Optical Biopsy VII

Robert R. Alfano
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# Contents

vii Conference Committee  
ix Introduction

## SESSION 1  FLUORESCENCE AND RAMAN DIAGNOSIS I

<table>
<thead>
<tr>
<th>Paper Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>7561 03</td>
<td>Visualization of epithelial morphology using autofluorescence microscopy under ultraviolet excitation [7561-02]</td>
<td>B. Lin, Univ. of California, Davis (United States); S. Urayama, R. M. G. Saroufeem, Univ. of California, Davis Medical Ctr. (United States); D. L. Matthews, Univ. of California, Davis (United States); S. G. Demos, Univ. of California, Davis (United States) and Lawrence Livermore National Lab. (United States)</td>
</tr>
<tr>
<td>7561 04</td>
<td>Advances in handheld spectral sensors and systems (Invited Paper) [7561-03]</td>
<td>J. M. Eichenholz, J. McCaffrey, Ocean Optics, Inc. (United States); J. Lane, Ocean Thin Films, Inc. (United States)</td>
</tr>
<tr>
<td>7561 07</td>
<td>UV extended supercontinuum source for time resolved and steady state spectroscopy for biological and chemical molecules [7561-06]</td>
<td>R. R. Alfano, V. Kartazaev, I. Zeylikovich, B. Das, The City College of New York (United States); D. Nolan, Corning Inc. (United States)</td>
</tr>
<tr>
<td>7561 09</td>
<td>Optical spectroscopy approach for the predictive assessment of kidney functional recovery following ischemic injury [7561-08]</td>
<td>R. N. Raman, Lawrence Livermore National Lab. (United States); C. D. Pivetti, Univ. of California, Davis Medical Ctr. (United States); A. M. Rubenchik, Lawrence Livermore National Lab. (United States); D. L. Matthews, Univ. of California, Davis (United States); C. Troppmann, Univ. of California, Davis Medical Ctr. (United States); S. G. Demos, Lawrence Livermore National Lab. (United States)</td>
</tr>
<tr>
<td>7561 0A</td>
<td>Rotational dynamics and polarization anisotropy of bound and unbound receptor-targeted contrast agents in cancerous and normal prostate tissues studied by time-resolved fluorescence spectroscopy [7561-09]</td>
<td>Y. Pu, W. B. Wang, The City College of New York (United States); S. Achilefu, Washington Univ. School of Medicine (United States); R. R. Alfano, The City College of New York (United States)</td>
</tr>
<tr>
<td>7561 0B</td>
<td>Stokes shift spectroscopy for breast cancer diagnosis [7561-11]</td>
<td>E. Jeyasingh, Jamal Mohamed College (India); A. Prakashrao, G. Singaravelu, Anna Univ. (India)</td>
</tr>
</tbody>
</table>

## SESSION 2  QUANTUM COHERENT EFFECTS IN BIOLOGY AND MEDICINE

<table>
<thead>
<tr>
<th>Paper Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>7561 0C</td>
<td>From Förster resonance energy transfer to coherent resonance energy transfer and back (Invited Paper) [7561-12]</td>
<td>R. M. Clegg, M. Sener, Govindjee, Univ. of Illinois at Urbana-Champaign (United States)</td>
</tr>
</tbody>
</table>
SESSION 3  FLUORESCENCE AND RAMAN DIAGNOSIS II

Telegrapher-based fluorescence-enhanced optical tomography in small volume
[7561-17]
R. Roy, The Univ. of Texas-Pan American (United States)

Polarized fluorescence study in human cervical tissue: change in autofluorescence through different excitation wavelengths [7561-19]
R. Singh, K. K. S. Tomar, M. Majumdar, P. Shukla, A. Pradhan, Indian Institute of Technology Kanpur (India); R. Gupta, S. Jain, C. Pantola, A. Agarwal, K. Pandey, Ganesh Shanker Vidyarthi Memorial Medical College (India)

