

Program

# ADVANCES IN OPTICS FOR BIOTECHNOLOGY, MEDICINE AND SURGERY

June 10 – 14, 2007  
Naples Beach Hotel & Golf Club  
851 Gulf Shore Boulevard North  
Naples, Florida 34102  
Tel: 1-239-261-2222

Conference Co-Chairs

Guillermo Tearney, M.D., Ph.D.  
Harvard University, USA

Samuel Achilefu, Ph.D.  
Washington University, USA

Paul M. W. French, Ph.D.  
Imperial College, London, UK

# ECI

Engineering Conferences International  
Six MetroTech Center -- Brooklyn, NY 11201  
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Engineering Conferences International (ECI) is a global engineering conferences program, originally established in 1962, that provides opportunities for the exploration of problems and issues of concern to engineers and scientists from many disciplines. ECI is a not-for-profit partnership between the Engineering Conferences Foundation (ECF) and Polytechnic University.

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## Organizing Committee Members

<b>Dan Farkas, Ph.D.</b> (Cedars-Sinai Medical Center)	<b>Intrinsic contrast microscopy</b>
<b>Charles Lin, Ph.D.</b> (Harvard University)	<b>Comprehensive, large field microscopy for basic research and clinical applications</b>
<b>Darryl Bonhop, Ph.D.</b> (Vanderbilt University)	<b>Molecular probes</b>
<b>Karsten König, Ph.D.</b> (Fraunhofer Institute for Biomedical Technology)	<b>Intravital microscopy</b>
<b>Peter Friedl, Ph.D.</b> (University of Würzburg)	
<b>Nimmi Ramanujam, Ph.D.</b> (Duke University)	<b>Imaging metabolic pathways</b>
<b>Vasan Venugopalan</b> (University of California, Irvine)	
<b>Rebecca Richards-Kortum, Ph.D.</b> (Rice University)	<b>Microendoscopy</b>
<b>Laura Marcu, Ph.D.</b> – (University of California, Davis)	<b>Tissue Spectroscopy</b>
<b>Dietrich Schweitzer</b> (University of Jena)	
<b>David Boas, Ph.D.</b> (Harvard University)	<b>Molecular DOT and Mesoscopic imaging</b>
<b>Rebekah Drezek, Ph.D.</b> (Rice University)	<b>Optical therapy and monitoring treatment response by optical methods</b>
<b>Steve Boppart, M.D., Ph.D.</b> (University of Illinois at Urbana-Champaign)	<b>Molecular imaging with scattered light</b>

**Sunday, June 10, 2007**

16:00 – 18:00            Conference Registration

18:00 – 19:30            Dinner

**Session I: Intrinsic contrast microscopy**

Session Chair: Dan Farkas, Cedars-Sinai Medical Center, USA

19:30 – 20:05

**Polarization microscopy**

Rudolf Oldenbourg, Marine Biological Laboratory, USA

20:05 – 20:40

**Fluorescence lifetime microscopy**

John White, University of Wisconsin Madison, USA

20:40 – 21:15

**Functional opt**

Zhongping Chen, University of California, Irvine, USA

21:15 – 21:50

TBD

Irene Georgakoudi, Tufts University, USA

21:50 – 22:50

Social Hour

**IMPORTANT ANNOUNCEMENTS**

- 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 copy will be sent to all participants after the conference.



