

Invited Speakers

Wednesday — June 21, 2017

Microbial Diversity - (Unified Theme)

Invisible Influence: The microbiome in precision medicine.

Dr. Jack Gilbert, University of Chicago, Chicago, IL, USA



Professor Jack A. Gilbert earned his Ph.D. from Unilever and Nottingham University, UK in 2002, and received his postdoctoral training at Queens University, Canada. He subsequently returned to the UK in 2005 to Plymouth Marine Laboratory at a senior scientist until his move to Argonne National Laboratory and the University of Chicago in 2010. Currently, Professor Gilbert is the Director of the Microbiome Center and a Professor of Surgery at the University of Chicago. He is also Group Leader for Microbial Ecology at Argonne National Laboratory, Research Associate at the Field Museum of Natural History, Scientific Fellow at the Marine Biological Laboratory, and the Yeoh Ghim Seng Visiting Professorship in Surgery at the National University of Singapore. Dr. Gilbert uses molecular analysis to test fundamental hypotheses in microbial ecology. He has authored more than 250 peer reviewed publications and book chapters on metagenomics and approaches to ecosystem ecology. He is the founding Editor in Chief of *mSystems* journal. In 2014 he was recognized on Crain's Business Chicago's 40 Under 40 List, and in 2015 he was listed as one of the 50 most influential scientists by Business Insider, and in the Brilliant Ten by Popular Scientist. In 2016 he won the Altemeier Prize from the Surgical Infection Society, and the WH Pierce Prize from the Society for Applied Microbiology for research excellence.

Microorganisms and Ecosystem Services - (AEM)

Identifying and quantifying microbial interdependencies that underpin ocean productivity

Dr. Erin Bertrand, Dalhousie University, NS



Erin Bertrand is a Tier II Canada Research Chair in Marine Microbial Proteomics and a 2017 Simons Foundation Early Career Investigator in Marine Microbial Ecology and Evolution. She joined the Biology Department at Dalhousie University in Halifax Nova Scotia as an Assistant Professor in 2015. Erin received a B.S. with honours in Chemistry and Environmental Studies from Bates College. She went on to complete her PhD in Chemical Oceanography from the MIT/WHOI Joint Program where she was awarded the Fye Award for Excellence in Chemical Oceanography research, 2010-2015. Erin was a US National Science Foundation Office of Polar Programs Postdoctoral Fellow at the J. Craig Venter Institute and Scripps Institution of Oceanography. Her research aims are focused on understanding how microbes influence ocean biogeochemistry. She is particularly interested in the molecular basis of microbial micronutritional requirements and what the consequences of those requirements are for global carbon, nitrogen, and sulfur cycling. Her group employs a range of quantitative mass spectrometry- based techniques, paired with field and laboratory experiments, to ask these questions.

Microbial Systems Biology - (MGCM)

Systematic identification of a class of bacterial effectors with novel regulatory activities

Dr. Alex Ensminger, University of Toronto, ON

Dr. Alex Ensminger is an Assistant Professor of Biochemistry and Molecular Genetics at the University of Toronto. He received his Ph.D. from MIT and did his postdoctoral work with Ralph Isberg at Tufts University School of Medicine and the Howard Hughes Medical Institute. The Ensminger lab has used a combination of microbial genomics, experimental evolution, and microbial systems biology to elucidate molecular and evolutionary processes that shape the host-pathogen interface. Recent work has leveraged a champion of high-throughput biology, *Saccharomyces cerevisiae*, to uncover novel effector activities for an enigmatic intracellular bacterial pathogen, *Legionella pneumophila*. Dr. Ensminger was a co-chair of the 2016 CSM Annual Conference and currently serves as the CSM faculty representative for the University of Toronto.

Climate Change Microbiology - (AEM)

Climate change microbiology: insights from freshwater cyanobacteria

Dr. Kathryn Cottingham, Dartmouth College, NH, USA

Kathy Cottingham is a professor of biological sciences at Dartmouth College with broad interests in ecology and its applications to environmental health. She did her undergraduate work in biology and mathematics at Drew University, a small liberal arts school in New Jersey. After graduation she went directly to the University of Wisconsin – Madison, where she earned her M.S. and Ph.D. studying the effects of nutrient inputs and food web structure on freshwater plankton communities with Steve Carpenter. Cottingham then joined the first cohort of postdocs at National Center for Ecological Analysis and Synthesis in Santa Barbara, California, before moving to Dartmouth and climbing through the ranks from assistant to associate to full professor. Cottingham is outgoing Chair of the Department of Biological Sciences and Vice-Chair of the Science Advisory Committee for the Lake Sunapee Protective Association.

