kent (United Kingdom)
- 6991 1D **Pneumatic skin flattening (PSF): a new technology for more selective, safer and painless coupling of an intense treatment laser beam into the skin** [6991-48]
M. Slatkine, Inolase/Candela (Israel); E. F. Bernstein, Laser Surgery and Cosmetic Dermatology Ctrs. (USA); G. Lask, Univ. of California, Los Angeles (USA); D. J. Goldberg, Mount Sinai School of Medicine (USA); N. Fournier, CLDP (France); M. Ke, Case Western Reserve Univ. (USA); M. Elman, Beit Harofim (Israel)
- 6991 1E **Biophotonic applications of optical communication devices** [6991-49]
G. Keiser, National Taiwan Univ. of Science and Technology (Taiwan); F.-J. Kao, National Yang Ming Univ. (Taiwan)
- 6991 1F **Personal UV biodosimeter for healthy indoor tanning** [6991-50]
I. P. Terenetskaya, T. N. Orlova, Institute of Physics (Ukraine)
- 6991 1H **Mid-infrared pulsed laser lithotripsy using an Er:YAG laser and a difference frequency generation laser** [6991-52]
H. Hazama, S. Yamada, K. Ishii, K. Awazu, Osaka Univ. (Japan)

- 6991 1L **Implant bone interface investigated with a non-invasive method: optical coherence tomography** [6991-56]
C. Sinescu, Victor Babeş Univ. of Medicine and Pharmacy of Timișoara (Romania); M. Hughes, A. Bradu, Univ. of Kent (United Kingdom); M. Negruțiu, C. Todea, S. Antonie, Victor Babeş Univ. of Medicine and Pharmacy of Timișoara (Romania); P. L. Laissue, Univ. of Kent (United Kingdom); M. Rominu, Victor Babeş Univ. of Medicine and Pharmacy of Timișoara (Romania); A. Gh. Podoleanu, Univ. of Kent (United Kingdom)
- 6991 1M **Investigation of bracket bonding for orthodontic treatments using en-face optical coherence tomography** [6991-57]
C. Sinescu, M. L. Negruțiu, Victor Babeş Univ. of Medicine and Pharmacy of Timișoara (Romania); M. Hughes, A. Bradu, Univ. of Kent (United Kingdom); C. Todea, R. Rominu, D. Dodenciu, Victor Babeş Univ. of Medicine and Pharmacy of Timișoara (Romania); P. L. Laissue, A. Gh. Podoleanu, Univ. of Kent (United Kingdom)
- 6991 1N **Quantitative estimates of vascularity in a collagen-based cell scaffold containing basic fibroblast growth factor by non-invasive near-infrared spectroscopy for regenerative medicine** [6991-58]
T. Kushibiki, K. Awazu, Osaka Univ. (Japan)
- 6991 1T **Root canal filling evaluation using optical coherence tomography** [6991-65]
M. L. Negruțiu, C. Sinescu, Victor Babeş Univ. of Medicine and Pharmacy of Timișoara (Romania); M. Hughes, A. Bradu, Univ. of Kent (United Kingdom); C. Todea, C. I. Balabuc, L. M. Filip, Victor Babeş Univ. of Medicine and Pharmacy of Timișoara (Romania); A. Gh. Podoleanu, Univ. of Kent (United Kingdom)
- 6991 1U **Fibres reinforced dentures investigated with en-face optical coherence tomography** [6991-66]
M. L. Negruțiu, C. Sinescu, Victor Babeş Univ. of Medicine and Pharmacy of Timișoara (Romania); M. Hughes, A. Bradu, Univ. of Kent (United Kingdom); L. Goguta, M. Rominu, Victor Babeş Univ. of Medicine and Pharmacy of Timișoara (Romania); R. Negru, Politehnica Univ. Timișoara (Romania); A. Gh. Podoleanu, Univ. of Kent (United Kingdom)
- 6991 1V **Vanishing tattoo multi-sensor for biomedical diagnostics** [6991-67]
E. Moczko, I. Meglinski, S. Piletsky, Cranfield Univ. (United Kingdom)
- 6991 1Y **Optical characterization of porous silicon microcavities for glucose oxidase biosensing** [6991-71]
G. Palestino, GES, CNRS, Univ. Montpellier II (France) and Univ. Autónoma de San Luis Potosí (Mexico); V. Agarwal, D. B. Garcia, CIIICAP-UAEM (Mexico); R. Legros, GES, CNRS, Univ. Montpellier II (France); E. Pérez, Univ. Autónoma de San Luis Potosí (Mexico); C. Gergely, GES, CNRS, Univ. Montpellier II (France)
- 6991 1Z **Novel useful sun strategy to improve physical endurance** [6991-72]
R. N. Khramov, Institute of Theoretical and Experimental Biophysics (Russia) and Usefusun Oy (Finland); L. I. Fakhranurova, I. M. Santalova, N. B. Simonova, I. M. Vikhlyantsev, E. V. Karaduleva, Z. A. Podlubnaya, A. A. Manokhin, Institute of Theoretical and Experimental Biophysics (Russia); V. D. Kreslavski, Institute of Basic Biological Problems (Russia); D. I. Rzhnevsky, A. N. Murashev, Institute of Bioorganic Chemistry (Russia); V. A. Vorobiev, North-Caucasian State Technical Univ. (Russia) and Usefusun Oy (Finland)

