

RI Microbiome Symposium 2020

**Promoting Applied
Microbiome Research
in RI & the Northeast**

January 16 – 17, 2020

PROGRAM

Goals

Inform

To update attendees on cutting edge microbiome research relevant to the Northeast and beyond

Network

To bring together researchers from academic and medical institutions across the Northeast and encourage an exchange of ideas and form new collaborations

Synthesis

To break down silos between clinical and environmental microbiome research in order to find commonalities across disciplines

Thursday

January 16, 2020

4:00 pm Arrival and check-in - *Avedisian Hall, Floor 1*

5:00 pm Welcome Remarks - *170 Avedisian Hall*

Bongsup Cho, RI-INBRE Program Director
Paul Larrat, Dean, College of Pharmacy, University of
Rhode Island

5:10 pm Opening Remarks

Christopher Hemme, RI-INBRE Bioinformatics Core Director

5:15 pm Keynote

Tami Lieberman, Massachusetts Institute of Technology
De novo mutations in human skin microbiomes

6:00-8:00 pm Poster Session & Networking Reception -
Avedisian Hall, Atrium

Friday

January 17, 2020

8:30 am Symposium Goals - 170 Avedisian Hall

Christopher Hemme, RI-INBRE Bioinformatics Core Director

8:45-10:15 am Session I

Diet and the Microbiome

Moderator: Peter Belenky, Brown University

Mollie Monnig, Brown University

Microbial Translocation and Innate Immune Markers Following Moderate Alcohol in Healthy Volunteers

Kanakaraju Kaliannan, Harvard Medical School, MGH
The Effects of Polyunsaturated Fatty Acids on the Gut Microbiome

Swathi Penumutchu, Brown University

Effects of Complex Polysaccharides on Antibiotic-Induced Gut Dysbiosis

Zachary Pimentel, University of Rhode Island

Taxonomic and Functional Profiling of the Microbiome of the Eastern Oyster, Crassostrea virginia

10:15-10:30 am Break

10:30 am-12:00 pm Session II

Pathogens, Antibiotics and the Microbiome

Moderator: Kathryn Ramsey, University of Rhode Island

Amanda Jamieson, Brown University
Impact of Lung Microbes on Tolerance to Influenza A Virus Infection

Peter Belenky, Brown University
The Role of Microbial and Host Metabolism in Antibiotic-Induced Dysbiosis

Kellyanne Duncan, Brown University
Mucus Residing Community is Key for Gut Microbiome Stability

Rebecca Lebeaux, Dartmouth College
An Expedition into the Establishment of the Resistome: Exploring the Collection of Antimicrobial Resistance Genes in the Infant Gut

12:00-12:45 pm Facilities Tours and Lunch

- 3D Facility for Biomedical Sciences - 292 *Avedisian*
- RI Genomics & Sequencing Center - 352 *CBLs*
- RI-INBRE Central Research Core Facility - 405 *Avedisian*

Lunch - *Avedisian Hall, Atrium*

Lunch may be taken into Breakout Sessions A & B

12:45-2:00 pm Breakout Sessions

Breakout Session A - 105 Avedisian Hall Bioinformatics

Moderator: Christopher Hemme, RI-INBRE

August Guang, Brown University
Aspects of Power for Metagenomic Studies

Jason Dwyer, University of Rhode Island
*Nanopore Sensors for -omics: Combing Through the
Microbiome One Molecule at a Time*

Ying Zhang, University of Rhode Island
From Genomes to Ecosystems: Model-based
Characterization of omics Data

Open Discussion

Breakout Session B - 130 Avedisian Hall Student/Postdoc Lightning Talks

Moderator: Matthew Ramsey, University of Rhode Island

Benjamin Korry, Brown University
*Antibiotic Resistance Genes are Ubiquitous Among
the Gut Microbiota of Narragansett Bay Fish Species*

Jenna Wurster, Brown University
*Host Hyperglycemia Impacts Antibiotic Efficacy
Within the Gut Microbiome*

Dasith Perera, University of Rhode Island
*An Unexpected Finding in the Serum of Type II
Diabetics*

Kayla Russo, University of Rhode Island
*Metabolic Modeling of a Novel Mycoplasma
Identified from Eastern Oyster Microbiome*

Bianca Ross, University of Rhode Island
*Analysis of Nitrifying and denitrifying Bacteria
Communities in Advanced Nitrogen-Removal Onsite
Wastewater Treatment Systems*

Alissa Cox, University of Rhode Island
*Microbial Composition of greenhouse Gas Cycling
Communities in Soils Above Septic System
Drainfields*

