

# Program

## **Advances in Optics for Biotechnology, Medicine and Surgery XI *Clinical Challenges and Research Solutions***

**June 28 - July 2, 2009  
Burlington, Vermont, USA**

Conference Co-chairs:

**Stephen A. Boppart**

University of Illinois at Urbana-Champaign, USA

**Jeremy C. Hebden**

University College London, UK

**Laura Marcu**

University of California, Davis, USA



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## **Sunday, June 28, 2009**

16:00 – 18:00 Conference check-in

18:00 – 19:30 Dinner

### **Special Session A: International Perspectives on Optical Biomedicine**

Session Chairs: Paul French, Imperial College London, UK  
Brett Bouma, Lawrence Livermore National Laboratory, USA

19:30 – 20:05 **INTERNATIONAL PERSPECTIVES ON OPTICAL BIOMEDICINE**  
Brett Bouma, Lawrence Livermore National Laboratory, USA

20:05 – 20:40 **A NEW TOOL FOR TELEMEDICINE: LENS-FREE ON-CHIP IMAGING FOR HIGH THROUGHPUT CYTOMETRY AND POINT-OF-CARE DIAGNOSTICS**  
Aydogan Ozcan, UCLA, USA

20:40 – 21:15 **BIOPHOTONICS: AN INNOVATIVE AND PROMISING APPROACH FOR NON- AND MINIMAL INVASIVE BIOMEDICAL DIAGNOSIS**  
Juergen Popp, Friedrich Schiller University Jena, Germany

21:15 – 21:50 **DIAGNOSTICS AND TREATMENT OF TUMORS USING LASER TECHNIQUES**  
Katarina Svanberg, Lund University Hospital, Sweden

21:50 – 22:50 Social hour

### **Notes and Room Locations**

- Technical sessions will be in the Emerald Ballroom
- Poster sessions will be in the Lake Champlain Exhibition Hall
- Audiotaping, videotaping and photography of presentations are strictly prohibited.
- Speakers – Please leave at least 5 minutes for questions and discussion.
- Please do not smoke at any conference functions.
- Turn your cellular telephones to vibrate or off during technical sessions.
- Be sure to make any corrections to your name/contact information on the Master Participant List or confirm that the listing is correct. A corrected electronic copy will be sent to all participants after the conference.

**Monday, June 29, 2009**

07:00 – 08:00 Breakfast

**Session I: The Oscopyies**

Session Chair: Brian Wilson, Ontario Cancer Institute/University of Toronto, Canada

08:00 – 08:35 **THE OCSOPIES: SEEING FROM WITHIN**

Brian Wilson, Ontario Cancer Institute/University of Toronto, Canada

08:35 – 09:10 **RECENT DEVELOPMENT OF MULTI-FUNCTIONAL ENDOSCOPIC IMAGING SYSTEM**

Kazuhiro Gono, Olympus Medical Systems Corp., Japan

09:10 – 09:45 **WIDE-FIELD LASER-BASED IMAGING USING SCANNING SINGLE FIBER ENDOSCOPY**

Eric Seibel, University of Michigan, USA

09:45 – 10:20 **CLINICAL AND RESEARCH APPLICATIONS OF ANATOMICAL OPTICAL COHERENCE TOMOGRAPHY IN THE HUMAN AIRWAY**

David Sampson, University of Western Australia

10:20 – 10:55 **CLINICAL APPLICATIONS OF HYPERICIN FLUORESCENCE ENDOSCOPIC IMAGING FOR THE DIAGNOSIS OF HUMAN BLADDER AND ORAL CANCERS**