**Monday, June 11, 2007** (continued)

20:10 – 20:45

**TBD**

Brian Wilson, University of Toronto, Canada

20:45 – 21:20

**Fluorescence Imaging of Peritoneal Cancer: Role of Activatable Probes**

Peter Choyke, National Cancer Institute, USA

21:20 – 23:00

Social Hour

**Tuesday, June 12, 2007**

- 07:00 – 08:00 Breakfast
- Session V: Molecular probes**  
Session Chair: Darryl Bornhop, Vanderbilt University, USA
- 08:00 – 08:35 **Fluorescent probes and medical imaging**  
Ching Tung, Harvard University, USA
- 08:35 – 09:10 **Non-invasive optical imaging of cysteine protease activity using near infrared fluorescent activity based probes**  
Matthew Bogyo, Stanford University, USA
- 09:10 – 09:45 **Imaging applications with fluorescent quantum dots**  
Sandy Rosenthal, Vanderbilt University, USA
- 09:45 – 10:20 **Multifunctional contrast agents for optical coherence tomography**  
Stephen Boppart, University of Illinois at Urbana-Champaign, USA
- 10:20 – 10:45 Coffee Break
- 10:45 – 12:30 **Proffered Topic Session**  
Session Chair: Michael Feld
- 10:45 – 11:00 **Cytotoxicity of nanoparticles**  
Nastassja Lewinski, Rice University, USA
- 11:00 – 11:15 **Plasmonic nanoparticles with affinity and delivery functionalities for imaging intracellular biomarkers in live cells**  
Sonia Kumar, University of Texas at Austin, USA
- 11:15 – 11:30 **Tomographic phase microscopy**  
Wonshik Choi, MIT, USA
- 11:30 – 11:45 **Scattering spectroscopy for real-time detection of apoptosis in living cells**  
Christine Mulvey, Boston University, USA
- 11:45 – 12:00 **Fluorescence endoscopy with dynamic speckle illumination**  
Cathie Ventalon, Boston University, USA
- 12:00 – 12:15 **Laminar optical tomography for dermal and cardiac imaging**  
Elizabeth M.C. Hillman, Columbia University, USA
- 12:30 – 13:45 Lunch
- 13:45 – 18:00 *Ad hoc* Sessions / Free Time
- 18:00 – 19:30 Dinner
- 19:30 – 21:30 Poster Session and Social Hour



**Wednesday, June 13, 2007**

- 07:00 – 08:00            Breakfast
- Session VI: Intravital microscopy**  
Session Chair:    Karsten König, Fraunhofer Institute for Biomedical Technology, Germany  
                         Peter Friedl, University of Wurzburg, Germany
- 08:00 – 08:35            **Dissection of tumor and vascular biology using intravital microscopy**  
Dai Fukumura, Harvard University, USA
- 08:35 – 09:10            **Intravital microscopic analysis of cd8 t cell effector function**  
Thorsten Mempel, Harvard University, USA
- 09:10 – 09:45            **Intravital microscopic measurements of mediators and metabolic activity**  
Marc van Zandvoort, University of Maastricht, Netherlands
- 09:45 – 10:10            Coffee Break
- Session VII: Imaging metabolic pathways**  
Session Chair:    Nimmi Ramanujam, Duke University, USA  
                         Vasan Venugopalan, University of California, Irvine, USA
- 10:10 – 10:45            **Quantitative cell and tissue spectroscopy and imaging**  
Mary-Ann Mycek, University of Michigan, USA
- 10:45 – 11:20            **Imaging metabolic indicators in the eye**  
Dietrich Schweitzer, University of Jena, Germany
- 11:20 – 11:55            **Time-resolved autofluorescence and autofluorescence spectroscopy**  
Jianan Qu, Hong Kong University of Science and Technology, China
- 11:55 – 12:30            **Multiphoton autofluorescence microscopy of NADH**  
Karl A. Kasischke, University of Rochester, USA
- 12:30 – 13:45            Lunch
- 13:45 – 16:30            *Ad hoc* Session / Free Time
- Session VIII: Tissue Spectroscopy**  
Session Chair:    Laura Marcu, University of California, Davis, USA  
                         D Schweitzer, University of Jena, Germany
- 16:30 – 17:05            **Quantitative biological spectroscopy**  
Michael Feld, MIT, USA
- 17:05 – 17:40            **Detection of early bladder carcinoma by fluorescence cystoscopy with hexvix®: improvement of the specificity by microcystoscopy**  
Blaise Lovisa, EPFL, Switzerland
- 17:40 – 18:15            **Optical spectroscopy and multi-spectral imaging for in vivo detection of cancer: a global approach**  
Rebecca Richards-Kortum, Rice University, USA

**Wednesday, June 13, 2007**

18:15 – 18:50           **Advances in multispectral imaging: from single cell to tissue level**  
Tuan Vo-Dinh, Duke University