- 6991 20 **Optical detection of PNA/DNA hybridization in resonant porous silicon-based devices** [6991-74]
L. Rotiroti, Institute for Microelectronics and Microsystems, CNR (Italy) and Federico II Univ. of Naples (Italy); P. Arcari, A. Lamberti, C. Sanges, Federico II Univ. of Naples (Italy); E. De Tommasi, Institute for Microelectronics and Microsystems, CNR (Italy); I. Rea, Institute for Microelectronics and Microsystems, CNR (Italy) and Federico II Univ. of Naples (Italy); I. Rendina, L. De Stefano, Institute for Microelectronics and Microsystems, CNR (Italy)
- 6991 21 **Specific peptide for functionalization of GaN** [6991-76]
E. Estephan, Groupe d'Etude des Semi-conducteurs, CNRS, Univ. Montpellier II (France); C. Larroque, Univ. Montpellier I (France); T. Cloitre, Groupe d'Etude des Semi-conducteurs, CNRS, Univ. Montpellier II (France); F. J. G. Cuisinier, Univ. Montpellier I (France); C. Gergely, Groupe d'Etude des Semi-conducteurs, CNRS, Univ. Montpellier II (France)
- 6991 22 **Development of a new autofluorescence probe for the analysis of normal and tumour brain tissues** [6991-77]
R. Siebert, M. H. Vu Thi, F. Jean, Lab. IMNC, Univ. Paris-Sud (France); Y. Charon, Lab. IMNC, Univ. Paris-Sud (France) and Univ. Paris 7 (France); M. Collado-Hilly, INSERM, Univ. Paris-Sud (France); M. A. Duval, Lab. IMNC, Univ. Paris-Sud (France) and Univ. d'Evry (France); T. Mandat, URA CEA (France); L. Menard, Lab. IMNC, Univ. Paris-Sud (France) and Univ. Paris 7 (France); S. Palfi, URA, CNRS, CEA (France); T. Tordjmann, INSERM, Univ. Paris-Sud (France)
- 6991 23 **Waveguide-excited fluorescence microarray** [6991-78]
G. Sagarzazu, M. Bedu, L. Martinelli, K.N. Ha, N. Pelletier, V. I. Safarov, Genewave (France); C. Weisbuch, T. Gacoin, Lab. de Physique de la Matière Condensée, Ecole Polytechnique, CNRS (France); H. Benisty, Lab. Charles Fabry, Institut d'Optique Graduate School, CNRS (France)
- 6991 25 **Positive changes in the myocardium of SHR rats induced by photon radiation** [6991-80]
I. M. Santalova, Institute of Theoretical and Biophysics (Russia); N. M. Zakharova, Institute of Cell Biophysics (Russia); R. N. Khramov, Institute of Theoretical and Biophysics (Russia); I. V. Kraev, Institute of Cell Biophysics (Russia); A. N. Murashev, Institute of Bioorganic Chemistry (Russia); A. S. Averin, Institute of Cell Biophysics (Russia); L. Frachranurova, Institute of Theoretical and Biophysics (Russia)
- 6991 26 **Comparative analysis of tissue structure via Mueller matrix characterization of liquid crystals** [6991-81]
F. Fanjul-Vélez, N. Ortega-Quijano, J. L. Arce-Diego, Univ. of Cantabria (Spain)
- 6991 27 **Comparative study of primary and secondary tumors from patients with laryngeal and oropharyngeal cancer, using transmission electron microscopy** [6991-82]
L. G. Ghetea, A.-M. Niculescu, R. M. Motoc, G. Mihaescu, Univ. of Bucharest (Romania); V.-F. Duma, Aurel Vlaicu Univ. (Romania); D. A. Manu, Ilfov County Hospital (Romania); L. Gavrila, Univ. of Bucharest (Romania)
- 6991 28 **Genetic characterization of some Romanian red wine grapevine varieties** [6991-83]
L. G. Ghetea, R. M. Motoc, A.-M. Niculescu, Univ. of Bucharest (Romania); S. C. Litescu, National Institute of Research and Development for Biological Sciences (Romania); V.-F. Duma, Aurel Vlaicu Univ. (Romania); C. F. Popescu, National Research Institute for Biotechnology (Romania)

