Front Matter: Volume 7715
Biophotonics: Photonic Solutions for Better Health Care II

Jürgen Popp
Wolfgang Drexler
Valery V. Tuchin
Dennis L. Matthews
Editors

12–16 April 2010
Brussels, Belgium

Sponsored by
SPIE

Cosponsored By
B-PHOT—Brussels Photonics Team (Belgium) • Brussels-Capital Region (Belgium) • FWO—Fonds Wetenschappelijk Onderzoek (Belgium) • ICO—International Commission for Optics • Ville de Bruxelles (Belgium) • Laserlab Europe • WiTec (Germany)

Cooperating Organisations
CBO-BCO (Belgium) • EOS—European Optical Society (Germany) • IET—The Institution of Engineering and Technology (United Kingdom) • IOP—institute of Physics (United Kingdom) • Photonics4Life (Germany) • Photonics@be (Belgium) • Photonics 21 (Germany) • PromOptica (Belgium)

Published by
SPIE

Volume 7715


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:


ISSN 1605-7422
ISBN 9780819481887

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 © 2010, 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 1605-7422/10/$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

SPIEDigitalLibrary.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 10-12, 20-22, 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.
### SESSION 1  ADVANCED MICROSCOPIC METHODS

#### 7715 03  SIM and PALM: high-resolution microscopy methods and their consequences for cell biology [7715-02]
- G. Krampert, Carl Zeiss AG (Germany);
- I. Kleppe, T. Kalkbrenner, K. Weisshart, R. Wolleschensky, Carl Zeiss MicroImaging GmbH (Germany);
- M. Kempe, Carl Zeiss AG (Germany)

#### 7715 04  Influence of sample preparation and identification of subcellular structures in quantitative holographic phase contrast microscopy [7715-03]
- B. Kemper, L. Schmidt, S. Przibilla, C. Rommel, A. Vollmer, S. Ketelhut, J. Schnekenburger, G. von Bally, Westfälische Wilhelms-Univ. Münster (Germany)

#### 7715 05  Digital holography for second harmonic microscopy: application to 3D-tracking of nanoparticles [7715-04]
- E. Shaffer, C. Depeursinge, Ecole Polytechnique Fédérale de Lausanne (Switzerland)

#### 7715 06  High resolution surface plasmon microscopy for cell imaging [7715-05]
- F. Argoul, Lab. Joliot-Curie and Lab. de Physique, CNRS, Ecole Normale Supérieure de Lyon (France);
- K. Monier, Lab. Joliot-Curie, CNRS, Ecole Normale Supérieure de Lyon (France);
- T. Roland, Lab. Joliot-Curie and Lab. de Physique, CNRS, Ecole Normale Supérieure de Lyon (France);
- J. Elezgaray, Lab. de Microbiologie et Biochimie Appliquée, CNRS, Univ. Bordeaux 1 (France);
- L. Berguiga, Lab. Joliot-Curie, CNRS, Ecole Normale Supérieure de Lyon (France)

### SESSION 2  COHERENCE DOMAIN OPTICAL METHODS AND OPTICAL COHERENCE TOMOGRAPHY

#### 7715 09  Demonstration of PECVD SiC thermal delay lines for optical coherence tomography in the visible [7715-08]
- G. Pandraud, E. Margallo-Balbás, P. M. Sarro, Technische Univ. Delft (Netherlands)

#### 7715 0A  Study and suppression of motion artifacts in full-field optical coherence tomography [7715-09]
- D. Sacchet, J. Moreau, P. Georges, A. Dubois, Lab. Charles Fabry de l’Institut d’Optique, CNRS, Univ. Paris-Sud (France)

#### 7715 0B  High-power FDM laser for swept source-OCT at 1060 nm (Best Student Paper) [7715-10]
- S. Marschall, Technical Univ. of Denmark (Denmark);
- T. Klein, W. Wieser, B. Biedermann, Ludwig-Maximilians-Universität München (Germany);
- K. Hsu, Micron Optics, Inc. (United States);
- B. Sumpf, K.-H. Hasler, G. Erbert, Ferdinand-Braun-Institut für Höchstfrequenztechnik (Germany);
- O. B. Jensen, C. Pedersen, Technical Univ. of Denmark (Denmark);
- R. Huber, Ludwig-Maximilians-Universität München (Germany);
- P. E. Andersen, Technical Univ. of Denmark (Denmark)
### SESSION 3  OPTICAL TECHNOLOGIES FOR PROCESS ANALYTICS AND QUALITY CONTROL I

7715 0E  **Rejection of false saturation data in optical pulse-oximeter** [7715-13]
L. Scalise, P. Marchionni, V. Carnielli, Univ. Politecnica delle Marche (Italy)

7715 0G  **A non-contact optical procedure for precise measurement of respiration rate and flow** [7715-15]
L. Scalise, P. Marchionni, I. Ercoli, Univ. Politecnica delle Marche (Italy)

### SESSION 4  OPTICAL TECHNOLOGIES FOR PROCESS ANALYTICS AND QUALITY CONTROL II

7715 0I  **Two-wavelength spectral imaging-based Thai rice breed identification** [7715-17]
S. Sumriddetchkajorn, National Electronics and Computer Technology Ctr. (Thailand); K. Suwansukho, P. Buranasiri, King Mongkut's Institute of Technology Ladkrabang (Thailand)