19:00 – 19:30           Social Hour

19:30 – 21:30           Banquet

**Thursday, June 14, 2007**

- 07:00 – 08:00            Breakfast
- Session IX: Molecular DOT and Mesoscopic imaging**  
Session Chair: David Boas, Harvard University, USA
- 08:00 – 08:35            **NIRS data in infants, science and clinic**  
Maria Angela Franceschini, Harvard University, USA
- 08:35 – 09:10            **MONSTIR in the neonate clinic**  
Jem Hebden, University College London, UK
- 09:10 – 09:45            **Mesoscopic imaging**  
David Cuccia, Modulated Imaging Corporation, USA
- 09:45 – 10:10            Coffee Break
- Session X: Molecular imaging with scattered light**  
Session Chair: Stephen Boppart, University of Illinois at Urbana-Champaign, USA
- 10:10 – 10:45            **Light Scattering Spectroscopy**  
Lev Perelman, Harvard University
- 10:45 – 11:20            **Vibrational Imaging (CARS)**  
Ji-Xin Cheng, Purdue University, USA
- 11:20 – 11:55            **Infrared (FTIR) Imaging of Molecular Composition in Histological Specimens**  
Rohit Bhargava, University of Illinois at Urbana-Champaign, USA
- 11:55 – 12:30            **THG imaging and tissue imaging with nonlinear endogenous contrast**  
Emmanuel Beaurepaire, Ecole Polytechnique, France
- 12 :30 – 12 :40            Wrap-up
- 12:40 – 13:45            Lunch
- 13:30 –                    Departure

Poster Presentations

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## POSTER PRESENTATIONS

1. **IN VIVO MULTIPHOTON MICROSCOPY OF METABOLIC OXIDATION REDUCTION STATES AND FLUORESCENCE LIFETIMES IN NORMAL AND PRE CANCEROUS EPITHELIA**  
MELISSA SKALA, DUKE UNIVERSITY, USA
2. **CELL MEMBRANE DYNAMICS MEASURED BY QUANTITATIVE PHASE IMAGING**  
GABRIEL POPESCU, MIT, USA
3. **AUTOFLUORESCENCE AND LIGHT SCATTERING SIGNATURE OF NORMAL AND HUMAN PAPILLOMAVIRUS IMMORTALIZED HUMAN FORESKIN KERATINOCYTES**  
CHERRY GREINER, TUFTS UNIVERSITY, USA
4. **REFLECTANCE MODEL THAT EXTRACTS THE OPTICAL PROPERTIES IN SMALL SUPERFICIAL VOLUMES OF TURBID MEDIA**  
ROBERTO REIF, BOSTON UNIVERSITY, USA
5. **TRI-MODEL SPECTROSCOPY IMAGING SYSTEM**  
CONDON LAU, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, USA
6. **REAL-TIME SPECTROSCOPIC ASSESSMENT OF EPITHELIAL DYSPLASIA IN THE ORAL CAVITY**  
SASHA MCGEE, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, USA
7. **TOMOGRAPHIC PHASE MICROSCOPY**  
WONSHIK CHOI, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, USA
8. **DIAGNOSIS OF BREAST CANCER USING FLUORESCENCE SPECTROSCOPY A PHYSICAL MODEL BASED APPROACH**  
CHANGFANG ZHU, UNIVERSITY OF WISCONSIN-MADISON, USA
9. **EXTRACTION OF UNIQUELY CEREBRAL HEMODYNAMIC TRENDS USING CORRECTED NEAR INFRARED SPECTROSCOPY (C-NIRS)**  
ROLF B SAAGER UNIVERSITY OF ROCHESTER, USA
10. **A CLINICAL INSTRUMENT FOR SPECTRAL DIAGNOSIS OF CUTANEOUS MALIGNANCY**  
NARASIMHAN RAJARAM UNIVERSITY OF TEXAS, USA
11. **OPTIMIZATION OF NANOSHELL CONJUGATION TO LIVE HUMAN BREAST CANCER CELLS FOR TUMOR MARGIN DETECTION**  
LISSETT R. BICKFORD, RICE UNIVERSITY, USA
12. **ELASTIC SCATTERING SPECTROSCOPY FOR REAL TIME DETECTION OF APOPTOSIS IN LIVING CELLS**  
CHRISTINE MULVEY, BOSTON UNIVERSITY, USA
13. **INTEGRATED RAMAN AND ANGULAR SCATTERING MICROSCOPY**  
ZACHARY SMITH, UNIVERSITY OF ROCHESTER, USA
14. **COMPARISON OF THE EFFECT OF 5-AMINOLEVULINIC ACID ON THE PPIX INCLUDED FLUORESCENCE INTENSITY AND LIFETIME OF NORMAL AND MALIGNANT BREAST CELL LINES**  
STACY MILLON, DUKE UNIVERSITY, USA
15. **SPATIALLY RESOLVED REFLECTANCE SPECTROSCOPY WITH VARIABLES FIBER GEOMETRY**  
ADRIEN WANG, RICE UNIVERSITY, USA