SESSION 4  IMAGING DIAGNOSIS

Multimodality optical imaging combining optical coherence tomography (OCT) and fluorescence lifetime imaging (FLIM) for morphological and biochemical tissue characterization [7561-23]
S. Shrestha, J. Park, P. Pande, B. E. Applegate, J. A. Jo, Texas A&M Univ. (United States)

Multispectral imaging techniques observing the dynamic changes in the hemoglobin concentrations as diagnostic tool for diseased tissues [7561-24]
J. H. G. M. Klaessens, H. J. Noordmands, R. de Roode, Univ. Medical Ctr. Utrecht (Netherlands); R. M. Verdaasdonk, Free Univ. Medical Ctr. (Netherlands)

Tissue characterization by using narrow band imaging (Invited Paper) [7561-26]
K. Gono, Olympus Medical Systems Corp. (Japan)

Diffuse reflectance spectroscopy of pre- and post-treated oral submucous fibrosis: an in vivo study [7561-29]
S. Sivabalan, Anna Univ. Chennai (India); C. Ponranjini Vedeswari, S. Jayachandran, Tamilnadu Government Dental College and Hospital (United States); D. Koteeswaran, C. Pravda, Meenakshi Ammal Dental College and Hospital (United States); P. Aruna, S. Ganesan, Anna Univ. Chennai (India)

SESSION 5  BIOPHOTONIC APPROACH FOR DISEASE AND VIRUS DETECTION

Photonic approach to the selective inactivation of viruses with a near-infrared ultrashort pulsed laser (Invited Paper) [7561-32]
K. T. Tsen, Arizona State Univ. (United States); S.-W. D. Tsen, Washington Univ. School of Medicine (United States); Q. Fu, S. M. Lindsay, K. Kibler, B. Jacobs, Arizona State Univ. (United States); T. C. Wu, The Johns Hopkins Medical Institutions (United States); Z. Li, H. Yan, S. Cope, S. Vaiana, Arizona State Univ. (United States); J. G. Kiang, Uniformed Services Univ. of the Health Sciences (United States)

The importance of optical methods for non-invasive measurements in the skin care industry (Invited Paper) [7561-33]
G. N. Stamatas, Johnson & Johnson Consumer France (France)
Differentiation of normal and cancerous lung tissues by multiphoton imaging [7561-38]
C.-C. Wang, F.-C. Li, R.-J. Wu, V. A. Hovhannisyan, National Taiwan Univ. (Taiwan); W.-C. Lin, National Taiwan Univ. Hospital (Taiwan); S.-J. Lin, National Taiwan Univ. (Taiwan) and National Taiwan Univ. Hospital (Taiwan); P. T. C. So, Massachusetts Institute of Technology (United States); C.-Y. Dong, National Taiwan Univ. (Taiwan)

POSTER SESSION

Healing and evaluating guinea pig skin incision after surgical suture and laser tissue welding by using in vivo Raman spectroscopy [7561-40]
A. Alimova, V. Srimoju, R. Chakraverty, R. Muthukatili, R. R. Alfano, The City College of New York (United States)

Changes of collagen, elastin, and tryptophan contents in laser welded porcine aorta tissues studied using fluorescence spectroscopy [7561-41]
C.-H. Liu, W. B. Wang, V. Kartazaev, The City College of New York (United States); H. Savage, The New York Eye and Ear Infirmary (United States); R. R. Alfano, The City College of New York (United States)

Optical birefringence of aorta tissues [7561-42]
G. C. Tang, W. B. Wang, Y. Pu, R. R. Alfano, The City College of New York (United States)

Development of optical mammography based on analysis of time-resolved photon path distribution [7561-43]

Application of NIR fluorescent markers to quantify expression level of HER2 receptors in carcinomas in vivo [7561-50]
V. Chernomordik, M. Hassan, S. B. Lee, R. Zielinski, J. Capala, A. Gandjbakhche, National Institutes of Health (United States)
Conference Committee