Malini Olivo, Singapore National Cancer Centre, National University of Singapore

10:55 – 11:15 Coffee break

**Session II: In Vivo Imaging and Animal Models for Optical Imaging**

Session Chair: Elizabeth Hillman, Columbia University, USA

11:15 – 11:50 **IN VIVO NONLINEAR SPECTRAL IMAGING OF MOUSE SKIN TISSUES**

Hans Gerritsen, Utrecht University, The Netherlands

11:50 – 12:25 **IN VIVO OPTICAL IMAGING OF ANIMAL DISEASE MODELS: FROM MICRO TO MACRO**

Elizabeth Hillman, Columbia University, USA

12:25 – 13:00 **FLUORESCENCE-BASED IN-VIVO IMAGING: NOT QUITE WYSIWYG**

Richard Levenson, Cambridge Research and Instrumentation (CRI), USA

13:00 – 13:35 **IN VIVO OPTICAL IMAGING OF CERENKOV RADIATION FROM BETA-EMITTING RADIONUCLIDES**

Simon Cherry, University of California, Davis, USA

13:35 – 14:50 Lunch

14:50 – 17:30 *Ad hoc* sessions / free time

17:30 – 19:00 Dinner

**Session III: Clinical optical imaging and diagnostics**

Session Chair: Brian Pogue, Dartmouth University, USA

19:00 – 19:35 **INTRODUCTION TO CLINICAL OPTICS**

Brian Pogue, Dartmouth University, USA

**Monday, June 29, 2009 (continued)**

- 19:35 – 20:10      **CONFOCAL MICROSCOPY OF SKIN CANCERS: TRANSLATIONAL ADVANCES TOWARD CLINICAL UTILITY**  
Alon Scope, Memorial Sloan-Kettering Cancer Center, New York, USA
- 20:10 – 20:45      **FLUORESCENCE GUIDED SENTINAL LYMPH NODE RESECTION - PHASE 1 TRIAL SUMMARY**  
Summer Gibbs-Strauss, Harvard University, USA
- 20:45 – 21:20      **MONITORING NEOADJUVANT CHEMOTHERAPY WITH OPTICS**  
Peter Kaufman, Dartmouth University, USA
- 21:20 – 21:55      **PATHOLOGIC VALIDATION OF EXPERIMENTAL IMAGING SYSTEMS**  
Wendy A. Wells, Dartmouth University, USA
- 21:55 – 22:55      Social hour

**Tuesday, June 30, 2009**

07:00 – 08:00 Breakfast

**Session IV: Nanobiophotonics and Molecular Probes**

Session Chair: Samuel Achilefu, Washington University, USA

08:00 – 08:35 **NANOPARTICLES AND NANOMOLECULES IN TUMOR IMAGING**

Samuel Achilefu, Washington University, USA

08:35 – 09:10 **DEVELOPMENT OF NOVEL FLUORESCENCE PROBES BASED ON RATIONAL DESIGN STRATEGIES FOR VISUALIZING CELLULAR RESPONSES AND TARGETED TUMOR IMAGING**

Yasuteru Urano, University of Tokyo, Japan

09:10 – 09:45 **IMAGING OF MOLECULAR ASSEMBLIES FOR MOLECULAR DETECTION**

Konstantin Sokolov, University of Texas-Austin, USA

09:45 – 10:20 **DEVELOPING AND IMAGING MOLECULAR PROBES FOR GI CANCERS**

Chris Contag, Stanford University School of Medicine, USA

10:20 – 10:55 **INSTRUMENTATION DEVELOPMENT FOR CLINICAL IMAGING OF FLUORESCENT PROBES**

John Rasmussen, University of Texas-Houston, USA

10:55 – 11:15 Coffee break

11:15 – 13:00 **Session V: Oral presentations of selected posters**

Session Chair: Jeremy Hebden, University College London, UK

11:15 – 11:30 **HIGH-SPEED IMAGING OF CELLULAR DYNAMICS USING QUANTITATIVE PHASE MICROSCOPY**

Matthew Rinehart, Duke University, USA

11:30 – 11:45 **MULTI-PARAMETRIC OPTICAL IMAGING OF BREAST TUMOR USING INTEGRATED OPTICAL COHERENCE TOMOGRAPHY (OCT) AND FLUORESCENCE MOLECULAR IMAGING (FMI)**