16. **COMBINED FLUORESCENCE AND REFLECTANCE HYPERSPECTRAL IMAGING FOR EARLY CANCER DETECTION**  
AESOOK PARK, UNIVERSITY OF TEXAS, USA
17. **OPTICAL TOMOGRAPHY USING LARGE DATA SETS AND ANALYTIC SOLUTIONS**  
SOREN D. KONECKY, UNIVERSITY OF PENNSYLVANIA, USA
18. **COREGISTERED DIFFUSE OPTICAL AND POSITRON EMISSION TOMOGRAPHY OF HUMAN BREAST**  
SOREN D. KONECKY, UNIVERSITY OF PENNSYLVANIA, USA
19. **ENHANCED GOLD NANOSHELL SCATTERING CONTRAST USING ANGLED FIBER PROBES**  
VENGADESAN NAMMALVAR, RICE UNIVERSITY, USA
20. **PROBING THE LOCAL HETEROGENEITY OF ORAL MUCOSA FOR THE EARLY DETECTION OF CANCER USING POLARIZED REFLECTANCE SPECTROSCOPY : A PILOT CLINICAL TRIAL**  
LINDA T. NIEMAN, THE UNIVERSITY OF TEXAS, USA
21. **DESIGN OF A CLINICAL MULTIMODAL SPECTROSCOPY SYSTEM**  
OBRAD R. SCEPANOVIC, MIT, USA
22. **REAL-TIME SPECTROSCOPIC DETECTION OF EPITHELIAL NEOPLASIA IN HPV-RELATED LESIONS**  
JELENA MIRKOVIC, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, USA
23. **CONFOCAL DIFFRACTION PHASE MICROSCOPY**  
NIYOM LUE, MIT, USA
24. **RAMAN SPECTROSCOPY IDENTIFYING BREAST CANCER TUMOR GRADES**  
ZOYA VOLYNSKAYA, MIT, USA
25. **PLASMONIC NANOPARTICLES WITH AFFINITY AND DELIVERY FUNCTIONALITIES FOR IMAGING INTRACELLULAR BIOMARKERS IN LIVE CELLS**  
SONIA KUMAR, UNIVERSITY OF TEXAS, USA
26. **APPLICATION OF NEW QUANTITATIVE RAMAN TECHNIQUES TO WHOLE BLOOD SAMPLES**  
GAJENDRA P. SINGH, MIT, USA
27. **FLUORESCENCE SPECTROSCOPIC CHARACTERIZATION OF BREAST TISSUE PATHOLOGY DURING CORE NEEDLE BREAST BIOPSY**  
CHANGFANG ZHU, UNIVERSITY OF WISCONSIN-MADISON, USA
28. **INTRAOPERATIVE ASSESSMENT OF BREAST TISSUE VIA IN VIVO OPTICAL BIOPSY :A WINDOW INTO BREAST PHYSIOLOGY**  
J. QUINCY BROWN, DUKE UNIEVRSITY , USA
29. **PUSHING THE ENVELOPE ON PHOTODYNAMIC THERAPY DOSIMETRY COMBINED SINGLET OXYGEN LUMINESCENCE AND PHOTSENSITIZER PHOTOBLEACHING**  
MARK JARVI, UNIVERSITY OF TORONTO, CANADA
30. **MULTIFOCAL MULTIPHOTON MICROSCOPY WITH TIME CORRELATED SINGLE PHOTON COUNTING FLUORESCENCE LIFETIME IMAGING MICROSCOPY**  
S. KUMAR, IMPERIAL COLLEGE LONDON, UK
31. **REAL TIME MINIMALLY INVASIVE FIBER BUNDLE MICROENDOSCOPY IN TISSUE.**  
TIM MULDOON, RICE UNIVERSITY, USA