Epidemiology in a Changing Pathogen Landscape - (I&I)
Enabling global genomic epidemiology - a key tool for public health and microbiology research
Dr. Fiona Brinkman, Simon Fraser University, BC


Fiona Brinkman is a Professor in Bioinformatics and Genomics the Department of Molecular Biology and Biochemistry at Simon Fraser University, with cross appointments in Computing Science and the Faculty of Health Sciences. A graduate of Waterloo (B.Sc. 1990) and Ottawa (Ph.D. 1996), she is most known for R&D of widely used bioinformatics software that aids both microbe (PSORTb, Island Viewer, Pseudomonas.com), and human immune (InnateDB) analyses. She is currently co-leading a national effort (IRIDA.ca, now used across the Public Health Agency of Canada) to develop and use an open source genomic epidemiology bioinformatics resource to better track infectious diseases. An associated GenEpiO Consortium is coordinating genomic epidemiology ontology development (involving >70 researchers from 13 countries). She is also leading development an approach to integrate diverse data for the CanadianCHILDstudy.ca birth cohort, including microbiome, genomic, epigenetic, environmental indices, psycho/social/stress, medications, and nutrition data. She is on several committees and Boards, including the Board of Directors for Genome Canada, and the SAB for the EBI's European Nucleotide Archive. She has received a number of awards, including a TR100 award from MIT, CSM Fisher Award, and has been recognized as a Thomson Reuters Highly Cited Researcher.

Structural Biology - (MGCM)
Discovery of a novel flagellin family in diverse bacteria that forms enzymatically active flagella
Dr. Andrew Doxey, University of Waterloo, ON


Dr. Andrew Doxey is an Assistant Professor in the Department of Biology (cross-appointed to the School of Computer Science) at the University of Waterloo (UW). Dr. Doxey completed a Ph.D. in protein bioinformatics at UW, and an NSERC Postdoctoral Fellowship at Stanford in computational genomics. The Doxey Lab (which currently includes 12 graduate, undergraduate, and postdoctoral researchers) explores biological data mining, protein function prediction, and comparative and evolutionary genomics. A common theme is the development and application of computational methods to predict novel biological phenomena from genomes and other "omics" datasets. Current efforts are focused on computational discovery of new families of bacterial toxins and proteases, as well as uncharacterized proteins from newly sequenced microbial genomes and metagenomes. Doxey Lab research is currently supported by NSERC, MITACS and an Ontario Early Researcher Award.

Thursday — June 21, 2017



Computational Methods in Microbiology - (Unified Theme)

Enterotypes, Autism, Aliens and the Elderly: the microbiome as a composition
Dr. Greg Gloor, University of Western Ontario, ON

Greg Gloor is a Professor of Biochemistry with broad experience in molecular biology, genetics and genomics. Most recently he has developed tools to investigate fundamentals of molecular evolution, microbial ecology and meta-transcriptomics. He is currently working on developing and adapting principled methods to characterize correlation and differential abundance in sparse, high throughput sequencing data as generated in 16S rRNA gene sequencing surveys, meta-genomics and meta-transcriptomics. He is the developer and maintainer of the ALDEx2 R package on Bioconductor.



Microbial Arms Race: Antibiotics and Resistance - (I&I)

A Thermosensory Diguanylate Cyclase that Mediates Temperature-dependent Bacterial biofilm Development

Dr. Joe Harrison, University of Calgary, AB

Dr. Joe Harrison is an Assistant Professor in Biological Sciences at the University of Calgary. He is a microbiologist, biochemist and molecular geneticist. He holds a Canada Research Chair in Biofilm Microbiology and Genomics, and is the Chair of the University of Calgary Biofilm Research Group. Harrison studies signal transduction, a process that all living cells use to sense external stimuli and trigger a chain of chemical events inside the cell, resulting in physiological adaptation to the environment. He is particularly interested in signal transduction that allows bacteria to build biofilms, which are slime-covered communities of microorganisms that resist drugs, evade immunity and cause infection. Harrison currently leads the University of Calgary “Bugs-to-Drugs” initiative, which seeks to build breakthrough tools and technologies for discovering microbial natural products that can be used as new medicines to thwart chronic diseases.



Microbial Origins and Symbioses - (Unified theme)

One plus one equals one: historical and modern perspectives on symbiosis

Dr. John Archibald, Dalhousie University, NS

John M. Archibald is a Professor of Biochemistry & Molecular Biology at Dalhousie University, and a Senior Fellow of the Canadian Institute for Advanced Research, Program in Integrated Microbial Biodiversity. He is an Associate Editor for Genome Biology & Evolution and an Editorial Board member of Current Biology, Eukaryotic Cell, BMC Biology, Environmental Microbiology, and Protist Genomics. He is the author of more than 100 research articles and One Plus One Equals One: Symbiosis and the Evolution of Complex Life (Oxford University Press, 2014). He is a Fellow of the American Academy of Microbiology and in 2016 was elected Member of the College of New Scholars, Artists and Scientists of the Royal Society of Canada.