Shuai Yuan, University of Maryland, USA

11:45 – 12:00 **REAL-TIME PHOTOACOUSTIC AND ULTRASOUND IMAGING OF HUMAN VASCULATURE**

Roy G.M. Kolkman, University of Twente, The Netherlands

12:00 – 12:15 **SIMULTANEOUS IMAGING OF OXYGEN CONCENTRATION AND BLOOD FLOW IN-VIVO DURING STROKE USING A DIGITAL MICROMIRROR DEVICE**

Adrien Ponticorvo, University of Texas at Austin, USA

12:15 – 12:30 **NON-INVASIVE EVALUATION OF ORGAN FUNCTION USING DYNAMIC CONTRAST ENHANCED MOLECULAR IMAGING**

Cyrus Amoozegar, Columbia University, USA

12:30 – 12:45 **MAGNETO-OPTIC PROBES FOR OXYGEN MONITORING OF TUMORS**

Pascal Gallant, INO, Quebec, Canada

**Tuesday, June 30, 2009 (continued)**

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|---------------|--|
| 12:45 – 13:00 | <b>SMALL MOLECULE LABELS FOR ULTRA-SENSITIVE IMAGING OF LIPID DROPLETS IN LIVING MONOCYTES</b><br>Tyler Weeks, University of California Davis, USA |
| 13:00 – 14:15 | Lunch  |
| 14:15 – 18:00 | <i>Ad hoc</i> sessions / free time   |
| 18:00 – 19:30 | Dinner   |
| 19:30 – 22:30 | <b>Poster session</b> and social hour  |



**Wednesday, July 1, 2009**

07:00 – 08:00 Breakfast

**Session VI: Optics for Systems Biology**

Session Chair: Irene Georgakoudi, Tufts University, USA

08:00 – 08:35 **SPECTROSCOPY AND IMAGING APPLICATIONS IN SYSTEMS BIOLOGY**  
Irene Georgakoudi, Tufts University, USA

08:35 – 09:10 **NANOSCALE IMAGING AND SENSING FOR PROTEOMICS**  
Adam Wax, Duke University, USA

09:10 – 09:45 **SERS MICROSCOPY: NANOPARTICLE PROBES AND BIOMEDICAL APPLICATIONS**  
Sebastian Schluecker, University of Wurzburg, Germany

09:45 – 10:20 **NONLINEAR OPTICAL MICROSCOPY OF MULTI-COLOR EXCITATIONS FROM ULTRAFAST SUPERCONTINUUM GENERATION: IN VIVO IMAGING OF LIVING CELLS AND TISSUES**  
Jianan Qu, Hong Kong University

10:20 – 10:55 **RESOLVING CELLULAR STRUCTURES WITH SUPER-RESOLUTION FLUORESCENCE MICROSCOPY**  
Bo Huang, Howard Hughes Medical Institute, Harvard University, USA

10:55 – 11:15 Coffee break

**Session VII: Spectroscopy**

Session Chair: Rohit Bhargava, University of Illinois at Urbana-Champaign, USA

11:15 – 11:50 **SPECTROSCOPY FOR MEDICAL USE: AN INTEGRATIVE PARADIGM**  
Rohit Bhargava, University of Illinois at Urbana-Champaign, USA

11:50 – 12:25 **A MULTIDISCIPLINARY APPROACH TO UNDERSTANDING DEVELOPMENT, FUNCTION AND DISEASES OF MUSCULOSKELETAL TISSUE**  
Michael Morris, Department of Chemistry, University of Michigan, USA

12:25 – 13:00 **WATCHING INDIVIDUAL IMMUNE CELLS ACTIVATE USING ELASTIC AND INELASTIC SCATTERING MICROSCOPY**  
Andrew Berger, University of Rochester, USA

13:00 – 13:35 **TBA**  
Nirmala Ramanujam, Duke University, USA

13:35 – 14:50 Lunch

14:50 – 16:00 *Ad hoc* sessions / free time

**Special Session B: Clinical Devices and Systems (Industry)**

Session Chair: Dennis Matthews, Lawrence Livermore National Laboratory, USA

16:00 – 16:35 **OVERVIEW OF SESSION ON CLINICAL DEVICES AND SYSTEMS (INDUSTRY PERSPECTIVE)**  
Dennis Matthews, Lawrence Livermore National Laboratory, USA