32. **IN VIVO MULTISPECTRAL REFLECTANCE AND FLUORESCENCE OPTICAL IMAGING OF ORAL NEOPLASIA**  
DARREN ROBLYER RICE UNIVERSITY, USA
33. **HIGH SPEED WIDE-FIELD OPTICALLY SECTIONED FLIM**  
JAMES MCGINTY IMPERIAL COLLEGE LONDON, UK
34. **AUTOFLUORESCENCE LIFETIME INSTRUMENTATION FOR THE IMAGING OF FRESHLY EXCISED TISSUE AND DETECTION OF MALIGNANCY**  
JAMES MCGINTY, IMPERIAL COLLEGE LONDON, UK
35. **PLASMON RESONANCE COUPLING FOR SENSITIVE MONITORING OF EGFR ACTIVATION AND TRAFFICKING IN LIVE CELLS**  
JESSE AARON, UNIVERSITY OF TEXAS, USA
36. **COST EFFECTIVE DIGITAL IMAGING AID FOR EARLY DETECTION OF CERVICAL NEOPLASIA**  
JAIR MARTINEZ, RICE UNIVERSITY, USA
37. **ELASTIC SCATTERING SPECTROSCOPY AS A LABORATORY TOOL FOR PATHOLOGICAL ASSESSMENT OF PROSTATE CANCER**  
OUSAMA A'AMAR, BOSTON UNIVERSITY, USA
38. **QUANTITATIVE PHASE IMAGING OF MEMBRANE POTENTIAL IN APLYSIA NEURONS**  
SEUNGEUN OH, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, USA
39. **QUANTIFICATION OF FLOW IN LASER SPECKLE CONTRAST IMAGING**  
ASHWIN B PARTHASARATHY, THE UNIVERSITY OF TEXAS, USA
40. **COMPARISON OF THE TIME AND FREQUENCY DOMAIN PHOSPHORESCENCE LIFETIME MEASUREMENTS WHEN USING TWO-PHOTON EXCITATION**  
ARNOLD ESTRADA, UNIVERSITY OF TEXAS, USA
41. **DEVELOPMENT AND OPTICAL CHARACTERISATION OF ENGINEERED NORMAL DYSPLASTIC AND CANCEROUS EPITHELIA**  
JONATHAN M. LEVITT, TUFTS UNIVERSITY, USA
42. **CYTOTOXICITY OF NANOPARTICLES**  
NASTASSJA LEWINSKI, RICE UNIVERSITY, USA
43. **THREE DIMENSIONAL MICROELECTROMECHANICAL ENDOSCOPIC MICROSCOPY WITH A RAPIDLY SCANNING LASER**  
JUN ZHANG, UNIVERSITY OF CALIFORNIA, IRVINE, USA
44. **HEMODYNAMIC IMAGING OF CORTICAL SPREADING DEPRESSION**  
ADRIEN PONTICORVO, THE UNIVERSITY OF TEXAS, USA
45. **FLUORESCENCE LIFETIME IMAGING OF CARTILAGE AND ARTERIAL AUTOFLUORESCENCE**  
CLIFFORD TALBOT, IMPERIAL COLLEGE LONDON, UK
46. **INTRINSIC PHASE IMAGING WITH GRADED FIELD AUTOCONFOCAL MICROSCOPY**  
DARYL LIM, BOSTON UNIVERSITY, USA
47. **OUT OF FOCUS BACKGROUND REJECTION WITH DIFFERENTIAL ABERRATION TWO PHOTON FLUORESCENCE MICROSCOPY**  
KENG YEH K. CHU, BOSTON UNIVERSITY, USA

48. **NON-INVASIVE MONITORING OF GLUCOSE AND HEMOGLOBIN**  
HAREL PRIMACK, ORSENSE LTD. ISRAEL
49. **A NOVEL FUNCTIONAL TRANSLATOR PROTEIN RECEPTOR LIGAND FOR CANCER IMAGING**  
MINGFENG BAI, VANDERBILT UNIVERSITY, USA
50. **BREAST TISSUE OPTICAL PROPERTY ANALYSIS WITH FUZZY SEGMENTATION PRIOR DERIVED FROM CO-REGISTERED TOMOSYNTHESIS**  
QIANQIAN FANG, MARTINOS CENTER, MASSACHUSETTS GENERAL HOSPITAL, USA
51. **FLUORESCENCE ENDOSCOPY WITH DYNAMIC SPECKLE ILLUMINATION**  
CATHIE VENTALON, BOSTON UNIVERSITY, USA
52. **MIT LASER BIOMEDICAL RESEARCH CENTER**  
CATHIE VENTALON, BOSTON UNIVERSITY, USA