

Preliminary Program
(September 17, 2023)

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

October 15-19, 2023
Tomar, Portugal

Conference Chairs:

Frederic Leblond
Polytechnique Montreal, Canada

Mark Niedre
Northeastern University, USA

Conference Co-Chairs

Summer Gibbs
Oregon Health and
Science University, USA

David Cuccia
Modulim, Inc., USA

Jonathan Liu
University of Washington,
USA



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Sunday, October 15, 2023

17:30 – 18:30	Conference check-in
18:30 – 19:00	Welcome reception (with music)
19:30 – 21:00	Dinner

Monday, October 16, 2023

07:30 – 08:30 Breakfast and Discussion Time

Session 1: Optics in Surgical Interventions I

08:30 – 09:00 **Can near infrared nerve-specific imaging improve surgical outcomes?**
Summer Gibbs, Oregon Health and Science University, USA

09:00 – 09:30 **Seeing early cancer in a new light with hyperspectral endoscopy**
Sarah Bohndiek, University of Cambridge, United Kingdom

09:30 – 10:00 **Advanced optical imaging for surgical vision**
Sylvain Gioux, Intuitive Surgical, Switzerland

10:00 – 10:30 **Intraoperative detection of insufficient surgical margins in head and neck cancer resection using dual aperture fluorescence ratio imaging**
Kenneth Tichauer, Illinois Institute of Technology, USA

10:30 – 11:00 Coffee Break and Discussion Time

Session 2: Optics in Surgical Interventions II

11:00 – 11:30 **What role in surgery for Raman spectroscopy?**
Frederic Leblond, Polytechnique Montreal, Canada

11:30 – 12:00 **Development of imaging probes for fluorescence guided surgery of GI and endocrine tumors**
Michael Bouvet, University of California San Diego, USA

12:00 – 12:30 **TBA**
Pablo Valdes, University of Texas Medical Branch, USA

12:30 – 13:00 **Beyond tumor-to-background ratios: Methods for improved decision making in fluorescence guided surgery**
Kimberley Samkoe, Thayer School at Dartmouth, USA

13:00 – 14:30 Lunch

Session 3: Microscopic Imaging in Biomedicine I

14:30 – 15:00 **TBA**
Jonathan Liu, University of Washington, USA

15:00 – 15:30 **Low-cost, in vivo microscopy**
Dongkyun Kang, University of Arizona, USA

15:30 – 16:00 **Autofluorescence lifetime imaging to monitor immune cell metabolism and function**
Melissa Skala, Morgridge Institute for Research, USA

16:00 – 16:30 **Cell tracking in vivo: From hematopoietic stem cells to mature leukocytes**
Charles P. Lin, Wellman Center for Photomedicine, Massachusetts General Hospital, USA

16:30 – 18:00 Coffee Break and Poster Session I

Monday, October 16, 2023 (continued)

Session 4: Microscopic Imaging in Biomedicine II

- 18:00 – 18:30 **Label-free fluorescence lifetime techniques for image-guided interventions**
Laura Marcu, University of California, Davis, USA
- 18:30 – 19:00 **Fast mid-infrared imaging with non-degenerate two-photon absorption**
Eric Potma, University of California, Irvine, USA
- 19:00 – 19:30 **Investigating cellular metabolic changes in response to therapy using two-photon excited autofluorescence**
Narasimhan Rajaram, University of Arkansas, USA
- 19:30 – 21:00 Dinner

Tuesday, October 17, 2023

07:30 – 08:30 Breakfast and Discussion Time

Session 5: Vascular Imaging and Biofluid Studies

08:30 – 09:00 **Towards fluorescence molecular in vivo liquid biopsy of circulating tumor cells**
Mark Niedre, Northeastern University, USA

09:00 – 09:30 **Minimally-invasive surgical application of multispectral and polarization resolved imaging**
Dan Elson, Imperial College, United Kingdom

09:30 – 10:00 **Extreme imaging cytometry - From instrumentation to AI acceleration**
Kevin Tsia, The University of Hong Kong, Hong Kong

10:00 – 10:30 **Coherent spatial imaging of hemodynamics**
Bernard Choi, University of California, Irvine, USA

10:30 – 11:00 Coffee Break and Discussion Time

Session 6: Optics in Neurosciences and Neuropathology I

11:00 – 11:30 **Minimally invasive monitoring of the central nervous system**
David Busch, University of Texas Southwestern, USA

11:30 – 12:00 **High-resolution imaging of myelin loss and degradation in neurodegenerative diseases with birefringence microscopy**
Irving Bigio, Boston University, USA