### SESSION 5  OPTICAL TWEEZERS AND LASER CATAPULTING

7715 0K  **Speckle field as a multiple particle trap** [7715-19]
V. G. Shvedov, The Australian National Univ. (Australia) and Taurida National Univ. (Ukraine); A. V. Rode, The Australian National Univ. (Australia); Ya. V. Izdebskaya, The Australian National Univ. (Australia) and Taurida National Univ. (Ukraine); A. S. Desyatnikov, W. Krolkowski, Yu. S. Kivshar, The Australian National Univ. (Australia)

7715 0M  **Peculiarities of RBC aggregation studied by double trap optical tweezers** [7715-21]

### SESSION 6  NANO-OPTICAL TOOLS AND METHODS FOR BIOPHOTONICS AND BIOMEDICAL OPTICS I

7715 0O  **Green laser excited surface plasmon resonance biosensor utilizing highly sensitive phase interrogation detection** [7715-23]
H. Chen, National Yang-Ming Univ. (Taiwan) and Taipei City Hospital (Taiwan); W.-C. Hsu, Y.-J. Wang, National Yang-Ming Univ. (Taiwan); T.-J. Yen, National Tsing Hua Univ. (Taiwan)

7715 0P  **A cellular assay using metal-modified fluorescence lifetime analysis for high-content screening of protein internalization** [7715-24]
N. Cade, G. Fruhwirth, King's College London (United Kingdom); S. J. Archibald, The Univ. of Hull (United Kingdom); T. Ng, D. Richards, King's College London (United Kingdom)

7715 0Q  **Optimisation of fluorescent DNA labels for two-photon microscopy** [7715-25]
G. Metgé, Commissariat à l’Énergie Atomique (France) and Institut Curie, CNRS, Paris VI (France); C. Fiorini-Debuisschert, F. Charra, Commissariat à l’Énergie Atomique (France); G. Bordeau, E. Faurel, M. P. Teulade-Fichou, Institut Curie, CNRS, Paris VI (France)
Photothermolysis of tumor with gold nanoparticles guided by NIR and acoustic thermometries [7715-26]
M. A. Sirotkina, M. V. Shirmanova, M. L. Bugrova, L. B. Snopova, V. V. Elagin, Nizhny Novgorod State Medical Academy (Russian Federation); P. V. Subochev, V. A. Kamensky, A. D. Mansfel'd, Institute of Applied Physics (Russian Federation); V. A. Nadtochenko, Institute of Problems of Chemical Physics (Russian Federation); E. V. Zagainova, Nizhny Novgorod State Medical Academy (Russian Federation)

SESSION 7 NANO-OPTICAL TOOLS AND METHODS FOR BIOPHOTONICS AND BIOMEDICAL OPTICS II

In vitro and in vivo studies on laser-activated gold nanorods for applications in photothermal therapies (Invited Paper) [7715-27]
R. Pini, F. Ratto, P. Matteini, Istituto di Fisica Applicata Nello Carrara (Italy); S. Centi, Univ. degli Studi di Firenze (Italy); F. Rossi, Istituto di Fisica Applicata Nello Carrara (Italy)

High performance multichannel photonic biochip sensors for future point of care diagnostics: an overview on two EU-sponsored projects [7715-29]
D. Giannone, A. Kazmierczak, F. Dortu, Multitel A.S.B.L. (Belgium); L. Vivien, Institut d'Electronique Fondamentale, Univ. Paris-Sud XI (France); H. Sohlström, Royal Institute of Technology (Sweden)

Detection of MMP-8 via porous silicon microcavity devices functionalized with human antibodies [7715-30]
M. Martin, Groupe d'Etude des Semi-conducteurs, CNRS, Univ. Montpellier 2 (France); C. Taleb Bendiab, L. Massif, F. J. G. Cuisinier, Univ. Montpellier 1 (France); C. Gergely, Groupe d'Etude des Semi-conducteurs, CNRS, Univ. Montpellier 2 (France)

SESSION 8 SPECTROSCOPIC AND MICROSCOPIC METHODS I

Diffuse reflectance measurement tool for laparoscopic surgery [7715-34]
M. E. Giardini, A. B. Klemm, A. Di Falco, T. F. Krauss, Univ. of St. Andrews (United Kingdom)

Monitoring intra-cellular lipid metabolism in macrophages by Raman- and CARS-microscopy (Invited Paper) [7715-36]
C. Matthäus, G. Bergner, C. Krafft, B. Dietzek, IPHT Jena (Germany); S. Lorkowski, Friedrich-Schiller-Univ. Jena (Germany); J. Popp, IPHT Jena (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

SESSION 9 SPECTROSCOPIC AND MICROSCOPIC METHODS II

A microfluidic platform for chip-based DNA detection using SERS and silver colloids [7715-39]
K. K. Strelau, K. Weber, R. Möller, Friedrich-Schiller-Univ. Jena (Germany); W. Fritzschke, IPHT Jena (Germany); J. Popp, Friedrich-Schiller-Univ. Jena (Germany) and IPHT Jena (Germany)

