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Clinical and Biomedical Spectroscopy and Imaging IV

J. Quincy Brown

Volker Deckert

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- ECBO Post-Deadline Session
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Introduction

These proceedings are from Clinical and Biomedical Spectroscopy and Imaging IV, held June 22-24, 2015 at the European Conferences on Biomedical Optics in Munich, Germany. This year's conference comprised 45 oral and 42 poster presentations from leading international research groups.

The conference was organized into five tracks and ten sessions including: Biospectroscopy and POC Diagnostics; Clinical and Preclinical Diagnostics I and II; Clinical and Preclinical Tissue Characterization I and II; Minimally Invasive Diagnostics / Laboratory Medicine I and II; and Novel Techniques in Diagnosis, Therapy, and Monitoring. A poster session and corresponding poster preview session were also held.

The Biospectroscopy and POC Diagnostics session contained six oral presentations, on topics ranging from label-free Raman analysis of microorganisms to fluorescence-based rapid porphyria diagnostic tests and multi-spectral surface plasmon resonance sensing.

The Clinical and Preclinical Diagnostics track covered two sessions containing 10 oral presentations. Reports included a number of *ex vivo* and *in vivo* clinical applications, including the use of targeted fluorescence guidance in gastrointestinal endoscopy, fluorescence lifetime imaging of corneal metabolism, rapid near-patient fluorescence microscopy of prostate biopsies, tracking of lipids and invasomes in stratum corneum using TERS, noninvasive detection of hypercholesterolemia using hyperspectral skin imaging, comprehensive analysis of *in vivo* skin optical properties and vascular parameters using diffuse reflectance spectroscopy, deep skin optical property extraction using diffuse reflectance spectroscopy, improved precancer diagnosis using fusion of autofluorescence and diffuse reflectance spectroscopy, the use of diffuse optics to probe the bone marrow for oncological management, and characterization of the thyroid using diffuse optics.

The Clinical and Preclinical Tissue Characterization track also covered two sessions with 11 oral presentations, and included reports on tissue diagnostics using a combined Raman and fluorescence fiber probe, early diagnosis of tongue malignancies using fluorescence spectroscopy, a fluorescent replacement for traditional H&E histopathology, characterization of colitis using autofluorescence spectroscopy, analysis of length-scale variations on light scattering patterns of cells, the use of NIRS to monitor tumor microwave ablation, clinical results on the use of Raman spectroscopy to discriminate inflammatory bowel diseases, the use of structured illumination microscopy to image entire prostate surgical margins, an analysis of the effect of realistic fiber probe interfaces on Monte-Carlo simulated diffuse reflectance, fiber optic thermotherapy for liver tumors, and the effects of

pressure on tissue optical properties measured by single-fiber reflectance spectroscopy.

The Minimally Invasive Diagnostics/Laboratory Medicine track covered two sessions with 12 oral presentations. Topics included lab-on-a-chip SERS for levofloxacin detection in body fluid, SERS for detection of harmful environmental substances, Raman spectroscopy of biogenic gases in hollow-core fibers, Raman spectroscopic temporal monitoring of the quality of stored whole donated blood, a novel method to create a universal calibration data set for Raman reconstruction based on Wiener estimation, detection of propofol in blood by Raman spectroscopy, intracellular pH sensing in cells using genetically encoded ratiometric sensors, measurement of aqueous glucose using differential absorption frequency domain OCT, real time medical diagnostics using hyperspectral imaging, spectroscopic characterization of an ultra-broadband tunable quantum cascade laser, spectroscopic imaging of blood glucose in superficial skin vessels, and a battery operated ATR Fourier spectrometer for *in situ* glucose monitoring.

The Novel Techniques in Diagnosis, Therapy, and Monitoring contained six oral presentations on 3D imaging of apoptosis using light sheet microscopy, reflectance property analysis of RF-fused bowel tissues, analysis of yeast cells using light scattering microscopy, the use of light scattering microscopy for probing apoptosis and tumor cell recognition, the use of 5-ALA for see-and-treat in Barrett's esophagus cellular models, and the use of gold nanorods to track cell death during plasmonic photothermal therapy.

The conference chairs very gratefully acknowledge the members of the programme committee for their work in peer reviewing and scoring the three-page summaries submitted to the conference. In addition, we are grateful to SPIE staff for their help and support during the organization of the conference. Finally, we would like to thank all of the conference attendees and authors for contributing to this year's successful conference.

J. Quincy Brown
Volker Deckert