Sarah Wigginton, University of Rhode Island
*Microbial Nitrogen Removal in Soils Treating Septic
System Wastewater*

Arianna Krinos, MIT
*EUKnique: Single-Cell Transcriptomic Analysis for
Marine Microbial Eukaryotes*

Jessica Carney, University of Rhode Island
*Tiny Cells with a Big Impact: An Unexpected Bloom
in the Mid-Atlantic*

Dawn Gratalo, Shoreline Biome
*Microbiome Profiling at the Strain Level Using rRNA
Amplifications*

2:00 pm Keynote

Sarah Hird, PhD, University of Connecticut
Birds and Bacteria: Evolution of the Avian Microbiome

2:45-4:14 pm Session III

Healthy States: Commensal Microbiomes

Moderator: Roxanne Beinart, University of Rhode Island

Matthew Ramsey, University of Rhode Island
*Identifying Mechanisms That Dictate Spatial
Composition of the Oral Microbiota*

Laura Williams, Providence College
*Inter-Individual Variation in the Gut Bacterial
Communities of Captive Coppery Titi Monkeys*

Bianca Brown, Brown University
*Effects of Environment and Species Identity on the
Gut Microbiomes of Co-occurring Small Mammals in
a Savanna Ecosystem*

Rebecca Stevick, University of Rhode Island
*Linking Environmental Variability to Oyster
Microbiomes in Narragansett Bay*

4:15-4:30 pm Break

4:30-6:00 pm Session IV

Microbial Ecology

Moderator: Ying Zhang, University of Rhode Island

Marcia Marston, Roger Williams University
*Long-term Coexistence of Cyanobacterial & Viral
Communities in Narragansett Bay*

Koty Sharp, Roger Williams University
*Using the Local Temperate Coral *Astrangia poculata*
to Identify What Drives Stability of Coral-Microbe
Interactions*

Laura Blum, Middlebury College
*Microbial Drivers of Nitrogen Metabolism:
Searching Tara Oceans Metagenomes*

Corinna Breusing, University of Rhode Island
*High-Pressure Shipboard Experiments Provide
Insights into the Physiological Dynamics of
Chemosynthetic Vent Snail Symbionts*

6:00 pm Closing Remarks

Session Themes

Diet and the Microbiome

Host diet represents a significant environmental factor shaping gut microbiome structure and function. Talks in this session will focus on how changes to diet can positively and negatively affect commensal microbiomes and host health.

Pathogens, Antibiotics and the Microbiome

Cycling of antibiotics and multidrug resistant bacteria is a significant environmental health challenge. Talks in this session will focus on the effects of antimicrobials and pathogens on commensal microbiome stability and function.

Healthy States: Commensal Microbiomes

Comparative analysis provides insight into the evolution and ecology of host-associated microbiomes. Talks in this session will focus on community structure and function of microbiomes associated with human and non-human hosts.

Microbial Ecology

Microbial communities are shaped by their environment, whether that environment is aquatic, terrestrial or a living host. Talks in this session will focus on the evolutionary and ecological factors shaping microbial community structure and function in a variety of habitats.

Bioinformatics

Omics analysis of microbial communities present a significant data analysis challenge compared to analysis of isolates. Talks in this session will focus on novel methods for computational analyses of microbial community data.

Lightning Talks

A goal of this symposium is to provide students and postdocs opportunities to present their research. In this session, selected students and postdocs who submitted poster abstracts will give five-minute presentations of their research. Topics will cover any aspect of microbiome research.

Thursday Keynote

De novo Mutations in Human Skin Microbiomes

Dr. Tami Lieberman, Assistant Professor, Institute for Medical Engineering, MIT

Tami Lieberman joined the Massachusetts Institute of Technology (MIT) faculty in January 2018. She leads a computational and experimental research group focused on uncovering the principles governing colonization niche range and personalization in the human microbiome.



Tami trained in molecular biology and mathematics at Northwestern University, where she conducted research in the laboratory of Jon Widom and was funded by a Barry M. Goldwater Scholarship. She then earned a PhD in Systems Biology from Harvard University, where she conducted research in Roy Kishony's laboratory. During her graduate research, Tami developed new genomic approaches for understanding how bacteria evolve during infections of individual people. As a postdoc in Eric Alm's lab at MIT, she further developed and applied these genomic approaches to understand the microbes that colonize us during health.

Tami has also made contributions to our understanding of antibiotic resistance, including the co-invention of a new platform for visualizing evolution in real time. Her work has been covered in the popular press, including online coverage from *The Atlantic*, *The Wall Street Journal*, *National Geographic*, *The Boston Globe*, and *ArsTechnia*.