Synthetic (Micro)Biology - (MGCM)
Metabolite Valves: Dynamic Control of Metabolic Flux for Pathway Engineering
Dr. Kristala Jones Prather, Massachusetts Institute of Technology, MA, USA


Kristala Jones Prather is an Associate Professor of Chemical Engineering at MIT. She received an S.B. degree from MIT in 1994 and Ph.D. from the University of California, Berkeley (1999), and worked 4 years in BioProcess Research and Development at the Merck Research Labs (Rahway, NJ) prior to joining the faculty of MIT. Her research interests are centered on the design and assembly of recombinant microorganisms for the production of small molecules, with additional efforts in novel bioprocess design approaches. Research combines the traditions of metabolic engineering with the practices of biocatalysis to expand and optimize the biosynthetic capacity of microbial systems. A particular focus is the elucidation of design principles for the production of unnatural organic compounds within the framework of the burgeoning field of synthetic biology. Prather is the recipient of a Camille and Henry Dreyfus Foundation New Faculty Award (2004), an Office of Naval Research Young Investigator Award (2005), a Technology Review “TR35” Young Innovator Award (2007), a National Science Foundation CAREER Award (2010), and the Biochemical Engineering Journal Young Investigator Award (2011). Additional honors include selection as the Van Ness Lecturer at Rensselaer Polytechnic Institute (2012), a Young Scientist of the World Economic Forum Annual Meeting of the New Champions (2012), and a Fellow of the Radcliffe Institute for Advanced Study (2014-2015). Prather has been recognized for excellence in teaching with the C. Michael Mohr Outstanding Faculty Award for Undergraduate Teaching in the Dept. of Chemical Engineering (2006, 2016), the MIT School of Engineering Junior Bose Award for Excellence in Teaching (2010), and through appointment as a MacVicar Faculty Fellow (2014), the highest honor given for undergraduate teaching at MIT.

Viruses, Vaccination & Health - (I&I)
Phage morons modulate pathogenesis of *Pseudomonas aeruginosa* update invited speaker and detailed program.
Dr. Karen Maxwell, University of Toronto, ON


Dr. Karen Maxwell is an Assistant Professor in the Department of Biochemistry at the University of Toronto. She completed her undergraduate studies in Biochemistry at the University of Waterloo, her Ph.D. in the Department of Molecular Genetics at the University of Toronto and her postdoctoral work at the Ontario Centre for Structural Genomics with Aled Edwards. Studies in the Maxwell lab focus on how phages, the viruses that infect and kill bacteria, contribute to human diseases and microbiome dynamics. Her team is also actively pursuing several engineering projects, including the use of phages for rapid point-of-care diagnosis of bacterial infections, and the application of phage genes for the control of CRISPR-Cas9 genome editing technologies.



Microbes in Unusual Environments - (AEM)

Something from nothing? The creation of a new microbial ecosystem 2500 meters below the surface

Dr. Kelly Wrighton, Ohio State University, Ohio, USA

After working for several years using microbial metabolism for bioremediation services in the energy sector, **Kelly Wrighton** earned her Ph.D. from the University of California Berkeley Department of Microbiology. Here her research focused on anaerobic physiology and electron transfer mechanism in microbial fuel cells. Her Phd was funded by a Chang-Lee Diversity Fellow from the University. From here she transferred to Jill Banfield's lab, also at UC Berkeley, for her post-doctoral research, where she performed field research in subsurface systems and used metagenomics to infer new biogeochemical roles for many bacterial phyla which lacked any prior genomic or cultivation representation. Currently, Kelly is an Assistant Professor in the Department of Microbiology at the Ohio State University, where she group enjoys blending anaerobic physiology experiments, field work, and omic technologies to understand interconnected microbial processes that control anoxic carbon cycling. She defines her work as ecosystem independent- exploring microbial roles in guts (from moose to human), wetland muds (soils), and 2,500 deep rocks. In the past five years her publications have included Science, Nature, Nature Communications, Nature Microbiology. Her research on fractured shales was recently awarded Discovery Magazine's top 100 scientific discoveries in 2016, and she is a two time Kavli fellow.

Workshop Speakers

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GE Healthcare Life Sciences

Filtration 101- techniques and advances in filtration

Fernand Girard, Bioprocess Specialist, GE Healthcare Life Sciences



Beckman Coulter, Inc

Flow cytometric analysis of bacteria samples

Melis McHenry, Beckman Coulter Life Sciences



Thursday — June 22, 2017



Illumina

Using Illumina's next generation sequencing technology to understand microbes

Dr. Michael Smith, Executive Sequencing and Data Analysis Specialist



DNA GenoTek

Strategies and performance benchmarks for microbiome sampling & stabilization

Dr. Heloise Breton, DNA Genotek, Microbiome product specialist