12:00 – 12:30 **Optical spectroscopy for real-time neuronavigation during deep brain stimulation surgeries**
Daniel Côté, CERVO Brain Research Center, Université Laval, Canada

12:30 – 14:00 Lunch

14:00 – 18:00 Excursion – Guided tour of the Convento de Cristo

Session 7: Optics in Neurosciences and Neuropathology II

18:30 – 19:00 **Non-invasive evaluation of microvascular and endothelial function with hybrid near-infrared spectroscopies**
Turgut Durduran, ICFO-The Institute of Photonic Sciences, Spain

19:00 – 19:30 **Assessing cerebrovascular insufficiency and neural risk with diffuse optical methods**
Maria Angela Franceschini, Massachusetts General Hospital, Harvard Medical School, USA

19:30 – 20:00 **Changes in neurovascular coupling as an indicator of cerebral health**
Jana Kainerstorfer, Carnegie Mellon, USA

20:00 – 21:30 Dinner

Wednesday, October 18, 2023

07:30 – 08:30 Breakfast and Discussion Time

Session 8: Automated Learning Approaches in Biomedicine

08:30 – 09:00 **Multimodal computational pathology**
Faisal Mahmood, Harvard Medical School, USA

09:00 – 09:30 **Real-time label-free AI-enhanced digital histopathology using SLAM microscopy**
Stephen Boppart, University of Illinois Urbana-Champaign, USA

09:30 – 10:00 **Multimodal computational colonoscopy**
Nicholas Durr, Johns Hopkins University, USA

Session 9: Imaging Device Standards and Tissue Phantoms

10:00 – 10:30 **Phantoms to accelerate technology development and standardization in Biophotonics**
Stefan Andersson-Engels, Tyndall National Institute, Ireland

10:30 – 11:00 **Tools to build consensus and accelerate clinical translation of intraoperative fluorescence imaging**
Ethan LaRochelle, QUEL Imaging, USA

11:00 – 11:30 Coffee Break and Discussion Time

Session 10: Nanomedicine

11:30 – 12:00 **Nano-complex-therapy: A novel approach for the development of biocompatible hybrid nanovectors**
Jolanda Spadavecchia, CNRS, France

12:00 – 12:30 **Nanobody-based fluorescent contrast agents for rapid and specific intra-operative tumor visualization**
Sophie Hernot, Vrije Universiteit Brussel, Belgium

12:30 – 13:00 **Multifunctional porphyrin-lipid nanoparticles for cancer theranostics: From discovery to first-in-human and beyond**
Brian Wilson, University Health Network, Canada

13:00 – 14:30 Lunch

14:30 – 16:00 Free Time / Discussions

16:00 – 17:30 Coffee Break and Poster Session II

Session 11: Contributed Talks

17:30 – 17:45 **The tauVIVO time-domain fluorescence imaging system for the simultaneous imaging of ICG and targeted NIR tracers**
Hans Ingelberts, Vrije Universiteit Brussel, Belgium

Wednesday, October 18, 2023 (continued)

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| 17:45 – 18:00 | Fluorescence depth quantification using spatial frequency imaging and deep learning reconstruction
Michael Daly, Princess Margaret Cancer Centre, Canada |
| 18:00 – 18:15 | Near infrared fluorescent anti-mucin antibodies target and brightly label colonic polyps in CPC-APC mice
Kristin Cox, UC San Diego, USA |
| 18:15 – 18:30 | Bimodal characterization of human skin in vivo by combining diffuse reflectance spectroscopy and photothermal radiometry
Boris Majaron, Jozef Stefan Institute, Slovenia |
| 18:30 – 19:30 | Free Time |
| 19:30 – 21:00 | Conference Banquet |

Thursday, October 19, 2023

07:30 – 08:30 Breakfast and Discussion Time

Session 12: Clinical Translation of Emerging technologies

08:30 – 09:00 **Shortwave infrared imaging and spectroscopy in the time and spatial frequency domains**

Darren Roblyer, Boston University, USA

09:00 – 09:30 **Monitoring radiotherapy with functional OCT: Microvascular responses and correlations with MRI**

Alex Vitkin, University of Toronto / Princess Margaret Cancer Centre, Canada

09:30 – 10:00 **Computational approaches for model-based Diffuse Optical Tomography**

Hamid Dehghani, University of Birmingham, United Kingdom

10:00 – 10:30 **Low-cost optoacoustics? Prospects for miniaturizing and democratizing optoacoustic imaging systems in biomedical research and the clinics**

Daniel Razansky, ETH Zurich, Switzerland

11:00 Check-out and Departure