Friday Keynote

Birds and Bacteria: Evolution of the Avian Microbiome

Dr. Sarah Hird, Assistant Professor, Department of Molecular & Cell Biology, University of Connecticut

Sarah Hird joined the faculty at the University of Connecticut in 2016, in the Department of Molecular and Cell Biology. Her group studies the role of the microbiome in vertebrate evolution with a special interest in avian microbiomes.



Dr. Hird earned her Bachelor's degree in Biology at the University of Idaho. She followed that with a Master's Degree in Biology at the University of Idaho with Dr. Jack Sullivan where she studied nuclear markers in red-tailed chipmunk hybrid zones. She earned her PhD in Biological Sciences at Louisiana State University with Drs. Robb Brumfield and Bryan Carstens studying novel computational tools and utilization of gut microbiota for phylogeographic inference. At the University of California - Davis, she served as a Chancellor's Postdoctoral Fellow in the laboratory of Dr. Jonathan Eisen.

Her main research questions are about the evolution of host-associated microbiomes and microbial phylogeography. She is also interested in how to use/create computational tools to answer those questions, specifically on what factors shape and maintain the gut microbiomes of wild birds.

Poster Presentations

1. *Mechanisms of Interaction Between Oral Corynebacterium and Streptococci*
Eric Almeida & Matthew Ramsey
Department of Cell & Molecular Biology, University of Rhode Island
2. *Role of Microbial and Host Metabolism in Antibiotic-Induced Dysbiosis*
Peter Belenky
Department of Pathobiology, Brown University
3. *Microbial Drivers of Nitrogen Metabolism: Searching Tara Oceans Metagenomes*
Laura Blum
Department of Biology, Middlebury College
4. *High-Pressure Shipboard Experiments Provide Insights into the Physiological Dynamics of Chemosynthetic Vent Snail Symbionts*
Corinna Breusing & Roxanne Beinart
Graduate School of Oceanography, University of Rhode Island
5. *Effects of Environment and Species Identity on the Gut Microbiomes of Co-occurring Small Mammals in a Savanna Ecosystem*
Bianca Brown
Department of Ecology & Evolutionary Biology, Brown University
6. *Tiny Cells with a Big Impact: An Unexpected Bloom in the Mid-Atlantic*
Jan Rines¹, **Jessica Carney**¹, Lucie Maranda¹ & Jerome Prezioso²
¹Graduate School of Oceanography, University of Rhode Island
²NOAA Fisheries

7. *Microbial Composition of Greenhouse Gas Cycling Communities in Soils Above Septic System Drainfields*
Alissa Cox
Laboratory of Soil Ecology & Microbiology, University of Rhode Island

8. *Effects of Early Life NICU Stress on the Developing Gut Microbiome*
Amy D'Agata¹, Jing Wu², Manushi KV Welandawe², Samia VO Dutra³, Brad Kane³, Maureen Groer³
¹University of Rhode Island, Nursing
²University of Rhode Island, Computer Science & Statistics
³University of South Florida, Nursing

9. *Tecan Informational Poster*
Jennifer Couget
Tecan Group Limited

10. *A Call for Future Studies: Do Gut Microbiomes Change Seasonally and Modulate Digestive and Metabolic Functions in Migratory Birds?*
Kristen DeMoranville & Clara Cooper-Mullin
Department of Cell & Molecular Biology, University of Rhode Island

11. *Recovery and Identification of Marine Microbes from Narragansett Bay and Assessment of Their Potential for Biofilm Formation*
Juwaan Douglas-Jenkins & Anne Reid
Department of Biology, Salve Regina University

12. *Mucus Residing Community is Key for Gut Microbiome Stability*
Kellyanne Duncan & Shipra Vaishnava
Department of Pathobiology, Brown University

13. *Nanopore Sensors for -omics: Combing Through the Microbiome one Molecule at a Time*

Jason Dwyer

Department of Chemistry, University of Rhode Island

14. *Protistan Diversity of Benthic Habitats in Narragansett Bay*

Erin S. Frates¹, Erin Borbee², Alia Al-Haj³, Chris Lane²,
Robinson W. Fulweiler³, Roxanne A. Beinart⁴

¹Department of Cell & Molecular Biology, University of Rhode Island

²Department of Biological Sciences, University of Rhode Island

³Departments of Earth & Environment & Biology, Boston University

⁴Graduate School of Oceanography, University of Rhode Island

15. *Assembling the Genome of a chemosynthetic Symbiont from Deep-sea hydrothermal Vent Snail Alviniconcha hessleri*

