

Program

Advances in Optics for Biotechnology, Medicine and Surgery XV

July 23 - 26, 2017

**Westin Snowmass
Snowmass Village, Colorado, USA**

Conference Chairs

Peter So

Massachusetts Institute of Technology, USA

Kate Bechtel

Triple Ring Technologies, USA

Ivo Vellekoop

University of Twente, The Netherlands

Michael Choma

Yale University, 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.

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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

Advances in Optics for Biotechnology, Medicine and Surgery XIV

June 14-17, 2015

Vail, Colorado, USA

Conference Chairs:

Rainer Leitgeb, Medical University of Vienna, Austria

Richard Levenson, University of California – Davis, USA

Laura Waller, University of California, Berkeley, USA

Conference Sponsors

**Supported by the National Institute of Biomedical Imaging
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Sunday, July 23, 2017

16:00 – 18:00	Conference Check-in (First floor registration area)
17:00 – 18:00	Poster Session 1
18:00 – 19:30	Dinner
19:30 – 21:30	<u>Session 1: Multi-scale optical imaging and monitoring</u> Chair: Arjun Yodh, University of Pennsylvania, USA
19:30 – 20:00	Highest resolution whole body molecular imaging: Cherenkov excited luminescence scanned imaging Brian Pogue, Dartmouth College, USA
20:00 – 20:30	Optical imaging of brain functions and networks: From mouse to man Joe Culver, Washington University in St. Louis, USA
20:30 – 21:00	Bedside measurement of hemodynamic biomarkers with fast diffuse correlation spectroscopy Ashwin Parthasarathy, University of South Florida, USA
21:00 – 21:30	Towards integrated multi-scale imaging of complex biological systems Kwanghun Chung, Massachusetts Institute of Technology, USA

Notes and room locations

- *Technical sessions will be in Salon A.*
- *Poster Sessions will be in Salons C and D.*
- *Breakfasts will be in the Monte Room. Vouchers will be distributed at registration.*
- *Lunches and dinners will be in the Alpine Springs room.*
- *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, July 24, 2017

- 07:30 – 08:30 Breakfast
- 08:30 – 10:30 **Session 2: Orphan / rare disease**
Chair: Brian Wong, Beckman Laser Institute - University of California-Irvine, USA
- 08:30 – 09:00 **Cystic fibrosis**
Gary Tearney, Massachusetts General Hospital, USA
- 09:00 – 09:30 **ARF-OCE for mapping mechanical properties of ocular and vascular tissues**
Jiang Zhu, University of California-Irvine, USA
- 09:30 – 10:00 **Disease of vocal cords**
Brian Wong, Beckman Laser Institute - University of California-Irvine, USA
- 10:00 – 10:30 **Near infrared spectroscopy in the pediatric brain**
Erin Buckley, Emory University/Georgia Institute of Technology, USA
- 10:30 – 11:00 Coffee Break / Poster Session 1
- 11:00 – 13:00 **Session 3: Next-gen fiber endoscopy**
Chair: Christophe Moser, EPFL, Switzerland
- 11:00 – 11:30 **30 years in the making: Direct imaging through a fiber, from concept to live functional imaging**
Rafael Piestun, University of Colorado, Boulder, USA
- 11:30 – 12:00 **Endoscopic light delivery for ablation and 3D printing**
Christophe Moser, EPFL, Switzerland
- 12:00 – 12:30 **Non linear endoscopes**
Hervé Rigneault, Institute Fresnel, France
- 12:30 – 13:00 **What is hiding in the Transmission Matrix?**
Tomas Cizmar, Institute of Scientific Instruments of the Czech Academy of Sciences, Brno, Czech Republic
- 13:00 – 14:00 Lunch
- 14:00 – 17:30 Free Time
Optional Rafting Trip
- 17:30 – 18:30 Poster Session 1
- 18:30 – 20:00 Dinner
- 19:00 – 20:30 **Panel 1: Development & Commercialization in Biophotonics**
Panel Chair: Kate Bechtel, Triple Ring Technology, USA

Tuesday, July 25, 2017

- 07:30 – 08:30 Breakfast
- 08:30 – 10:30 **Session 4: Optics and biomechanics**
Chair: David Sampson, University of Western Australia, Australia
- 08:30 – 09:00 **Imaging cancer cell morphodynamics and interactions with the micro-environment using light sheet microscop**
Reto Fiolka, University of Texas Southwestern, USA
- 09:00 – 09:30 **OCE and ocular biomechanics**
Salavat Aglyamov, University of Houston, USA
- 09:30 – 10:00 **Brillouin microscopy**
Giuliano Scarcelli, University of Maryland, USA
- 10:00 – 10:30 **OCE in cancer**
David Sampson, University of Western Australia, Australia
- 10:30 – 11:00 Coffee Break / Poster Session 2
- 11:00 – 13:00 **Session 5: Consumer Biophotonics**
Chair: Jen Keating, Triple Ring Technologies, USA
- 11:00 – 11:30 **How consumer wearable technology is driving innovation in healthcare and medical devices**
Steven LeBoeuf, Valencell, USA
- 11:30 – 12:00 **Noninvasive optical sensors for increased safety in law enforcement, industrial, and medical applications**
Ben Ver Steeg, TruTouch, USA
- 12:00 – 12:30 **Remote monitoring of patient vital signs for personalized healthcare**
Vahram Mouradian, Sensogram Tech, USA
- 12:30 – 13:00 **Scalable and cost-effective optical components for biosensing applications**
Wei-Chuan Shih, University of Houston, USA
- 13:00 – 14:00 Lunch
- 14:00 – 17:30 Free Time
Optional Group Hike
- 17:30 – 18:30 Poster Session 2
- 18:30 – 21:30 Banquet
Announce next ECI committee
Student Poster Awardee Presentations