Classification of human colonic tissues using FTIR spectra and advanced statistical techniques [7715-41]
A. Zwielly, Ben-Gurion Univ. of the Negev (Israel); S. Argov, Soroka Univ. Medical Ctr. (Israel); A. Salman, Sami Shamoon College (Israel); E. Bogomolny, S. Mordechai, Ben-Gurion Univ. of the Negev (Israel)
SESSION 10  SPECTROSCOPIC AND MICROSCOPIC METHODS III

**7715 1B** Morphological differences between normal and cancerous mammalian cells via multitechnique microscopic studies [7715-42]  
M. Saab, Groupe d’Etude des Semi-conducteurs, CNRS, Univ. Montpellier 2 (France); E. Estephan, Univ. Montpellier 1 (France); M. Martin, Groupe d’Etude des Semi-conducteurs, CNRS, Univ. Montpellier 2 (France); N. Bec, C. Larroque, Institut de Recherche en Cancérologie de Montpellier, Univ. Montpellier 1 (France); T. Cloître, Groupe d’Etude des Semi-conducteurs, CNRS, Univ. Montpellier 2 (France); F. Cuisinier, Univ. Montpellier 1 (France); C. Gergely, Groupe d’Etude des Semi-conducteurs, CNRS, Univ. Montpellier 2 (France)

**7715 1B** Automated ensemble segmentation of epithelial proliferation, necrosis, and fibrosis using scatter tumor imaging [7715-45]  
P. B. Garcia-Allende, O. M. Conde, Univ. de Cantabria (Spain); V. Krishnaswamy, Dartmouth College (United States); P. J. Hoopes, Dartmouth College (United States) and Dartmouth Medical School (United States); B. W. Pogue, Dartmouth College (United States); J. Mirapeix, J. M. Lopez-Higuera, Univ. de Cantabria (Spain)

SESSION 11  FIBER AND PHOTONIC CRYSTAL BIOMEDICAL TECHNOLOGIES

**7715 1C** Aptamer-based surface plasmon fibre sensor for thrombin detection [7715-46]  
T. Allsop, D. Nagel, Aston Univ. (United Kingdom); R. Neal, Univ. of Plymouth (United Kingdom); E. M. Davies, C. Mou, Aston Univ. (United Kingdom); P. Bond, Univ. of Plymouth (United Kingdom); S. Rehman, STR Fiber Technologies (United Kingdom); K. Kalli, Cyprus Univ. of Technology (Cyprus); D. J. Webb, Aston Univ. (United Kingdom); P. Calverhouse, Univ. of Plymouth (United Kingdom); M. Mascini, Univ. degli Studi di Firenze (Italy); I. Bennion, Aston Univ. (United Kingdom)

**7715 1D** OFSETH: optical technologies embedded in smart medical textile for continuous monitoring of respiratory motions under magnetic resonance imaging [7715-47]  
F. Narbonneau, Multitel A.S.B.L. (Belgium); J. De Jonckheere, M. Jeanne, Ctr. Hospitalier Regional Univ. de Lille (France); D. Kinet, Multitel A.S.B.L. (Belgium); J. Witt, K. Krebber, Bundesanstalt für Materialforschung und -prüfung (Germany); B. Paquet, CENTEXBEL (Belgium); A. Depré, Elasta NV (Belgium); L. T. D’Angelo, Technische Univ. München (Germany); T. Thiel, AOS GmbH (Germany); R. Logier, Ctr. Hospitalier Regional Univ. de Lille (France)

**7715 1E** DNA recognition by peptide nucleic acid-modified PCFs: from models to real samples [7715-48]  
S. Selleri, E. Coscelli, F. Poli, D. Passaro, A. Cucinotta, C. Lantano, R. Corradini, R. Marchelli, Univ. degli Studi di Parma (Italy)