**Wednesday, July 1, 2009 (continued)**

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|---------------|---|
| 16:35 – 17:10 | <b>COMMERCIALIZING A MOLECULAR DIAGNOSTIC INSTRUMENT</b><br>Bill Colston, Quantalife, USA               |
| 17:10 – 17:45 | <b>TBA</b><br>Babak Nemati, Strategic Intelligence, Inc., USA   |
| 17:45 – 18:20 | <b>ROBOT VISION</b><br>Catherine Mohr, Intuitive Surgical Systems, USA                                  |
| 18:20 – 18:55 | <b>SPELLING MOLECULAR IMAGING FOR THE NEW GRAMMAR OF DRUG DISCOVERY</b><br>Thomas Kruker, Novartis, USA |
| 19:30 – 21:30 | Banquet   |
| 21:30 – 22:30 | Social hour   |

**Thursday, July 2, 2009**

07:00 – 08:00 Breakfast

**Session VIII: Dynamic Fluorescence**

Session Chair: Daniel Elson, Imperial College London, UK

08:00 – 08:35 **FLUORESCENCE LIFETIME IMAGING FROM MICROSCOPES TO ENDOSCOPES**

Daniel Elson, Imperial College London, UK

08:35 – 09:10 **TIME DOMAIN FLUORESCENCE TOMOGRAPHY: THEORY AND IN-VIVO APPLICATIONS**

Anand Kumar, Harvard University, USA

**Special Session C: Clinical Challenges, Research Solutions**

Session Chair: Reid Thompson, Vanderbilt University, USA

09:10 – 09:45 **MOLECULAR IMAGING: APPLICATIONS TO CLINICAL NEUROSURGERY**

Reid Thompson, Vanderbilt University, USA

09:45 – 10:05 Coffee break

10:05 – 10:40

**TBA**

Peter Konrad, Vanderbilt University, USA

10:40 – 11:15

**HEARING THE LIGHT: OPTICAL STIMULATION A NOVEL TECHNIQUE FOR COCHLEAR IMPLANTS**

Claus Richter, Northwestern University, USA

11:15 – 11:50

**HEAD AND NECK CANCER: OPPORTUNITIES AND PITFALLS AS A MODEL SYSTEM FOR NOVEL IMAGING TECHNIQUES**

Gregory Farwell, University of California, Davis, USA

12:00 – 13:15

Lunch

13:15 –

Departure

### Poster List

1. **SIMULTANEOUS EEG AND NEAR-INFRARED IMAGING OF THE INFANT BRAIN**  
Rob J. Cooper, University College London Biomedical Optics Research Laboratory, UK
2. **TOWARDS UNIFICATION OF LASER SPECKLE CONTRAST ANALYSIS AND LASER DOPPLER METHODS FOR WHOLE FIELD PERFUSION IMAGING**  
Wiendelt Steenbergen, University of Twente - Institute for Biomedical Technology, the Netherlands
3. **TRACKING DYNAMICS OF MAGNETIC NANOPARTICLE-BASED CONTRAST AGENTS IN TISSUES USING MAGNETOMOTIVE OPTICAL COHERENCE TOMOGRAPHY**  
Renu John, Biophotonics Imaging Laboratory, Beckman Institute for Advanced Science and Technology, USA
4. **UV-VISIBLE DIFFUSE REFLECTANCE SPECTROSCOPY WITH A SELF-CALIBRATING FIBER OPTIC PROBE**  
Bing Yu, Duke University, USA
5. ***IN VIVO* APPLICATION OF DYNAMIC OPTICAL COHERENCE ELASTOGRAPHY**  
Xing Liang, University of Illinois at Urbana-Champaign, USA
6. **QUANTIFYING NANOSCALE MOTIONS IN LIVE CELLS USING SLIM**  
Gabriel Popescu, University of Illinois at Urbana-Champaign, USA
7. **INTEGRATED OPTICAL COHERENCE AND MULTIPHOTON MICROSCOPY WITH A DUAL SPECTRUM LASER SOURCE**  
Ben Graf, Beckman Institute for Advanced Science and Technology: University of Illinois at Urbana-Champaign, USA
8. **IMPROVING THE UNDERSTANDING AND VERSATILITY OF INFRARED MICROSPECTROSCOPY USING FIRST PRINCIPLES MODELING**  
Brynmor J. Davis, University of Illinois at Urbana-Champaign, USA
