Program

Advances in Optics for Biotechnology, Medicine, and Surgery XIV

June 14-17, 2015

Vail, Colorado, USA

Conference Chairs

Rainer Leitgeb, PhD
Medical University of Vienna, Austria

Richard Levenson, MD
University of California – Davis, USA

Laura Waller, PhD
University of California, Berkeley, USA

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Engineering Conferences International (ECI) is a not-for-profit 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.

Previous conferences in this series:

Future Directions for Lasers in Medicine and Surgery
February 26-March 3, 1989
Palm Coast, Florida
Conference Chairs:
Ronald W. Waynant, FDA, USA
Ashley J. Welch, University of Texas-Austin, USA

Future Directions for Lasers in Medicine and Surgery II
February 24-March 1, 1991
Palm Coast, Florida
Conference Chairs:
Thomas F. Deutsch, Wellman Labs, MA General, USA
Ronald W. Waynant, FDA/CDRH, USA

Future Directions for Lasers in Medicine and Surgery III
February 27-March 4, 1993
Palm Coast, Florida
Conference Chair:
Joseph T. Walsh, Jr., Northwestern University, USA

Lasers in Medicine and Surgery IV
July 9-14, 1995
Snowbird, Utah
Conference Chairs:
Sharon Thompsen, University of Texas, USA
George Pettit, USDA

Advances in Optical Technology for Medicine and Surgery V
July 13-18, 1997
Snowbird, Utah
Conference Chairs:
Irving J. Bigio, Los Alamos National Laboratory, USA
Kenton W. Gregory, Oregon Medical Laser Center, USA
Bruce J. Tromberg, Beckman Laser Institute, UC Irvine, USA

Advances in Optics for Biotechnology, Medicine and Surgery VI
Aug. 1-6, 1999
Kailua-Kona, Hawaii
Conference Chairs:
David Benaron, Stanford University, USA
Eva M. Sevick-Muraca, Purdue University, USA
Arjun G. Yodh, University of Pennsylvania, USA

Advances in Optics for Biotechnology, Medicine and Surgery VII
July 22-27, 2001
Banff, Alberta, Canada
Conference Chairs:
Daniel Farkas, University of Pittsburgh, USA
Michele Follen, University of Texas, Anderson Cancer Center, USA
Michael Patterson, Hamilton Regional Cancer Center/McMaster University, Canada

Previous conferences in this series:

Advances in Optics for Biotechnology, Medicine and Surgery VIII
August 3-7, 2003
Banff, Alberta, Canada
Conference Chairs:
Molly Brewer, University of Arizona, USA
Thomas Foster, University of Rochester, USA
James Fujimoto, Massachusetts Institute of Technology, USA

Advances in Optics for Biotechnology, Medicine and Surgery IX
July 24-28, 2005
Copper Mountain, Colorado
Conference Chairs:
Stephen M. Hahn, University of Pennsylvania, USA
Vasilis Ntziachristos, Harvard University, USA
Brian Wilson, University of Toronto, Canada

Advances in Optics for Biotechnology, Medicine and Surgery X
June 10-14, 2007
Naples, Florida, USA
Conference Chairs:
Guillermo Tearney, Harvard University, USA
Samuel Achilefu, Washington University, USA
Paul M.W. French, Imperial College, London, UK

Advances in Optics for Biotechnology, Medicine and Surgery XI
June 28-July 2, 2009
Burlington, Vermont, USA
Conference 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

Advances in Optics for Biotechnology, Medicine and Surgery XII
June 5-8, 2011
Naples, Florida, USA
Conference Chairs:
Elizabeth Hillman, Columbia University, USA
Daniel Elson, Imperial College London, UK
R.C. Thomson, Vanderbilt University, USA

Advances in Optics for Biotechnology, Medicine and Surgery XIII
June 2-5, 2013
Lake Tahoe, California, USA
Conference Chairs:
James W. Tunnell, University of Texas at Austin, USA
Maryann Fitzmaurice, Case Western University, USA
A.C. Boccara, ESPCI-Paris Tech., France

Conference Sponsors

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Sunday, June 14, 2015

12:00 – 14:00	Conference Check-in (East Centennial Foyer)
14:00 – 14:15	Welcome (Conference Chairs and ECI Liaison)
14:15 – 16:15	**Session 1: Optics and the Brain** Chair: Frederic Leblond, Polytechnique Montreal, Canada
14:15 – 14:55	**In vivo multiphoton imaging of mouse brain** Chris Xu, Cornell University, USA
14:55 – 15:35	**Optical coherence microscopy of brain function in health and disease** Vivek Srinivasan, University of California, Davis, USA
15:35 – 16:15	**Optics for imaging brain functions and networks** Joseph Culver, Washington University, USA
16:15 - 18:00	Free time / Set up posters
18:00 – 19:30	Dinner (Creekside Room)
19:30 – 21:30	**Session 2: Optoacoustics** Chair: Matt O'Donnell, University of Washington, USA
19:30 – 20:10	**Revolutionizing optical imaging with Multispectral Optoacoustic Tomography (MSOT)** Vasilis Ntziachristos, Technische Universität München, Germany
20:10 – 20:50	**Evaluation of enhanced flow of human inflammatory arthritis by photoacoustic imaging** Xueding Wang, University of Michigan, USA
20:50 – 21:30	**Clinical translation of an interleaved ultrasound and photoacoustic imaging system** Matt O'Donnell, University of Washington, USA
21:30 – 22:30	Poster Session / Social Hour