**7715 1F** Laser two-photon polymerization micro- and nanostructuring over a large area on various substrates [7715-49]  
M. Malinauskas, V. Purlys, A. Žukauskas, G. Bičkauskaitė, T. Gertus, P. Danilevičius, D. Paipulas, M. Rutkauskas, H. Gilbergs, Vilnius Univ. (Lithuania); D. Baltrūkienė, Institute of Biochemistry (Lithuania); L. Bukeškinis, Vilnius Univ. (Lithuania); R. Širmenis, Vilnius Univ. Hospital (Lithuania); V. Bukeškienė, Institute of Biochemistry (Lithuania); R. Gadonas, Vilnius Univ. (Lithuania); V. Sirvydis, Vilnius Univ. Hospital (Lithuania); A. Piskarskas, Vilnius Univ. (Lithuania)
<table>
<thead>
<tr>
<th>Session</th>
<th>Topic</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>BIOCHIPS</td>
<td>Highly integrated biophotonics towards all-organic lab-on-chip systems</td>
<td>C. Vannahme, S. Klinkhammer, Karlsruhe Institute of Technology (Germany); F. Brinkmann, Karlsruhe Institute of Technology (Germany) and Westfälische Wilhelms-Univ. Münster (Germany); S. Lenhert, Karlsruhe Institute of Technology (Germany), Westfälische Wilhelms-Univ. Münster (Germany), and Florida State Univ. (United States); T. Großmann, U. Lemmer, T. Mappes, Karlsruhe Institute of Technology (Germany)</td>
</tr>
<tr>
<td>13</td>
<td>BLOOD OXYGENATION</td>
<td>Concentrations of hemoglobin fractions calculation using modified Lambert-Beer law and solving of an ill-posed system of equations</td>
<td>O. Abdallah, M. Natsheh, K. Abo Alam, Q. Qananwah, A. Al Nabulsi, A. Bolz, Karlsruhe Institute of Technology (Germany)</td>
</tr>
<tr>
<td>14</td>
<td>PDT</td>
<td>Autofluorescence of pigmented skin lesions using a pulsed UV laser with synchronized detection: clinical results</td>
<td>H. P. H. Cheng, Technical Univ. of Denmark (Denmark); P. Svenmarker, H. Xie, Lund Univ. (Sweden); P. Tidemand-Lichtenberg, O. B. Jensen, Technical Univ. of Denmark (Denmark); N. Bendsoe, K. Svanberg, Lund Univ. Hospital (Sweden); P. M. Petersen, C. Pedersen, Technical Univ. of Denmark (Denmark); S. Andersson-Engels, Lund Univ. (Sweden); P. E. Andersen, Technical Univ. of Denmark (Denmark)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assessment of photodynamic damage on Escherichia coli via atomic force microscopy</td>
<td>S. C. Núñez, Instituto de Pesquisa em Saúde (Brazil); M. Simões Ribeiro, Instituto de Pesquisas Energéticas e Nucleares (Brazil); A. Silva Garcez, São Leopoldo Mandic (Brazil); W. Miyakawa, Instituto de Estudos Avançados (Brazil)</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>Protoporphyrin IX for photodynamic therapy of brain tumours</td>
<td>A. Johansson, F. W. Kreth, A. Ardeshiri, Univ. Clinic Großhadern (Germany); W. Stummer, Univ. Clinic Münster (Germany); O. Schnell, J. Herms, G. Palte, W. Beyer, H. Stepp, Univ. Clinic Großhadern (Germany)</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>Photodynamic therapy on bladder cancer cells: further studies on the performance of Coimbra sensitizers</td>
<td>A. M. d’A. Rocha Gonsalves, A. C. Serra, M. Pineiro, M. F. Botelho, Univ. de Coimbra (Portugal)</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>Light attenuation in rat skin following low level laser therapy on burn healing process</td>
<td>D. F. Teixeira Silva, Univ. Nove de Julho (Brazil); M. Simões Ribeiro, Instituto de Pesquisas Energéticas e Nucleares (Brazil)</td>
</tr>
</tbody>
</table>
SESSION 15  ENVIRONMENTAL BIOPHOTONICS

7715 Q  Professional and household dosimeters for UV biologically active ranges of solar radiation on the basis of ZnSe semiconductor-metal nanostructures [7715-134]

SESSION 16  DENTAL BIOPHOTONICS

7715 R  Photodynamic therapy on bacterial reduction in dental caries: in vivo study [7715-60]
A. Baptista, R. Araujo Prates, I. T. Kato, M. M. Amaral, A. Zanardi de Freitas, M. Simões Ribeiro, Instituto de Pesquisas Energéticas e Nucleares (Brazil)

7715 S  Teeth material ablation by femtosecond laser [7715-61]
I. Ionita, Univ. of Bucharest (Romania); M. Zamfirescu, National Institute for Laser, Plasma and Radiation (Romania)

7715 T  Root canal filling evaluation using optical coherence tomography [7715-62]
M. L. Negruțiu, C. Sinescu, F. Topala, L. Nica, Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania); C. Ioniță, Univ. at Buffalo (United States); C. Marcauteanu, I. Goguța, Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania); A. Brădu, G. Dobre, Univ. of Kent (United Kingdom); M. Romanu, Univ. de Medicina si Farmacie Victor Babes, Timisoara (Romania); A. G. Podoleanu, Univ. of Kent (United Kingdom)

POSTER SESSION

7715 V  Biomolecular detection using a metal semiconductor field effect transistor [7715-31]
E. Estephan, Univ. Montpellier 1 (France); M. Saab, P. Buzatu, R. Aulombard, Groupe d’Etude des Semi-conducteurs, CNRS, Univ. Montpellier 2 (France); F. J. G. Cuisinier, Univ. Montpellier 1 (France); C. Gergely, T. Cloitre, Groupe d’Etude des Semi-conducteurs, CNRS, Univ. Montpellier 2 (France)

7715 W  Optical coherence tomography as approach for the minimal invasive localization of the germinal disc in ovo before chicken sexing [7715-64]
A. Burkhardt, S. Geißler, E. Koch, Technische Univ. Dresden (Germany)

7715 Y  Biconical tapered optical fiber biosensor for measuring refractive index of α-amino acids in aqueous D-glucose and sucrose solution [7715-67]
M. I. Zibaii, H. Latifi, M. Karami, M. Gholami, S. M. Hosseini, M. H. Ghezelayagh, Shahid Beheshti Univ. (Iran, Islamic Republic of)

