

# **Advances in Optics for Biotechnology, Medicine and Surgery XVI**

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2 – 6 June 2019

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## **Sunday, June 2, 2019**

16:00 – 18:00	Conference Check-in (Mali Foyer)
18:00 – 19:30	Dinner
19:30 – 21:00	<b><u>Session I: Hot Topics</u></b> Session Chairs: Brian Pogue, Dartmouth College, USA Christophe Moser, EPFL, Switzerland
19:30 – 20:15	<b>Imaging multiple molecular markers under surgical light illumination</b> Viktor Gruev, University of Illinois at Urbana-Champaign, USA
20:15 – 21:00	<b>Molecular guided surgery advances</b> Eben Rosenthal, Stanford University, USA
21:00 – 22:00	Poster Session / Social Hour

### **Room locations and notes**

- General Sessions will be held in Mali I-II.
- Poster Sessions will be in Mali III.
- Meals will be in Soutana I-II. The conference banquet location will be announced on site.
- The ECI office is the Meeting Planner Office.
- Audio, still photo and video recording by any device (e.g., cameras, cell phones, laptops, PDAs, watches) is strictly prohibited during the technical sessions, unless the author and ECI have granted prior permission.
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**Monday, June 3, 2019**

- 07:00 – 08:30 Breakfast and Discussion Time
- Session II: Engineering Optical and Fiber Systems**  
Session Chair: Rongguang Liang, University of Arizona, USA
- 08:30 – 09:00 **Advances in SCAPE microscopy for high-speed volumetric imaging**  
Elizabeth Hillman, Columbia University
- 09:00 – 09:30 **Development of compact ultrafast fiber laser sources for nonlinear optical microscopy**  
Khanh Kieu, University of Arizona, USA
- 10:00 – 10:30 **OCT for image-guided therapy and surgery**  
Thomas Milner, Texas A&M University, USA
- 10:30 – 11:00 Coffee break and discussion time
- Session III: Optical-Radiation Interactions**  
Session Chair: Brian Wilson, University of Toronto, Canada
- 11:00 – 11:15 **Radiation-optical interactions**  
Brian Wilson, University of Toronto, Canada
- 11:15 – 11:45 **Liposomal optical activation delivery of agents**  
Jonathan Lovell, University of Buffalo, USA
- 11:45 – 12:15 **Combining ionising radiation with nanoconstructs: towards new options in cancer therapy**  
Ewa M. Goldys, The University of New South Wales, Australia
- 12:15 – 12:30 **Shedding light on the effect of radiation therapy on circulating tumor cells**  
Mark Niedre, Northeastern University, USA
- 12:30 – 14:00 Lunch
- 14:00 – 18:00 Networking/Discussion
- 18:00 – 19:30 Dinner
- Session IV: Neurophotonics**  
Session Chair: Chair Erin Buckley, Emory University/Georgia Tech, USA
- 19:30 – 20:00 **Increasing depth sensitivity and brain specificity of diffuse correlation spectroscopy blood flow measures**  
Maria Angela Franceschini, Massachusetts General Hospital, USA
- 20:00 – 20:30 **What does laser speckle contrast imaging really measure?**  
Andrew Dunn, University of Texas at Austin, USA
- 20:30 – 21:00 **Non-invasive optical measurement of cerebral critical closing pressure in pediatric hydrocephalus**  
Wesley Baker, Children's Hospital of Philadelphia, USA
- 21:00 – 22:00 Poster Session / Social Hour

**Tuesday, June 4, 2019**

- 07:00 – 08:30 Breakfast and Discussion Time
- Session V: Optics and Biomechanics**  
Chair: David Sampson, University of Surrey, United Kingdom
- 08:30 – 09:00 **Biomechanics of cells and tissues: What can we learn when we combine mechanical stimuli with microscopy?**  
Davide Iannuzzi, Vrije University, Netherlands
- 09:00 – 09:30 **Translational shear-wave optical coherence elastography**  
Kirill Larin, University of Houston, USA
- 10:00 – 10:30 **Diagnosis of intestinal fibrosis by spectroscopic and strain photoacoustic imaging**  
Guan (Gary) Xu, University of Michigan, USA
- 10:30 – 11:00 Coffee Break and Discussion Time
- Session VI: Molecular Guided Surgery**  
Chair: Sylvain Gioux, University of Strasbourg, France
- 11:00 – 11:30 **The state of fluorescence imaging in robotic surgery**  
Jonathan Sorger, Intuitive Surgical, USA
- 11:30 – 12:00 **Artificial intelligence (AI)-enabled multimodal macroscopic optical spectroscopy imaging platform for surgical oncology applications**  
Frederic Leblond, University of Montreal, Canada
- 12:00 – 12:30 **Making sense in surgery using Near-Infrared Optical Imaging**  
Sylvain Gioux, University of Strasbourg, France
- 12:30 – 14:00 Lunch
- Session VII: Imaging Through Turbid Media**  
Chairs: Christophe Moser, Polytechnique Fédérale de Lausanne (EPFL), Switzerland
- 14:00 – 14:30 **Scalable and reliable deep learning for computational microscopy in complex media**  
Lei Tian, Boston University, USA
- 14:30 – 15:00 **Photoacoustic microendoscopy through multimode fibers**  
Emmanuel Bossy, University of Grenoble, France
- Session VIII: Commercialization Case Studies**  
Chairs: Kate Bechtel, Triple Ring Technology, USA
- 15:30 – 16:00 **Development of the MediBeacon transdermal GFR measurement system**  
Martin Debreczeny, Medibeacon Inc., USA
- 16:00 – 16:30 **Commercialization of Photodisinfection Technologies**  
Nicolas Loebel, Ondine Biomedical, Inc., Canada
- 16:30 – 17:00 **Commercialization of Modulated Imaging**  
Amaan Mazhar, Modulated Imaging, Inc., USA