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Urs Utzinger, The University of Arizona (United States)
Wubao B. Wang, The City College of New York (United States)
Webb W. Watt, Cornell University (United States)

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1 Fluorescence and Raman Diagnosis I
   Stavros G. Demos, Lawrence Livermore National Laboratory (United States)

2 Quantum Coherent Effects in Biology and Medicine
   Robert R. Alfano, The City College of New York (United States)
3  Fluorescence and Raman Diagnosis II
   Jason M. Eichenholz, Ocean Optics, Inc. (United States)

4  Imaging Diagnosis
   Wubao Wang, The City College of New York (United States)

5  Biophotonic Approach for Disease and Virus Detection
   Stavros G. Demos, Lawrence Livermore National Laboratory (United States)
Introduction

The conference Optical Biopsy VIII was held at the BiOS in SPIE Photonics West in San Francisco under the “Biomedical Spectroscopy, Microscopy and Imaging” and “Clinical Technologies and Systems” tracks on January 25–28, 2010. The optical biopsy field has grown tremendously in terms of researchers involved, manuscripts, and patents published, but most importantly, in terms of the recognition and acceptance of its potential by the medical community and medical devices manufacturers. At the same time, progress in basic research resulted in new ways or improvements in already developed methods that will make the in vivo optical pathology techniques more relevant for translation to a clinical setting and more attractive from a business point of view. These exciting developments will help further grow this field. The effort and level of funding are expected to grow as more interested parties (namely the industrial and the venture capital communities) are expected to participate and be part of the development of the next generation medical devices. These new devices are expected to be based on light-related technologies since light can offer the desired spatial resolution, while the spectral domain can offer the noninvasive in situ diagnostic information. The optical biopsy is and will remain at the core of these biomedical developments.

The conference on Optical Biopsy VIII was well attended by scientists from around the world. The conference consisted of five oral sessions and one poster session for a total of 44 papers presented. Among them, there are 12 invited talks, 26 oral, and 6 poster presentations. The papers presented encompassed several different spectral and imaging technologies: fluorescence and Raman diagnosis; quantum coherent effects in biology and medicine; tissue native emission and contrast agents imaging diagnosis; and biophotonic approaches for disease and virus detections. The invited talks on coherence in biology drew a large audience and interest, and may represent a growth area that has been overlooked in the past. The oral presentations on Stokes Shift Spectroscopy for cancer diagnosis and the UV supercontinuum used for ideal excitation source for native fluorescence spectroscopy may have been potential part of the most innovative presentations.

One could recognize that a large percentage of the attendees were from the industrial community. The invited talks by key leaders in the industrial community highlighted that they are now actively involved or carefully watching the rapid development of optical biopsy technologies. We expect this trend to continue especially as the world’s economies emerge from the current downturn. Another trend observed during the years is the translation of research from the optical bench in the early years toward the bedside. A large number of the papers presented were dealing with the imaging of tissue at the microscopy level, demonstrating that optical techniques can capture cellular morphology and
organization in a manner similar to that provided by the current gold standard pathology based on extracting and staining tissue specimens. A number of talks focused on the use of spectroscopy to obtain information in real time including cancer detection, underlying conditions to skin appearance, and response to ischemia. We expect in the next conference to see more papers dealing with in vivo applications.

The attendees appreciated the talks from all of the invited speakers; in particular, the talks from pioneers and outstanding scientists: Professors Govindjee, Fleming, Matthews, and Lewis, and the corporate managers from GE-Siavash Yazdanfar, Olympus-Kazuhiro Gono, J&J-Georgios Stamatas, and Ocean Optics-Jason Eichenholz, for their efforts for the review talks.

We wish to thank Dr. Rob Randleman of Ocean Optics for support, and the session chairs and SPIE staff for their help in making this a successful conference.

Robert R. Alfano
Stavros G. Demos
Wubao B. Wang