7715 Z  Label free detection of DNA hybridization by refractive index tapered fiber biosensor [7715-68]
M. I. Zibaii, H. Latifi, E. Ghanati, M. Gholami, S. M. Hosseini, Shahid Beheshti Univ. (Iran, Islamic Republic of)
7715 20  **Phytoplankton as a fluorescent bioindicator of ecotoxictants in natural waters** [7715-69]
T. Gostev, F. Kouzminov, Lomonosov Moscow State Univ. (Russian Federation); M. Gorbunov, Rutgers, The State Univ. of New Jersey (United States); V. Fadeev, Lomonosov Moscow State Univ. (Russian Federation)

7715 21  **Fluorescent diagnostics of cyanobacteria** [7715-70]
F. I. Kouzminov, E. G. Maximov, Lomonosov Moscow State Univ. (Russian Federation); M. Y. Gorbunov, Rutgers, The State Univ. of New Jersey (United States); V. V. Fadeev, Lomonosov Moscow State Univ. (Russian Federation)

7715 23  **Real-time analysis of skin capillary-refill processes using blue LED** [7715-72]
E. Kviesis-Kipge, E. Curkste, J. Spigulis, Univ. of Latvia (Latvia); L. Elhvalde, Children's Univ. Clinical Hospital (Latvia)

7715 24  **Real time optical coherence tomography monitoring of *Candida albicans* biofilm in vitro during photodynamic treatment** [7715-73]
L. C. Suzuki, R. Araujo Prates, M. P. Raele, A. Zanardi di Freitas, M. Simões Ribeiro, Instituto de Pesquisas Energéticas e Nucleares, CNEN (Brazil)

7715 26  **Monitoring of the vessel capillary density spatial pattern in epithelium phantom model** [7715-75]
R. Kanawade, G. Saiko, A. Douplik, Friedrich-Alexander-Univers. Erlangen-Nürnberg (Germany)

7715 28  **Non-contact measurement of ocular microtremor using laser speckle** [7715-77]
E. Kenny, Trinity College Dublin (Ireland); D. Coakley, G. Boyle, St. James’s Hospital (Ireland)

7715 29  **Optical extraction of the helical pitch angle of amylopectin in starch** [7715-78]
S. Psilodimitrakopoulos, I. Amat-Roldan, P. Loza-Alvarez, Institut de Ciències Fotòniques (Spain); D. Artigas, Institut de Ciències Fotòniques (Spain) and Univ. Politècnica de Catalunya (Spain)

7715 2A  **Assessing structural characteristics of axons in cortical neurons using polarization sensitive SHG** [7715-79]
S. Psilodimitrakopoulos, Institut de Ciències Fotòniques (Spain); V. Petegnief, G. Soria, N. de Vera, Consejo Superior de Investigaciones Científicas (Spain); I. Amat-Roldan, Institut de Ciències Fotòniques (Spain); D. Artigas, Institut de Ciències Fotòniques (Spain) and Univ. Politècnica de Catalunya (Spain); A. M. Planas, Consejo Superior de Investigaciones Científicas (Spain); P. Loza-Alvarez, Institut de Ciències Fotòniques (Spain)

7715 2B  **Analysis of optical crosstalk in flexible imaging endoscopes based on multicore fibers** [7715-80]
N. Ortega-Quijano, F. Fanjul-Vélez, I. Salas-García, Ó. R. Hernández-Cubero, J. L. Arce-Diego, Univ. de Cantabria (Spain)

7715 2C  **Towards noninvasive method for the detection of pathological tissue variations by mapping different blood parameters** [7715-82]
O. Abdallah, Q. Qananwah, K. Abo Alam, A. Bolz, Karlsruhe Institute of Technology (Germany)
Fiber spectral domain optical coherence tomography for in vivo rat brain imaging [7715-85]
Y. Xie, T. Bonin, Univ. of Lübeck (Germany); S. Loeffler, Univ. Medical Ctr. Schleswig-Holstein (Germany); G. Huettemann, Univ. of Lübeck (Germany); V. Tronnier, Univ. Medical Ctr. Schleswig-Holstein (Germany); U. G. Hofmann, Univ. of Lübeck (Germany)

Micro-Raman spectroscopy of tissue samples for oral pathology follow-up monitoring [7715-89]
I. Delfino, Univ. degli Studi della Tuscia (Italy); C. Camerlingo, Istituto di Cibernetica, CNR (Italy); F. Zenone, Univ. degli Studi di Napoli Federico II (Italy); G. Perna, V. Capozzi, Univ. di Foggia (Italy); N. Cirillo, G. M. Gaeta, M. Lepore, Seconda Univ. degli Studi di Napoli (Italy)

High resolution single-mode-fiber-based sensor for intravascular detection of fluorescent molecular probes [7715-91]
R. N. Razansky, M. S. Mueller, A. Borisov, A. W. Koch, Technische Univ. München (Germany); F. A. Jaffer, Massachusetts General Hospital (United States) and Harvard Medical School (United States); V. Ntziachristos, Technische Univ. München (Germany)

Effect of light scattering superficial layer on the accuracy of flow velocity profiles measurements by Doppler optical coherence tomography [7715-92]
J. Lauri, Univ. of Oulu (Finland); A. V. Bykov, Univ. of Oulu (Finland) and Lomonosov Moscow State Univ. (Russian Federation); A. V. Priezzhev, Lomonosov Moscow State Univ. (Russian Federation); R. Myllylä, Univ. of Oulu (Finland)

