Parasitology Pre-meeting Course:

Imaging Parasites from Single Molecules to Whole Organism

November 20, 2019; 7 a.m. – 4:15 p.m.

Gaylord National Resort and Convention Center, National Harbor, Maryland USA

Parasitic infections in humans are caused by a diverse range of eukaryotic pathogens including both single-celled and multi-cellular organisms. Microscopy has provided an enormous wealth of information about the pathogenesis of these infections, the life cycle of the causative parasites, and the molecular mechanisms that underpin their growth and replication. In this course, we will discuss cutting edge techniques to visualize parasites – from the single molecule to the whole organism. Recent advances to the classic techniques of light and electron microscopy, together with computer-based algorithms to understand these data, have pushed the frontiers of imaging parasites. In this course, we will discuss these techniques and how they can be applied to divergent parasitic organisms to gain new levels of understanding about their basic cell biology and molecular pathogenesis. We will cover advances in 2D and 3D imaging techniques, advances in single molecule structural studies, and use of artificial intelligence as well as high throughput imaging to elucidate parasite biology.

Course Organizers:

Jeffrey Dvorin, MD, PhD, Assistant Professor of Pediatrics, Boston Children's Hospital and Harvard Medical School, Boston, Massachusetts, United States

Jake Baum, PhD, Professor of Cell Biology and Infectious Diseases, Imperial College London, London, United Kingdom

Eva Frickel, PhD, Group Leader, The Francis Crick Institute, London, United Kingdom

AGENDA

7 a.m.	Light Continental Breakfast
7:45 a.m.	**Welcome and Opening Remarks** *Jeffrey Dvorin, MD, PhD, Assistant Professor of Pediatrics, Boston Children's Hospital and Harvard Medical School, Boston, Massachusetts, United States*
8 a.m.	**Some Musings on the History of Microscopy** *Jake Baum, PhD, Professor of Cell Biology and Infectious Diseases, Imperial College London, London, United Kingdom*

8:30 a.m. Epifluorescence: **Inner Membrane Complex Formation in *Toxoplasma***
Dinkorma Ouologuem, PhD, Research Associate, Malaria Research and Training Center, University of Science, Techniques and Technology of Bamako, Bamako, Mali

9:15 a.m. Epifluorescence: **DNA Replication in *Plasmodium***
Catherine Merrick, PhD, Senior Lecturer, Department of Pathology, University of Cambridge, Cambridge, United Kingdom

10 a.m. Coffee Break

10:15 a.m. FIB-SEM/Live Microscopy: **Intraflagellar Transport in *Trypanosoma***
Eloise Bertiaux, PhD, Postdoctoral Fellow, Université de Genèveash, Geneva, Switzerland

11 a.m. FIB-SEM: **Daughter Parasite Formation in *Plasmodium***
Jeffrey Dvorin, MD, PhD, Assistant Professor of Pediatrics, Boston Children's Hospital and Harvard Medical School, Boston, Massachusetts, United States

11:45 Lunch (On your own)

1 p.m. Artificial Intelligence: **Application of AI to *T. gondii***
Eva Frickel, PhD, Group Leader, The Francis Crick Institute, London, United Kingdom

1:45 p.m. Artificial Intelligence: **Application of AI to *P. falciparum***
George Ashdown, PhD, Research Associate, Department of Life Sciences, Imperial College London, London, United Kingdom

2:30 p.m. Break

2:45 p.m. Cryo-EM: **Structure of the Rh5-CyRPA-RIPR Invasion Complex in *Plasmodium falciparum***
Wilson Wong, PhD, Senior Postdoctoral Fellow, Division of Infectious Diseases and Immune Defence, Walter and Eliza Hall Institute of Medical Research, Melbourne, Australia

3:30 p.m. CellProfiler: **High Throughput Imaging in Eukaryotic Cells**
Beth Cimini, PhD, Computational Biologist, The Broad Institute of MIT and Harvard, Cambridge, Massachusetts, United States

4:15 p.m. Course Adjourns