Notes

- *All technical sessions will be in Centennial D. Poster sessions will be in the Centennial ABC.*
- *Breakfasts will be in Atwater on Gore Creek and lunches will be in the Rocky Mountain Garden South. Dinner locations are noted in the program.*
- *Audiotaping, videotaping and photography of presentations are prohibited.*
- *Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).*
- *Speakers – Please leave at least 3-5 minutes for questions and discussion.*
- *Please do not smoke at any conference functions.*
- *Turn your mobile telephones to vibrate or off during technical sessions.*
- *Please write your name on your program so that it can be returned to you if lost or misplaced.*
- *After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.*

Monday, June 15, 2015

07:00 – 08:30	Breakfast
08:30 – 10:30	**Session 3: Super-resolution** Chair: Peter So, Massachusetts Institute of Technology, USA
08:30 – 09:10	**DNA probes for highly multiplexed, precisely quantitative, ultra-resolution imaging** Peng Yin, Harvard University, USA
09:10 – 09:50	**Nonlinear digital imaging** Jason Fleischer, Princeton University, USA
09:50 – 10:30	**TBA** Rafael Piestun, University of Colorado, Boulder, USA
10:30 – 11:00	Coffee Break
11:00 – 13:00	**Session 4: Imaging through Scattering** Chair: Haowen Ruan, California Institute of Technology, USA
11:00 – 11:40	**Biophotonics beyond multiple light scattering** Wonshik Choi, Korea University, Korea
11:40 – 12:20	**From star to neuron – adaptive optical microscopy for deep brain imaging** Na Ji, Howard Hughes Medical Institute, USA
12:20 – 13:00	**Scattered light microscopy** Ivo Vellekoop, University of Twente, The Netherlands
13:00 – 14:30	Lunch
14:30 – 16:00	Poster Session with 1 minute preview per presenter, voluntary. 1-slide
16:00 – 18:00	Free time (optional organized sport / social events)
18:00 – 19:30	Dinner (Rocky Mountain Garden South)
19:30 – 21:30	**Session 5: Optics at Point of Care** Chair: Aydogan Ozcan, University of California Los Angeles, USA
19:30 – 20:10	**Point of care technologies for women's health: Local and global challenges** Nimmi Ramanujam, Duke University, USA

Monday, June 15, 2015 (continued)

20:10 – 20:50 **Inkjet-printed fluidic paper SERS devices for chemical and biological analytics**
Ian White, University of Maryland, USA

20:50 – 21:30 **Cell phone polarized light imaging system for malaria diagnosis**
Gerard Cote, Texas A&M University, USA

Tuesday, June 16, 2015

07:00 – 08:30	Breakfast
08:30 – 11:10	**Session 6: Computational optics and compressed sensing** Chair: Laura Waller, University of California, Berkeley, USA
08:30 – 09:10	**Compressive phase retrieval** Yunhui Zhu, Massachusetts Institute of Technology, USA
09:10 – 09:50	**Adaptive spectral imaging classification** Michael Gehm, Duke University, USA
09:50 – 10:30	**Computed optical coherence tomography of biological tissues and cells** Steven G. Adie, Cornell University, USA
10:30 – 11:00	Coffee Break
11:00 – 11:40	**Session 7: Image Processing And Analysis** Chair: Kevin Eliceiri, University of Wisconsin-Madison, USA
11:00 – 11:40	**Image informatics for multiscale imaging** Kevin Eliceiri, University of Wisconsin-Madison, USA
11:40 – 12:20	**Efficient acquisition, storage, and analysis of optical images in clinical settings** Sina Farsiu, Duke University, USA
12:20 – 13:00	**Processing methods for enhancement, physiological measurement, and automated learning from optical signals** Gustavo Rohde, Carnegie Mellon University, USA
13:00	Lunch – box lunch available
14:00 – 18:00	Free time for recreation
18:00 – 20:30	Conference Banquet with poster, haiku/limerick awards (Cascade Ballroom)