Combining optical coherence tomography with fluorescence microscopy: a closer look into tissue [7715-93]
M. Gaertner, P. Cimalla, L. Knels, S. Meissner, E. Koch, Dresden Univ. of Technology (Germany)

3D topology and arrangement of proteins inside ceramide-rich domains [7715-94]
C. Imhäuser, Univ. of Applied Sciences and Arts Dortmund (Germany) and Univ. Duisburg-Essen (Germany); H. Gulbins, E. Gulbins, Univ. Duisburg-Essen (Germany); H.-G. Lipinski, Univ. of Applied Sciences and Arts Dortmund (Germany)

Comparison of spectral colorimetric measurements vs. color pictures in dermatology [7715-96]
P. Blain, F. Michel, V. Moreau, O. Vanhootegehem, Y. Renotte, S. Habraken, Univ. de Liège (Belgium)

Implantable reflectance pulse transit time blood pressure sensor with oximetry capability [7715-97]
J. Fiala, R. Gehlke, M. Theodor, P. Bingger, Albert-Ludwigs-Univ. Freiburg (Germany); K. Förster, C. Heilmann, F. Beyersdorf, Univ. Hospital Freiburg (Germany); H. Zapfe, A. Seifert, Albert-Ludwigs-Univ. Freiburg (Germany)

Photochemical predictive analysis of photodynamic therapy with non-homogeneous topical photosensitizer distribution in dermatological applications [7715-98]
I. Salas-Garcia, F. Fanjul-Vélez, N. Ortega-Quijano, Univ. de Cantabria (Spain); M. López-Escobar, Marqués de Valdecilla Univ. Hospital (Spain); J. L. Arce-Diego, Univ. de Cantabria (Spain)
Detection of colon and rectum cancers by terahertz techniques [7715-101]
F. Wahaia, Univ. do Porto (Portugal); G. Valusis, Institute of Semiconductor Physics (Lithuania); L. M. Bernardo, Univ. do Porto (Portugal); A. Oliveira, Lab. Anatomia Patológica (Portugal) and Hospital São Sebastião (Portugal); J. Macutkevic, I. Kasalynas, D. Seliuta, Institute of Semiconductor Physics (Lithuania)

Full-field optical coherence tomography at 800 nm and 1300 nm simultaneously [7715-102]
D. Sacchet, J. Moreau, P. Georges, A. Dubois, Lab. Charles Fabry de l'Institut d’Optique, CNRS, Univ. Paris-Sud (France)

Biomedical imaging by means of linear and non-linear Raman microspectroscopy [7715-104]
N. Vogler, Friedrich-Schiller-Univ. Jena (Germany) and IPHT Jena (Germany); T. Meyer, I. Latko, IPHT Jena (Germany); T. Bocklitz, Friedrich-Schiller-Univ. Jena (Germany); Ch. Krafft, IPHT Jena (Germany); V. Deckert, Friedrich-Schiller-Univ. Jena (Germany) and IPHT Jena (Germany); N. Bendsoe, K. Svanberg, Lund Univ. Hospital (Sweden); B. Dietzek, J. Popp, Friedrich-Schiller-Univ. Jena (Germany) and IPHT Jena (Germany)

Two channel microfluidic CARS for quantifying pure vibrational contrast of model analytes [7715-105]
B. Dietzek, IPHT Jena (Germany) and Friedrich-Schiller-Univ. Jena (Germany); G. Bergner, IPHT Jena (Germany) and Univ. Osnabrück (Germany); D. Akimov, D. Malsch, T. Henkel, IPHT Jena (Germany); S. Schlücker, Univ. Osnabrück (Germany); J. Popp, IPHT Jena (Germany) and Friedrich-Schiller-Univ. Jena (Germany)

Multi-spectral mapping of in vivo skin hemoglobin and melanin [7715-107]
D. Jakovels, J. Spigulis, I. Saknite, Univ. of Latvia (Latvia)

Biotissue structure investigation using ultra-short pulsed laser polarimetry [7715-108]
I. Ionita, O. Toma, Univ. of Bucharest (Romania)

Determination of local optical properties of the rat barrel cortex during neural activation: Monte-Carlo approach to light propagation [7715-109]
E. V. Migacheva, S. R. Chamot, O. Seydoux, Ecole Polytechnique Fédérale de Lausanne (Switzerland); B. Weber, Univ. Hospital Zürich (Switzerland); C. Depeursinge, Ecole Polytechnique Fédérale de Lausanne (Switzerland); P. Marquet, P. J. Magistretti, Ecole Polytechnique Fédérale de Lausanne (Switzerland) and Ctr. Hospitalier Univ. Vaudois (Switzerland)

Utilizing of anisotropic plasmonic arrays for analytics [7715-113]
D. Cialla, J. Petschulat, Friedrich-Schiller-Univ. Jena (Germany); U. Huebner, H. Schneidewind, M. Zeisberger, R. Mattheis, IPHT Jena (Germany); T. Pertsch, R. Moeller, Friedrich-Schiller-Univ. Jena (Germany); J. Popp, Friedrich-Schiller-Univ. Jena (Germany) and IPHT Jena (Germany)

