



Parasitology Pre-meeting Course:

Big Data and Genomics – A Practical Workshop on Sequence Analysis in Parasitology

October 28, 2018; 7 a.m. – 5 p.m.

Sheraton New Orleans, New Orleans, LA, United States

As the cost of genome sequencing has dropped, its applications to parasitology and tropical medicine have rapidly expanded. Identifying emerging pathogens and tracking their spread, understanding the origins and impact of drug resistance, investigating parasite population structures and how they are affected by disease elimination campaigns, carrying out fundamental studies of parasite cellular biology, tracing the evolution of the immune response to parasites – these are all fields where genomics and associated big data disciplines are becoming increasingly important. However, while the generating sequence data has become increasingly easy, the tools needed to analyze and interpret these data can appear intimidating and change rapidly, making it difficult to gain experience.

This practical, hands-on workshop will introduce participants to publicly available sequence analysis tools. Using parasite genome and/or RNAseq data obtained from actual field or laboratory experiments, participants will learn analytical methods and workflows used to extract meaningful biological, evolutionary and/or epidemiological insights. Through live exercises led by experts in the field, participants will learn how to retrieve data from sequence repositories, run them through preconfigured or customized workflows, and visualize and explore the data using web-based tools. These exercises will be augmented with short, didactic presentations on the theory and application of sequencing tools to parasitology research. Overall, the workshop will be interactive, interdisciplinary and provide participants with relevant tools and expertise to apply in their own research. Given the strong emphasis on hands-on learning, and the need to access web-based tools, participants will need to bring their own laptops if at all possible, as we cannot guarantee availability of computers for all participants.

Course Organizers:

Michael Ferdig, PhD, Department of Biology, University of Notre Dame, Notre Dame, Indiana, United States

Omar Harb, PhD, Director of Scientific Outreach and Education, Penn Center for Bioinformatics, University of Pennsylvania, Philadelphia, Pennsylvania, United States

Jessica Kissinger, PhD, Distinguished Research Professor, Director, Institute of Bioinformatics, Department of Genetics, University of Georgia, Athens, Georgia, United States

Jacquie Niles, MD, PhD, Associate Professor of Biological Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, United States

Julian Rayner, PhD, Senior Group Leader, Malaria Programme, Wellcome Trust Sanger Institute, Cambridge, United Kingdom

Course Instructors (for hands-on exercises):

Sebastian Baumgarten, PhD, Postdoctoral Researcher, Scherf Lab, Biology of Host-Parasite Interactions Unit, Institut Pasteur, France

Katrina Button-Simons, PhD, Postdoctoral Fellow, Ferdig Lab, University of Notre Dame, Notre Dame, Indiana, United States

Jane Pulman, PhD, Institute for Integrative Biology, University of Liverpool, Liverpool, United Kingdom

Sasha Siegel, PhD, Wellcome Trust Sanger Institute, Cambridge, United Kingdom

Susanne Warrenfeltz, PhD, Scientific Outreach Coordinator, University of Georgia, Athens, Georgia, United States

Mary Wilson, MD, Professor of Global Health, Department of Internal Medicine and Microbiology, University of Iowa College of Medicine, Iowa City, Iowa, United States

AGENDA

7 a.m. Light Continental Breakfast

8 a.m. **Introductory Lecture: The Next-Generation Sequencing Revolution**
Julian Rayner, PhD, Senior Group Leader, Malaria Programme, Wellcome Trust Sanger Institute, Cambridge, United Kingdom

8:30 a.m. **Hands-on Exercise: Preparing and Running an RNAseq or Variant Calling Analysis Workflow**

11 a.m. Coffee Break

11:15 a.m. **Lectures: RNAseq/Variant Analysis – Applications and Tools**
Jessica Kissinger, PhD, Distinguished Research Professor, Director, Institute of Bioinformatics, Department of Genetics, University of Georgia, Athens, Georgia, United States

Michael Ferdig, PhD, Department of Biology, University of Notre Dame, Notre Dame, Indiana, United States

Noon Lunch (on your own)

1:15 p.m. **Hands on Exercise: Understanding Output Files, Analysing and Visualizing Results**
(coffee provided)

4:15 p.m. **Wrap-up and Discussion**

5 p.m. Course Adjourns