- 6991 29 **Combined Monte Carlo and finite-difference time-domain modeling for biophotonic analysis** [6991-84]
Y. R. Hijazi, Eastern Mediterranean Univ. (Cyprus); C. Kortun, Univ. College London (United Kingdom); D. Arifler, Eastern Mediterranean Univ. (Cyprus)
- 6991 2A **Design of specific biochips for contrast enhancement of UV biological absorption** [6991-85]
K. Robin, J.-L. Reverchon, Thales Research and Technology (France); L. Mugherli, Lab. de Biochimie, Ecole Polytechnique, CNRS (France); H. Benisty, Lab. Charles Fabry de l'Institut d'Optique (France)
- 6991 2B **Photobiomodulation of early mouse embryo development** [6991-86]
T. A. Sviridova-Chailakhyan, L. I. Fakhranurova, N. B. Simonova, R. N. Khramov, Institute of Theoretical and Experimental Biophysics (Russia); A. A. Manokhin, Institute of Cell Biophysics (Russia); S. I. Paskevich, L. M. Chailakhyan, Institute of Theoretical and Experimental Biophysics (Russia)
- 6991 2C **Modeling of epithelia transport phenomena related with the acetowhitening optical changes: potential for the in vivo diagnosis of cervical neoplasia** [6991-87]
G. Papoutsoglou, A. Potirakis, Technical Univ. of Crete (Greece); C. Balas, Technical Univ. of Crete (Greece) and Forth-Photonics, UK & Greece (Greece)
- 6991 2D **FDTD simulation of optical phase contrast microscope imaging** [6991-88]
S. Tanev, Carleton Univ. (Canada); J. Pond, P. Paddon, Lumerical Solutions, Inc. (Canada); V. V. Tuchin, Saratov State Univ. (Russia) and Institute of Precise Mechanics and Control (Russia)
- 6991 2E **Synthesis and characterization of monodisperse Eu-doped luminescent silica nanospheres for biological applications** [6991-89]
F. Enrichi, R. Riccò, Civen/Nanofab (Italy); A. Parma, P. Riello, A. Benedetti, Civen/Nanofab (Italy) and Univ. Ca' Foscari Venezia and INSTM (Italy)
- 6991 2F **Optical properties of tissues after laser treatments in the wavelength range of 350–1000 nm** [6991-90]
K. Ishii, A. Kimura, K. Awazu, Osaka Univ. (Japan)
- 6991 2H **Imaging and interferometric analysis of protein crystal growth** [6991-92]
R. Raghunandan, Cochin Univ. of Science and Technology (India); A. S. Gupta, Indian Institute of Technology, Kanpur (India) and Uttar Pradesh Technical Univ., Lucknow (India); K. Muralidhar, Indian Institute of Technology, Kanpur (India)
- 6991 2I **Methods to increase efficiency of laser therapy of oncologic diseases: methods, equipment, experiment** [6991-93]
A. A. Mikov, V. N. Svirin, POLYUS Research & Development Institute, Federal State Unitary Enterprise (Russia)
- 6991 2J **The modern trends of the evolution laser information technology in oncology** [6991-94]
A. A. Mikov, V. N. Svirin, POLYUS Research & Development Institute, Federal State Unitary Enterprise (Russia)