**Tuesday, June 4, 2019 (continued)**

17:00 – 19:00	Networking/Discussion
19:00 – 19:30	Reception
19:30 – 21:00	Conference Banquet

**Wednesday, June 5, 2019**

- 07:00 – 08:30 Breakfast and Discussion Time
- Session IX: Microscopy Advances**  
Chairs: Christoph Moser
- 08:30 – 09:00 **Advances in computational wide field imaging**  
Peter So, Massachusetts Institute of Technology, USA
- 09:00 – 09:30 **Design, fabrication, and test of micro-optics for biomedical applications**  
Rongguang Liang, University of Arizona, USA
- 10:00 – 10:30 **Spectroscopic single-molecule localization microscopy (sSMLM)**  
Hao Zhang, Northwestern University, USA
- 10:30 – 11:00 Coffee Break and Discussion Time
- Session X: Learning in Optical Systems**  
Session Chair: Aydogan Ozcan, University of California Los Angeles, USA
- 11:00 – 11:30 **Too far, too small, too dark, too foggy: On the use of machine learning for computational imaging problems**  
George Barbastathis, Massachusetts Institute of Technology, USA
- 11:30 – 12:00 **Can we control highly complex and nonlinear optical systems?**  
Rafael Piestun, University of Colorado at Boulder, USA
- 12:00 – 12:30 **Toward a thinking microscope: Deep learning-enabled computational microscopy and sensing**  
Aydogan Ozcan (introduced by C. Moser), University of California Los Angeles, USA
- 12:30 Lunch and Departures

## **Poster Presentations**

1. **Simulation analysis of manipulating light propagation through turbid Media**  
Snow H. Tseng, National Taiwan University, Taiwan
2. **Speckleplethysmographic (SPG) estimation of heart rate variability**  
Cody E. Dunn, Beckman Laser Institute, UCI, USA
3. **Model eye imaging by closed-loop accumulation of single scattering (CLASS) microscopy**  
Yookyung Jung, Center for Molecular Spectroscopy and Dynamics/Institute for Basic Science (IBS), South Korea
4. **Interferometric speckle visibility spectroscopy for improved measurement of blood flow dynamics**  
Joshua H. Brake, California Institute of Technology, USA
5. **Generative adversarial network prediction of optical properties from single images with structured- or homogenous-illumination**  
Nicholas Durr, Johns Hopkins University, USA
6. **De-scattering with excitation patterning in temporally-focused microscopy (DEEP-TFM)**  
Jong Kang Park, MIT, USA
7. **Utilizing ectopic Hsp90 expression to diagnose breast cancer at the point-of-care using fluorescence microscopy**  
Roujia Wang, Duke University, USA
8. **Matrix approach of Full-Field OCT for volumetric imaging of an opaque human cornea**  
Paul Balontrade, Institut Langevin, France
9. **Image-guided fluorescence tomography in head & neck surgical models**  
Michael J. Daly, University Health Network, Canada
10. **A fast three-dimensional dynamic light scattering computational model for imaging through turbid media**  
Chakameh Zahed Jafari, University of Texas at Austin, USA
11. **Cortex-wide, cellular-resolution two-photon microscopy**  
Hunter B. Banks, Washington University in St. Louis, USA
12. **Using a multimodal platform to investigate the role of spreading depolarization and hemodynamics in neurological recovery**  
Christian Crouzet, Beckman Laser Institute, USA
13. **Methodology to rapidly map and quantify whole-brain microvasculature in 3d**  
Katiana M. Khouri, University of California, Irvine, USA
14. **Microvascular cerebral hemodynamics in pediatric sickle cell disease with Diffuse Correlation Spectroscopy**  
Erin M. Buckley, Emory University, USA
15. **SPAD based imaging of Cherenkov light in radiation therapy**  
Arthur Petusseau, Dartmouth College, USA
16. **Cherenkov-excited luminescence imaging of microdose injections for novel tumor response assay**

Jennifer Soter, Dartmouth College, USA

17. **Using dynamic vascular optical spectroscopy to monitor patients with peripheral arterial disease - three exemplary cases**  
Alessandro Marone, Columbia University, USA
18. **Imaging of stiffness heterogeneity in pancreatic cancer to assess elastography as a surrogate for drug distribution in orthotopic xenograft models**  
Phuong Vincent, Dartmouth College, USA
19. **Total hemoglobin reduction in the tumor volume correlates with response to breast cancer neoadjuvant chemotherapy within two weeks of treatment**  
Mirella Altoe, Columbia University, USA
20. **Wearable toe band system for monitoring of peripheral artery disease**  
Youngwan Kim, Columbia University, USA
21. **Workflow for real-time in-vivo Cherenkov-excited luminescence imaging during radiotherapy**  
Ethan LaRochelle, Dartmouth College, USA
22. **Towards label-free imaging of breast cancer-induced pre-metastatic niche using spontaneous Raman spectroscopy**  
Santosh Kumar Paidi, Johns Hopkins University, USA