9. **IMAGE ACQUISITION, TISSUE CLASSIFICATION, AND AUDIO FEEDBACK ALGORITHMS FOR OCT IMAGE-GUIDED SURGERY**  
Adeel Ahmad, University of Illinois at Urbana-Champaign, USA
10. **ANGLE-RESOLVED LOW COHERENCE INTERFEROMETRY: RECENT DEVELOPMENT AND *IN VIVO* STUDY FOR DETECTION OF PRECANCEROUS CELLS IN BARRETT'S ESOPHAGUS PATIENTS**  
Yizheng Zhu, Department of Biomedical Engineering, Duke University, USA
11. **SIMULTANEOUS POSITRON EMISSION TOMOGRAPHY AND MULTISPECTRAL THREE-DIMENSIONAL FLUORESCENCE OPTICAL TOMOGRAPHY IMAGING SYSTEM FOR SMALL ANIMALS**  
Simon Cherry, University of California, USA
12. **ONLINE ANALYSIS OF FLUORESCENCE LIFETIME IMAGING MICROSCOPY (FLIM) DATA BASED ON A FULLY AUTOMATED LAGUERRE DECONVOLUTION METHOD**  
Javier A. Jo, Texas A&M University, USA
13. **PARALLEL FREQUENCY DOMAIN OCT AND DUAL WINDOW PROCESSING METHOD FOR MEASUREMENTS OF TISSUE PHANTOM MORPHOLOGY AND ABSORPTION PROPERTIES**  
Francisco E. Robles, Duke University, USA

14. **ACTIVATION OF HUMAN IMMUNE CELLS STUDIED BY IRAM (INTEGRATED RAMAN AND ANGULAR-SCATTERING MICROSCOPY)**  
Andrew J. Berger, University of Rochester, USA
15. **VIDEO-RATE TOMOGRAPHIC PHASE MICROSCOPY**  
Wonshik Choi, G. R. Harrison Spectroscopy Laboratory, Massachusetts Institute of Technology, Massachusetts, USA
16. **HYPERSPSCTRAL TWO-PHOTON MICROSCOPY FOR 3D INSTANT HISTOLOGY**  
Lauren Grosberg, Columbia University, USA
17. **MEASURING MICROVASCULAR PO<sub>2</sub> CHANGES FROM ACUTE, FOCAL ISCHEMIA WITH TWO-PHOTON MICROSCOPY**  
Arnold D. Estrada, University of Texas at Austin, USA
18. **OPTICAL DIFFRACTION TOMOGRAPHY FOR LIVE CELL IMAGING**  
Yongjin Sung, G. R. Harrison Spectroscopy Laboratory, Massachusetts Institute of Technology, USA
19. **MONTE CARLO METHODS FOR SIMULATING COHERENT IMAGING MICROSCOPES**  
Carole K. Hayakawa, Dept. of Chemical Engineering and Materials Science, University of California, USA
20. **HIGH-SPEED TWO PHOTON MICROSCOPY OF REACTIVE CORTICAL CELLS *IN VIVO***  
Brenda Chen, Columbia University, New York, USA
21. **BREAST COIL HOLDER IMPLEMENTATION FOR OPTIMIZED MRI-GUIDED OPTICAL SPECTROSCOPY**  
Michael Mastanduno, Thayer School of Engineering at Dartmouth, USA
22. **SPECTRAL HISTOLOGY OF HUMAN TISSUE USING MID-INFRARED SPECTROSCOPIC IMAGING**  
Michael John Walsh, University of Illinois at Urbana-Champaign, USA
23. **CONFOCAL RAMAN MICROSPECTROSCOPY OF ORAL STREPTOCOCCI**  
Brooke D. Beier, University of Rochester, USA
24. **ULTRA-FAST MULTIWAVELENGTH CCD-BASED OPTICAL IMAGING**  
Matthew B. Bouchard, Columbia University, USA
25. **LINE-FIELD SPECTRAL DOMAIN PHASE MICROSCOPY**  
Zahid Yaqoob, Massachusetts Institute of Technology, USA
26. **ENDOSCOPIC FLUORESCENCE LIFETIME IMAGING FOR INTRAOPERATIVE DISEASE DIAGNOSIS**  
Yinghua Sun, University of California, USA
27. **MONTE CARLO MODELING FOR 3D OPTICAL IMAGING OF MESOSCOPIC VOLUMES**  
Clémence Bordier, Columbia University, USA
28. **SIMULTANEOUS PROBING OF MULTIPLE OPTICAL PATH LENGTHS FOR PRECANCER DETECTION**  
Linda T. Nleman, M.D. Anderson Cancer Center, USA
29. **OPTICAL DETECTION OF BLOOD BRAIN BARRIER DISRUPTION *IN VIVO***  
Aysegul Ergin, Boston University, Department of Biomedical Engineering, USA