Michelle Hauer & Roxanne Beinart

Graduate School of Oceanography, University of Rhode Island

16. *Impact of Lung Microbes on Tolerance to Influenza A Virus Infection*

Amanda Jamieson

Molecular Microbiology & Immunology, Brown University

17. *The Effects of Polyunsaturated Fatty Acids on the Gut Microbiome*

Kanakaraju Kaliannan

Department of Medicine, Harvard Medical School/MGH

18. *Antibiotic Resistance Genes are Ubiquitous Among the Gut Microbiota of Narragansett Bay Fish Species*

Benjamin Korry & Peter Belenky

Department of Pathobiology, Brown University

19. *EUKnique: Single-Cell Transcriptomic Analysis for Marine Microbial Eukaryotes*
Arianna Krinos
Department of Earth, Atmospheric & Planetary Sciences, Massachusetts Institute of Technology
20. *An Expedition into the Establishment of the Resistome: Exploring the Collection of Antimicrobial Resistance Genes in the Infant Gut*
Rebecca Lebeaux
Graduate Program in Quantitative Biomedical Sciences, Geisel School of Medicine, Dartmouth College
21. *Long-term Coexistence of Cyanobacterial and Viral Communities in Narragansett Bay*
Marcie Marston
Department of Biology, Roger Williams University
22. *Microbial Translocation and Innate Immune Markers Following Moderate Alcohol in Healthy Volunteers*
Mollie Monnig
Behavioral & Social Sciences, Brown University
23. *Effects of Complex Polysaccharides on Antibiotic-Induced Gut Dysbiosis*
Swathi Penumutchu & Peter Belenky
Department of Pathobiology, Brown University
24. *An Unexpected Finding in the Serum of Type II Diabetics*
Dasith Perera
Department of Cell & Molecular Biology, University of Rhode Island
25. *Taxonomic and Functional Profiling of the Microbiome of the Eastern Oyster, *Crassostrea virginica**
Zachary Pimentel & Ying Zhang
Department of Cell & Molecular Biology, University of Rhode Island

26. *Identifying Mechanisms That Dictate Spatial Composition of the Oral Microbiota*

Matthew Ramsey

Department of Cell & Molecular Biology, University of Rhode Island

27. *Analysis of Nitrifying and Denitrifying Bacteria Communities in advanced Nitrogen-Removal Onsite Wastewater Treatment Systems*

Bianca Ross

Laboratory of Soil Ecology & Microbiology, University of Rhode Island

28. *Metabolic Modeling of a Novel Mycoplasma Identified from Eastern Oyster Microbiome*

Kayla Russo & Ying Zhang

Department of Cell & Molecular Biology, University of Rhode Island

29. *Localizing Key Bacterial Members of *Astrangia poculata*'s Microbiome and Monitoring the Changes in Taxa Diversity in Response to Holobiont Disturbance*

Allison Klein & Koty Sharp

Department of Biology, Roger Williams University

30. *Linking Environmental Variability to Oyster Microbiomes in Narragansett Bay*

Rebecca Stevick

Graduate School of Oceanography, University of Rhode Island

31. *Quantifying Variation in Functional Symbiont Density Throughout the Ciliate Life Cycle*

Benjamin Toles & Roxanne Beinart

Department of Cell & Molecular Biology, University of Rhode Island

32. *Microbial Nitrogen Removal in Soils Treating Septic System Wastewater*
Sarah Wigginton
Laboratory of Soil Ecology & Microbiology, University of Rhode Island
33. *The Harvard T. H. Chan School of Public Health Microbiome Analysis Core (HMAC): Advancing Microbiome Research.*
Jeremy Wilkinson
HSPH Microbiome Analysis Core, Harvard T.H. Chan School of Public Health
34. *Inter-Individual Variation in the Gut Bacterial Communities of Captive Coppery Titi Monkeys*
Laura Williams
Department of Biology, Providence College
35. *Host Hyperglycemia Impacts Antibiotic Efficacy within the Gut Microbiome*
Jenna Wurster & Peter Belenky
Department of Pathobiology, Brown University
36. *Microbiome Profiling at the Strain Level Using rRNA Amplicons*
Bo-young Hong, **Dawn Gratalo**, C. Clark, Thomas Jarvie, George M. Weinstock, Mark Driscoll
Shoreline Biome, Inc.
37. *An Integrated, Scalable Platform for Microbiome and Antimicrobial Resistance Data Analysis*
Jonathan Jacobs
QIAGEN Digital Insights

Notes

Special thanks to our sponsors



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January 16 & 17, 2020

The University of Rhode Island
Avedisian Hall/College of Pharmacy
7 Greenhouse Road, Kingston RI 02881

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