- 6991 2K **Irradiation by pulsed Nd:YAG laser induces the production of extracellular matrix molecules by cells of the connective tissues: a tool for tissue repair** [6991-95]
M. Monici, V. Basile, F. Cialdai, G. Romano, F. Fusi, A. Conti, Univ. of Florence (Italy)
- 6991 2L **New technology of cerebral oxygenation measurements by time-resolved spectroscopy** [6991-96]
Yu. Chivel, B.I. Stepanov Institute of Physics (Belarus)
- 6991 2O **Wearable wireless photoplethysmography sensors** [6991-101]
J. Spigulis, R. Ertis, V. Nikiforovs, E. Kviesis-Kipge, Univ. of Latvia (Latvia)

Author Index

Conference Committee

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Keynote Session

Wolfgang Drexler, Cardiff University (United Kingdom)

- 1 Advanced Spectroscopy and Microscopy I
 Paul M. W. French, Imperial College London (United Kingdom)
- 2 Advanced Spectroscopy and Microscopy II
 Jürgen Popp, Friedrich-Schiller Universität Jena (Germany)
- 3 Advanced Spectroscopy and Microscopy III
 Dennis L. Matthews, University of California/Davis (USA)
- 4 Optical Coherence Tomography
 Stephen A. Bopp, University of Illinois at Urbana-Champaign (USA)

- 5 Optical Fibers, Assays, and Sensors I
 Hugo Thienpont, Vrije Universiteit Brussel (Belgium)
- 6 Optical Fibers, Assays, and Sensors II
 Arthur E. T. Chiou, National Yang-Ming University (Taiwan)
- 7 Advanced Spectroscopy and Microscopy IV
 Kishan Dholakia, University of St. Andrews (United Kingdom)
- 8 Advanced Spectroscopy and Microscopy V
 Olivier Haeberlé, Université de Haute Alsace (France)
- 9 Photonic Therapies
 Valery V. Tuchin, Saratov State University (Russia)

Introduction

Biophotonics is gaining a lot of attention in the international world of photonics. Dealing with the development of novel optical systems and solutions for medicine and the life sciences, biophotonics is a discipline and a market on the rise, both in the scientific and the economic sense. Market surveys anticipate a worldwide growth by 10 to 30 percent in the coming years. Photonic technologies will probably transform healthcare, just like they have revolutionized communications and data storage during the last 20 years.

Biophotonics sets the trend towards a personalized medicine—by improving diagnosis, therapy, and follow-up care. Its solutions for an efficient and affordable health care help counter the problems of exploding health care costs coming with ageing societies. Furthermore, biophotonics research aims at a deeper understanding of the processes within living cells, which is a prerequisite for the early recognition and targeted treatment of diseases.

But the challenges of this discipline are as big as its chances. Among them, the highly interdisciplinary character of biophotonics is probably the biggest issue. In practice, scientists and technology developers often lack knowledge about users' and patients' needs, just like many physicians and biologists only roughly know about the potential of optical technologies. However, the future scientific and economic success of biophotonics strongly depends on the ability of these experts to bridge this gap.

This has been a major focus of the conference “Biophotonics: Photonic Solutions for Better Health Care”. Not only the latest biophotonics research topics were presented and discussed, but emphasis was likewise put on the question of how to overcome the gap between such different disciplines as physics, chemistry, engineering, biology, and medicine which are all strongly related to biophotonics. The approach to invite papers from a variety of subdisciplines and to actually have experts from different fields talk to each other turned out to be very successful.

We believe the conference has contributed vital cooperation within the world of biophotonics, and has underlined the growing importance of biophotonics research for the future. We are anticipating further fruitful dialogues.

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Wolfgang Drexler
Valery V. Tuchin
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