Wednesday, June 17, 2015

07:00 – 08:30	Breakfast
08:30 – 10:30	**Session 8: Novel contrast agents** Chair: Samuel Achilefu, Washington University School of Medicine, USA
08:30 – 09:10	**Highly fluorescent semiconducting polymer dots for biology and medicine** Daniel Chiu, University of Washington, USA
09:10 – 09:50	**Stimulated Raman scattering imaging of alkyne vibrational tags** Wei Min, Columbia University, USA
09:50 – 10:30	**Providing contrast for molecular endoscopy** Christopher H. Contag, Stanford University, USA
10:30 – 11:00	Coffee Break
11:00 – 13:00	**Session 9: Imaging Biological Mechanisms** Michael Choma, Yale University, USA
11:00 – 11:40	**Imaging stem cell biology** Charles Lin, Massachusetts General Hospital, USA
11:40 – 12:20	**Microscale biological fluid flows** Michael Choma, Yale University, USA
12:20 – 13:00	**Nanometer and Sub-second Resolution on Neuronal Synapsis using New Small Quantum Dots and Super-resolution Microscopy** Paul R. Selvin, University of Illinois at Urbana-Champaign, USA
13:00 – 14:30	Lunch
14:30 – 16:30	**Session 10: Surgical Guidance and Endoscopy** Chair: Brian Wilson, University Health Network/ University of Toronto, Canada
14:30 – 15:10	**Surgical and biopsy guidance using fluorescence + additional imaging modalities** Calum MacAulay, BC Cancer Agency, Canada
15:10 – 15:50	**Neurosurgical guidance using optical spectroscopy** Frederic LeBlond, Polytechnique Montreal, Canada
15:50 – 16:30	**Hybrid imaging approaches for image guided surgery** Fijs Van Leeuwen, Leiden University Medical Center, The Netherlands
16:30	Departures

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An ECI Conference Series

Poster Presentation List

1. **Long-term validation of a multi-wavelength, frequency-domain diffuse optical spectroscopy instrument**
   Alex Matlock, University of California, Irvine, USA

2. **Label-free microscopy quantifies treatment-induced heterogeneity in vivo**
   Amy Shah, Vanderbilt University, USA

3. **Fluorescent imaging on a microfluidics chip for quantification of leukocyte count**
   Aneeka A. Majid, University of Arkansas, USA

4. **Optimization of a fluorescence scanning endoscope using a multimode fiber**
   Antonio Miguel Caravaca Aguirre, University of Colorado at Boulder, USA

5. **Clinical applications of multimodal spectroscopy in skin cancer diagnosis**
   Austin J. Moy, The University of Texas at Austin, USA

6. **Handheld spatial frequency domain imaging system for skin imaging**
   Bin Yang, The University of Texas at Austin, USA

7. **A novel 'See and Treat' paradigm for breast cancer using fluorescently-labeled Hsp90 inhibitors**
   Brian T. Crouch, Duke University, USA

8. **Photothermal laser speckle imaging**
   Caitlin Regan, University of California, Irvine, USA

9. **Imaging microscopic sessile suspension feeders near surfaces with strong edge diffraction using digital holography and coded aperture**
   Daniel Shuldman, University of California, Berkeley, USA

10. **Three-photon microscopy for in vivo brain imaging**
    David R. Miller, The University of Texas at Austin, USA

11. **Optimazing multiphoton fluorescence microscopy for in vivo brain imaging**
    Flor A. Medina, The University of Texas at Austin, USA

12. **Seeing through biological tissues with time-reversed light**
    Haowen Ruan, California Institute of Technology, USA

13. **Monitoring metabolic enzyme activity in cells with fluorescence lifetime imaging of NAD(P)H**
    Joe T. Sharick, Vanderbilt University, USA

14. **High resolution fluorescence imaging of human hand pharmacokinetics using a low-cost flatbed scanner**
    Kripa Patel, Columbia University, USA

15. **Line-scanning confocal microscopy for efficient imaging of rare-earth doped nanocomposite contrast agents**
    Laura M. Higgins, Rutgers, The State University of New Jersey, USA

16. **SERS enabled scanning fiber endoscope**
    Liang Lim, University Health Network, Canada

17. **Development of a pre-clinical imaging system for assessment of short-wave infrared nanocomposite contrast agents**
    Mark C. Pierce, Rutgers, The State University of New Jersey, USA

18. **An analytical model of photothermal optical coherence tomography**
    Maryse Lapierre-Landry, Vanderbilt University, USA

19. **Expression of Lectin-like oxidized low-density lipoprotein receptor-1 (LOX-1) in sickle cell disease vasculopathy**
    Mingyi Chen, University of California, Davis, USA

20. **Functional biomarkers of radiation therapy failure in head and neck cancer**
    Narasimhan Rajaram, University of Arkansas, USA

21. **Quantitative multiplex imaging using sers nanoparticles for lung cancer cell line classification**
    Santa Borel, University of Toronto, Canada

22. **Goggle system for image-guided cancer surgery**
    Suman Mondal, Washington University in St Louis, USA

23. **Interstitial spectroscopy for photodynamic therapy**
    Timothy Baran, University of Rochester, USA

24. **A multimodal sub-diffuse reflectance microendoscopy and spectroscopy probe for detection of epithelial dysplasia**
    Timothy J. Muldoon, University of Arkansas, USA

25. **Developing a new treatment approach for port wine stain birthmarks**
    Wesley Moy, University of California, Irvine, USA

26. **Polarized spatial frequency domaing imaging of soft tissue fiber distributions**
    Will A. Goth, The University of Texas at Austin, USA

27. **A morphologically based Raman spectroscopic model for skin cancer detection**
    Xu Feng, The University of Texas at Austin, USA

28. **MUSE: Deep UV excitation microscopy for imaging of exogenous fluorophores in tissue with applications in histology and pathology**
    Farzad Fereidouni, University of California, Davis, USA