Fabrication of regular patterned SERS arrays by electron beam lithography [7715-114]
U. Huebner, H. Schneidewind, IPHT Jena (Germany); D. Cialla, K. Weber, Friedrich-Schiller-Univ. Jena (Germany); M. Zeisberger, R. Mattheis, IPHT Jena (Germany); R. Moeller, Friedrich-Schiller-Univ. Jena (Germany); J. Popp, IPHT Jena (Germany) and Friedrich-Schiller-Univ. Jena (Germany)
Raman microscopy of individual living human embryonic stem cells [7715-115]
S. M. Novikov, J. Beermann, S. I. Bozhevolnyi, Univ. of Southern Denmark (Denmark);
L. M. Harkness, M. Kassem, Univ. Hospital of Odense (Denmark)

Easy characterization of SERS substrates of enzymatically produced silver nanoparticles and
their applications in the area of bioanalytics [7715-117]
K. K. Strelau, T. Schüler, R. Möller, Friedrich-Schiller-Univ. Jena (Germany); W. Fritzsche, IPHT
Jena (Germany); J. Popp, Friedrich-Schiller-Univ. Jena (Germany) and IPHT Jena (Germany)

Sedimentation of agglomerated nanoparticles under cell culture conditions studied by
image based analysis [7715-118]
D. Schippritt, Univ. of Applied Sciences Dortmund (Germany); M. Wiemann, Univ.
Duisburg-Essen (Germany) and IBE R&D GmbH (Germany); H.-G. Lipinski, Univ. of Applied
Sciences Dortmund (Germany)

Selective removal of carious dentin using a nanosecond pulsed laser with a wavelength of
6.02 µm [7715-120]
K. Ishii, M. Saiki, Osaka Univ. (Japan); K. Yasuo, K. Yamamoto, K. Yoshikawa, Osaka Dental
Univ. (Japan); K. Awazu, Osaka Univ. (Japan) and Univ. of Fukui (Japan)

ZnO and TiO2 particles: a study on nanosafety and photoprotection [7715-124]
A. Popov, Univ. of Oulu (Finland) and Lomonosov Moscow State Univ (Russian Federation);
X. Zhao, A. Zvyagin, Macquarie Univ. (Australia); J. Lademann, Charité Universitätsmedizin
Berlin (Germany); M. Roberts, W. Sanchez, The Univ. of Queensland (Australia); A. Priezzhev,
Lomonosov Moscow State Univ. (Russian Federation); R. Myllylä, Univ. of Oulu (Finland)

Exploring red blood cell membrane dynamics with digital holographic microscopy
[7715-126]
D. Boss, Ecole Polytechnique Fédérale de Lausanne (Switzerland); J. Kuehn, Ctr. Hospitalier
Univ. Vaudois (Switzerland); C. Depeursinge, Ecole Polytechnique Fédérale de Lausanne
(Switzerland); P. J. Magistretti, P. Marquet, Ecole Polytechnique Fédérale de Lausanne
(Switzerland) and Ctr. Hospitalier Univ. Vaudois (Switzerland)

Broadband radiometry for photodynamic therapy [7715-127]
M. S. Folgosi-Correa, J. P. Caly, G. E. C. Nogueira, Instituto de Pesquisas Energéticas e
Nucleares (Brazil)

Possibility of improvement of hemoglobin properties as biosensors’ detection element
[7715-131]
A. S. Martirosyan, H. R. Vardapetyan, Russian-Armenian (Slavonic) Univ. (Armenia);
S. G. Tiratsuyan, Yerevan State Univ. (Armenia); A. A. Hovhannisyan, Russian-Armenian
(Slavonic) Univ. (Armenia)

FT-IR microspectroscopy characterization of supports for enzyme immobilization in
biosensing applications [7715-133]
M. Portaccio, B. Della Ventura, Seconda Univ. degli Studi di Napoli (Italy); K. Gabrovskaa,
I. Marinov, T. Godjevargova, Burgas Prof. Assen Zlatarov Univ. (Bulgaria); D. G. Mita,
M. Lepore, Seconda Univ. degli Studi di Napoli (Italy)

Author Index
Conference Committee

Symposium Chairs
Francis Berghmans, Vrije Universiteit Brussel (Belgium)
Ronan Burgess, European Commission (Belgium)
Jürgen Popp, Institut für Photonische Technologien e.V. (Germany)
Peter Hartmann, SCHOTT AG (Germany)
Hugo Thienpont, Vrije Universiteit Brussel (Belgium)

Conference Chairs
Jürgen Popp, Institut für Photonische Technologien e.V. (Germany)
Wolfgang Drexler, Cardiff University (United Kingdom)
Valery V. Tuchin, Saratov State University (Russian Federation)
Dennis L. Matthews, University of California, Davis Medical Center
(United States)