Wednesday, July 26, 2017

- 07:30 – 08:30 Breakfast
- 08:30 – 10:30 **Session 6: Biophotonics in scattering tissue**
Chair: Jerome Mertz, Boston University, USA
- 08:30 – 09:00 **Smart optical coherence tomography for ultra-deep imaging through highly scattering media**
Alexandre Aubry, Institut Langevin - ESPCI ParisTech, CNRS, France
- 09:00 – 09:30 **3D computational microscopy of dynamic samples**
Laura Waller, University of California, Berkeley, USA
- 09:30 – 10:00 **Fast time reversal optical focusing for deep brain optogenetic activation**
Changhui Yang, California Institute of Technology, USA
- 10:00 – 10:30 **Optical memory effects in two-photon microscopy**
Ivo Vellekoop, University of Twente, the Netherlands
- 10:30 – 11:00 Coffee Break / Poster Session 2
- 11:00 – 13:00 **Session 7: Aging-related, degenerative, and chronic disease**
Chair: Xueding Wang, University of Michigan, USA
- 11:00 – 11:30 **Photoacoustic imaging as a potential tool for clinical evaluation of Inflammatory arthritis**
Xueding Wang, University of Michigan, USA
- 11:30 – 12:00 **Imaging demyelination in models of neurodegenerative disorders**
Daniel Côté, Centre de recherche de l'Institut universitaire en santé mentale de Québec, Canada
- 12:00 – 12:30 **Imaging the role of lymphatics in chronic inflammatory diseases**
Eva Sevick-Muraca, University of Texas Health Science Center at Houston, USA
- 12:30 – 13:00 **Biophysical markers of sickle erythrocyte subpopulations**
Zahid Yaqoob, Laser Biomedical Research Center – MIT, USA
- 13:00 – 14:00 Lunch
- 14:00 – 15:00 **Panel 2: Precision medicine in cancer**
Panel Chair: Michael Choma, Radiology & Biomedical Imaging, Yale University, USA
- Optical imaging, personalization, and precision
Brian Pogue, Engineering Science, Dartmouth College, USA
- Monitoring emerging therapies in oncology
Darren Roblyer, Biomedical Engineering, Boston University, USA
- 15:00 – 15:15 Q&A
- 15:15 – 15:30 Poster awards and Tongue-in-cheek awards

Poster Presentations

1. **Rollerball microendoscope for mosaicking in high-resolution oral imaging**
Nicole Sevilla, Florida International University, USA
2. **Compressed full-field Fourier transform spectrometry**
Dushan N. Wadduwage, Massachusetts Institute of Technology, USA
3. **A biophysical Raman spectroscopic model for noninvasive screening of skin cancer**
Xu Feng, The University of Texas at Austin, USA
4. **In vivo multiphoton microscopy beyond 1 mm in the brain**
David R. Miller, The University of Texas at Austin, USA
5. **Development of a single-board computer high-resolution microendoscope (PiHRME) to increase access to cervical cancer screening in underserved areas**
Sonia G. Parra, Rice University, USA
6. **Improving light delivery for optogenetics using wavefront shaping**
Joshua Brake, California Institute of Technology, USA
7. **Assessing tracheal health using optical metabolic imaging and optical coherence tomography**
Daniel A. Gil, University of Wisconsin–Madison & Morgridge Institute for Research, USA
8. **Multiphoton tissue imaging by using moxifloxacin**
Ki Hean Kim, Pohang University of Science and Technology, South Korea
9. **Fluctuations in single-cell organelle size estimates from angular scattering measurements**
Robert L. Draham, University of Rochester, USA
10. **Spatiotemporal propagation of cerebral hemodynamics during and after resuscitation from cardiac arrest**
Christian Crouzet, Beckman Laser Institute, USA
11. **Imaging moving targets through scattering media**
Michelle Cua, California Institute of Technology, USA
12. **2D and 3D structured illumination microscopy with unknown patterns and a statistical prior**
Li-Hao Yeh, University of California, Berkeley, USA
13. **Single-shot Interferometric Polarization Microscopy**
Baoliang Ge, Massachusetts Institute of Technology, USA
14. **Optimizing field-of-view of deep-tissue scanning microscopy**
Gerwin Osnabrugge, University of Twente, Netherlands
15. **Tumor detection and treatment by means of thermography and laser irradiation**
Euiheon Chung, Gwangju Institute of Science and Technology, South Korea
16. **Frequency domain diffuse optical tomography with a single source and detector via high-speed hypocycloid scanning**
Matthew B. Applegate, Boston University, USA

17. **Compact cell culture imaging system using Fourier ptychographic microscopy**
Daniel Martin, California Institute of Technology, USA
18. **Exploiting diffuse reflectance measurement uncertainty estimates in spatial frequency domain imaging**
Vivian Pera, Boston University, USA
19. **3D computational microscopy of dynamic samples**
Laura Waller, University of California, Berkeley, USA
20. **Noninvasive monitoring of tumor oxygenation response to anti-hypoxia drug using near-infrared spectroscopy**
Xiangqian Hong, Marquette University, USA
21. **Multi-mode fiber imaging with selective mode control**
Sakshi Singh, University of Colorado, Boulder, USA
22. **Lightweight high-density diffuse optical tomography using sCMOS detection**
Karla M. Bergonzi, Washington University in St. Louis, USA
23. **In-vitro validation and quantitative measurements of graded burn wounds on a porcine model using handheld laser speckle imaging**
Ben Lertsakdadet, University of California, Irvine, USA
24. **Multimodal optical imaging platform for the early diagnosis for oral neoplasia**
Eric Yang, Rice University, USA
25. **WITHDRAWN**