30. **THE INFLUENCE OF HEXOKINASE I ON THE INCREASED UPTAKE OF 2-NBDG IN ESTROGEN RECEPTOR-POSITIVE BREAST CANCER CELLS**  
Stacy Millon, Duke University, USA
31. **FLUORESCENCE LAMINAR OPTICAL TOMOGRAPHY FOR IMAGING SKIN**  
Sean A. Burgess, Columbia University, USA
32. **NONINVASIVE MONITORING OF BLOOD LOSS USING DIFFUSE REFLECTANCE SPECTROSCOPY: A PRELIMINARY PATIENT STUDY**  
Janelle E. Bender, Duke University, USA
33. ***IN VIVO* MONITORING OF ANGIOGENESIS IN CERVICAL EPITHELIAL PRECANCERS – VALIDATION OF OPTICAL SPECTROSCOPIC CONTRAST WITH IMMUNOHISTOCHEMISTRY**  
Vivide Tuan Chyan Chang, Department of Biomedical Engineering, Duke University, USA
34. **A LOW COST SYSTEM FOR QUANTITATIVE SPECTRAL IMAGING OF TISSUE ABSORPTION AND SCATTERING**  
Henry L. Fu, Department of Biomedical Engineering, Duke University, USA
35. **MONITORING THE OSTEOGENIC PROCESS FOLLOWING DENTAL GRAFT PROCEDURES WITH SPATIALLY OFFSET RAMAN SPECTROSCOPY (SORS)**  
Jason R. Maher, The Institute of Optics, University of Rochester, USA
36. **STUDY OF CELL ELECTROMOTILITY USING LOW-COHERENCE DIFFRACTION PHASE MICROSCOPY**  
Seungeun Oh, Spectroscopy laboratory, Massachusetts Institute of Technology, USA
37. **UV DISPERSION PHASE MICROSCOPY OF CELLS**  
Dan Fu, Massachusetts Institute of Technology, USA
38. **BREAST COIL HOLDER IMPLEMENTATION FOR OPTIMIZED MRI-GUIDED OPTICAL SPECTROSCOPY**  
Michael Mastanduno, Thayer School of Engineering at Dartmouth, USA
39. **CONTRAST AGENTS BASED ON GOLD NANOPARTICLES FOR NON-INVASIVE DETECTION OF CANCER**  
Pratixa P. Joshi, University of Texas at Austin, USA
40. **DEVELOPMENT OF AN *EX VIVO* QUANTITATIVE SPECTROSCOPIC IMAGING SYSTEM**  
Debra Ferreira, Massachusetts Institute of Technology, USA
41. **OPTICAL IMAGING OF INTERACTIONS OF TUMOR-TARGETED, THERAPEUTIC GOLD/IRON NANOPARTICLES WITH LUNG CANCER CELLS: CORRELATION WITH THERAPEUTIC EFFECT**  
Justina Tam, University of Texas at Austin, USA
42. **SIDE-VIEWING RAMAN PROBE TO GUIDE BREAST NEEDLE BIOPSY FOR MICROCALCIFICATIONS**  
Z.Volynskaya, Massachusetts Institute of Technology, USA
43. **ENDOSCOPIC FLUORESCENCE LIFETIME IMAGING FOR THE CHARACTERIZATION OF HUMAN ATHEROSCLEROTIC PLAQUES**  
Jennifer Phipps, University of California, Davis, USA