Program Committee
Peter E. Andersen, Danmarks Tekniske Universitet (Denmark)
Arthur E. T. Chiou, National Yang-Ming University (Taiwan)
Paul Garside, University of Strathclyde (United Kingdom)
Markus Sauer, Universität Bielefeld (Germany)
Ernst H. K. Stelzer, European Molecular Biology Laboratory (Germany)
Hugo Thienpont, Vrije Universiteit Brussel (Belgium)
Siva Umapathy, Indian Institute of Science (India)
Gert von Bally, Westfälische Wilhelms-Universität Münster (Germany)
Brian C. Wilson, University of Toronto (Canada)

Session Chairs
1 Advanced Microscopic Methods
   Brett E. Bouma, Wellman Center for Photomedicine (United States)

2 Coherence Domain Optical Methods and Optical Coherence Tomography
   Thomas R. Huser, University of California, Davis Medical Center (United States)

3 Optical Technologies for Process Analytics and Quality Control I
   Maria Farsari, Foundation for Research and Technology-Hellas (Greece)
4 Optical Technologies for Process Analytics and Quality Control II
  Dennis L. Matthews, University of California, Davis Medical Center (United States)

5 Optical Tweezers and Laser Catapulting
  Dennis L. Matthews, University of California, Davis Medical Center (United States)

6 Nano-optical Tools and Methods for Biophotonics and Biomedical Optics I
  Roberto Pini, Istituto di Fisica Applicata Nello Carrara, CNR (Italy)

7 Nano-optical Tools and Methods for Biophotonics and Biomedical Optics II
  Ilko K. Ilev, U.S. Food and Drug Administration (United States)

8 Spectroscopic and Microscopic Methods I
  Lev T. Perelman, Harvard Medical School (United States)

9 Spectroscopic and Microscopic Methods II
  Stefan Andersson-Engels, Lund University (Sweden)

10 Spectroscopic and Microscopic Methods III
    Peter E. Andersen, Danmarks Tekniske Universitet (Denmark)

11 Fiber and Photonic Crystal Biomedical Technologies
    Iulian G. Ionita, University of Bucharest (Romania)

12 Biochips
    Stefano Selleri, Università degli Studi di Parma (Italy)

13 Blood Oxygenation
    Stefano Selleri, Università degli Studi di Parma (Italy)

14 PDT
    Ann Johansson, Ludwig-Maximilians-Universität München (Germany)

15 Environmental Biophotonics
    Hugo Thienpont, Vrije Universiteit Brussel (Belgium)

16 Dental Biophotonics
    Hugo Thienpont, Vrije Universiteit Brussel (Belgium)
Introduction

Biophotonics is a research area on the rise. Its goal is the development of new technologies and methods for medical diagnosis and therapy and for the analysis of cell processes, the understanding of which is an important prerequisite for both diagnosis, as well as therapy. Ultimately, biophotonics will not only help to increase well-being and the quality of life, but will also assist against exploding health-care costs due to our aging society.

Of utmost importance is the alignment of research and development in this field along the needs of the users, which are in many cases not, or at least not sufficient well-known. Therefore, the conference featured a special section called “Towards a Better Health Care: Unmet Medical Needs,” where renowned physicians from several medical fields like pathology, oncology, and infectious diseases explained their needs to the technology- and method-developers, an event which received much attention from a large audience.

The Biophotonics conference, in the framework of Photonics Europe, was the largest of the technical conferences consisting this year of 135 presentations, including five keynote lectures, which were supported by the European Network of Excellence for Biophotonics Photonics4Life. Thomas R. Huser, from UC Davis Medical Ctr. (USA), gave a presentation on imaging of HIV transfer between T cells by employing 4D live cell fluorescence microscopy and 3D structured illumination super-resolution microscopy. Brett Bouma, from the Wellman Ctr. for Photomedicine (USA), presented results of the imaging of structure and function of vasculature with frequency domain OCT. Ilko K. Ilev, from the U.S. Food and Drug Administration, presented a variety of novel multifunctional confocal imaging and sensing approaches employed in biophotonics and nanobiophotonics. Stefan Andersson-Engels, from Lund University (Sweden), detailed recent developments in his lab employing diffuse optical spectroscopy for biomedical diagnostics and treatment control, especially with regard to controlling the treatment of prostate cancer by PDT. Finally, Lev T. Perelman, from Harvard Medical School (USA), introduced in his presentation an endoscopic instrument employing polarized light scattering spectroscopy to detect early cancer in Barrett’s esophagus.

The other 130 papers touched the broad field of biophotonics including advanced microscopic and spectroscopic methods, biochips, OCT, optical tweezers and endoscopic methods, as well as PDT and dental biophotonics. By far, the most papers dealt with microscopic and spectroscopic methods followed by OCT and nano optical methods. Biophotonics also contributed substantially to the Hot Topics sessions, as two out of three opening lectures on Monday in this session featured revolutionary biomedical applications of light. These were given by the award-winning researchers Prof. Stefan Hell (Max-Planck-Institute of...
Biophysical Chemistry, Germany) and Prof. Kishan Dholakia (Univ. of St. Andrews, UK).

A majority of the presenters of the Biophotonics conference submitted manuscripts which can be found on the subsequent pages. We hope that these manuscripts will inspire and stimulate the reader to make her or his own contribution to this exciting and growing field.

Jürgen Popp
Wolfgang Drexler
Valery V. Tuchin
Dennis L. Matthews