44. **COMPUTATIONAL MODELING AND SIGNAL ENHANCEMENT FOR IMPROVED RAMAN MICROSCOPY**  
Matthew Schulmerich, University of Illinois at Urbana-Champaign, USA
45. **MULTIMODAL TISSUE DIAGNOSTIC SYSTEM COMBINING TIME-RESOLVED FLUORESCENCE SPECTROSCOPY, ULTRASOUND AND PHOTOACOUSTIC IMAGING**  
Yang Sun, Biomedical Engineering, University of California, USA
46. **A STEERABLE IVUS GUIDED MULTI-MODAL CATHETER FOR *IN-VIVO* TIME-RESOLVED FLUORESCENCE SPECTROSCOPY**  
Hongtao Xie, Department of Biomedical Engineering, University of California, USA
47. **INTRINSIC TWO-PHOTON EXCITED FLUORESCENCE BIOMARKERS OF STEM CELL DIFFERENTIATION**  
Irene Georgakoudi, Tufts University, USA
48. **NON-INVASIVE CHARACTERIZATION OF BIOMATERIAL MINERALIZATION USING LIGHT SCATTERING SPECTROSCOPY**  
Martin Hunter, Tufts University, USA
49. **HIGH-SPEED MORPHOLOGICAL IMAGING OF LIVING CELLS BY LOW-COHERENCE SPATIAL DOMAIN QUANTITATIVE PHASE MICROSCOPY**  
Toyohiko Yamauchi, Massachusetts Institute of Technology, USA
50. **TOWARDS THE DEVELOPMENT OF A LIGHT SCATTERING BASED *IN VIVO* FLOW CYTOMETER**  
Cherry Greiner, Tufts University, Massachusetts, USA
51. **IMPACT OF PHOTBLEACHING ON QUANTITATIVE BIOLOGICAL RAMAN SPECTROSCOPY**  
Chae-Ryon Kong, Massachusetts Institute of Technology, USA
52. **EXAMINATION OF OPTICAL PROPERTY VARIATIONS IN MOUSE SKIN: IMPLICATIONS FOR MOLECULAR IMAGING RESEARCH**  
Katherine Calabro, Boston University, USA
53. **CHARACTERIZING MEMBRANE PROTEIN ASSOCIATED NANOLIPOPROTEIN PARTICLES USING FLUORESCENCE CORRELATION SPECTROSCOPY**  
Tingjuan Gao, NSF Center for Biophotonics, University of California Davis Medical Center, USA
54. **DETECTION OF PRETERM LABOR WITH RAMAN SPECTROSCOPY**  
Elizabeth Vargis, Vanderbilt University, USA
55. **DEVELOPMENT OF A COMPACT LASER TRAP RAMAN SYSTEM FOR FULLY AUTOMATED SINGLE CELL ANALYSIS**  
Rui Liu, NSF Center for Biophotonics Science and Technology, University of California Davis Medical Center, USA
56. **PORTABLE DEPTH-SENSITIVE SPECTROSCOPIC DEVICE FOR EVALUATION OF ORAL LESIONS**  
Richard A. Schwarz, Dept. of Bioengineering, Rice University, USA