



*founded in 1931*

GORDON RESEARCH CONFERENCES *frontiers of science*

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**26th of June 2019**

ISME Office  
PO BOX 50  
6700 AB Wageningen  
The Netherlands

Dear ISME office and members,

This report is written in regards to ISME support of the **2019 Animal-Microbe Symbioses Gordon Research Seminar (GRS) and Gordon Research Conference (GRC)**, which took place from June 15<sup>th</sup> – 16<sup>th</sup> and June 16<sup>th</sup> – 21<sup>st</sup>, respectively (see attached programs), in Mount Snow, Vermont, USA. We would like to thank ISME for choosing to support the meeting by supporting the attendance of early-career scientists at both the GRS and GRC.

Animal-microbe symbioses are an exciting focus of research within the field of microbial ecology. Exemplifying this, both the GRS and GRC meetings were already full to capacity by February, four months before the meeting. Overall there were 71 attendees at the GRS and 197 attendees at the GRC, hailing from diverse institutions based in 21 countries (see attachment). Participants and speakers at both of the meetings were gender-balanced, with presentations from both junior and senior scientists, and with focus across a wide range of topics and methodologies. For early-career scientists in particular, attendance at the meeting represented a unique opportunity to engage with research at the forefront of the field and to foster important relationships with other researchers studying animal-microbe symbioses.

GRCs are renowned for providing an international forum for the communication and discussion of findings at the forefront of research in the biological, chemical, and physical sciences. The “off the record” policy of these meetings encourages an emphasis on the presentation and discussion of new unpublished results and ideas at the cutting edge of a particular field of research. Prior to the start of the 5-day GRC the associated 2-day GRS takes place. The GRS is organized *by* early-career scientists *for* early-career scientists. The GRS is focused on the presentation of research by a new generation of interdisciplinary and international scientists, as they begin careers in the field, through early-career-led scientific sessions and poster presentations. The planning of the GRS prior to the larger GRC encourages a more active participation by early-career scientists in the subsequent GRC, which everyone also attended.

The funding contributed by ISME was specifically used to fund registration fees for a number of early-career researchers selected based on the quality of their submitted abstracts to give talks and to act as discussion leaders at the Animal-Microbe Symbioses GRS (see attached). With the help of ISME, alongside other contributors, we were able to cover GRS registration fees for all of these early-career scientists and to offer travel grants to all selected speakers which covered part of their travel costs. As the GRC took place immediately after the

GRS at Mount Snow, this support also helped these same early-career researchers to attend the GRC meeting.

Subtitled “Symbiotic Tipping Points: Evolutionary Forces Driving Symbiotic Interactions”, the Animal-Microbe Symbioses GRS consisted of a keynote speaker session, 12 selected talks from early-career participants, two poster sessions (all participants were expected to bring a poster) and a mentorship component. John McCutcheon (University of Montana, USA) kicked off the GRS with his keynote talk entitled “A Functional Metabolic Chimera in the Three-Way Nested Endosymbiosis of Mealybugs”, which set the tone for an exciting and engaging meeting. Selected speakers presented their talks in two sessions, “Understanding the Intricacies of Nutritional Symbioses” and “The Secrets of Establishment and Maintenance of Symbiosis”, which together highlighted the disciplinary breadth of animal-microbe symbiosis research (see attached program). The mentorship component of the meeting was focused on science communication, and was titled “Making Science Accessible: From Twitter to Scientific Journalism”. Here we heard from two renowned leaders in scientific communication, Elisabeth Bik (Microbiome Digest / Harbers-Bik LLC, USA) who gave a talk about “Science and Social Media”, and Elizabeth Pennisi (Science, AAAS, USA), who gave a talk about “Tripartite Symbiosis: Journalist, Scientist and the Public: How Can We Best Communicate?”. Together they opened up a lively discussion and dialogue between GRS participants about improving how we interact with and communicate our science to the public. The GRS also allowed ample time for participants to interact with other early-career researchers, and gave them the opportunity to form connections and meet others in a less formal setting prior to the larger GRC meeting.

The Animal-Microbe Symbioses GRC, subtitled “Animal-Microbe Symbioses as Nested Ecosystems”, consisted of a keynote session with talks from two renowned researchers in the field: Sandie Degnan (University of Queensland, Australia) and John Thompson (University of California, Santa Cruz, USA), 8 sessions with a total of 32 talks from both selected and invited speakers and 4 poster sessions. The meeting also included “The GRC Power Hour™”, an open-forum discussion-based session where we focused on the unique issues faced by early career scientists and strategies to improve diversity and inclusion within the field. The topics discussed included: achieving work-life balance, recognizing and reducing unconscious bias, closing the pay gap faced by underrepresented minorities, career choices both inside and outside of academia, seeking mentorship, and managing non-research related service expectations. These discussions were fruitful, and offered insight and strategies to both junior and senior scientists. We will be writing an opinion piece summarizing the take-home messages gained from these discussions.

Overall the 2019 Animal-Microbe Symbioses GRS and GRC were a huge success and we are sincerely grateful to ISME for choosing to support the attendance of early-career scientists. We are thankful that the society offers their support to such initiatives, and focuses their efforts on aiding those at the start of their research careers.

Thank you and best regards,

*Ute Hentschel-Humeida*

Ute Hentschel Humeida, Ph.D.  
Chair, 2019 Animal-Microbe Symbioses Gordon Research Conference

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## Photos from the Animal-Microbe Symbioses GRS/GRC



**Top-left.** GRS attendees, early-career scientists representing the future of research in animal-microbe symbioses. **Top-right.** GRS attendees getting to know each other through some scientific speed networking. **Middle-left.** GRS co-chairs, PhD student Jennah Dharamshi and postdoctoral researcher Sandra Breum Andersen at the meeting venue in Mount Snow. **Middle-right.** Slide acknowledging the support of ISME at the GRS. **Bottom-left.** Slide acknowledging the support of ISME at the GRC. **Bottom-right.** Participants in a discussion-based power hour session which focused on issues affecting early-career scientists.

## **ISME Support - GRS/GRC Allocation**

Funding from ISME was used to support early career scientists at the GRS who were selected based on the quality of their submitted abstracts to act as speakers and discussion leaders in the session “The Secrets of Establishment and Maintenance of Symbiosis”. Specifically, funding from ISME was used for registration fees for these early-career scientists (who didn’t have support from other sources). In addition, the registration of an invited speaker at the GRC was supported using ISME funding. These early career scientists are:

### **GRS Discussion Leaders Supported:**

#### **Tobin Hammer**

(Postdoctoral researcher at University of Texas at Austin, USA)

#### **Susann Rossbach**

(PhD student at King Abdullah University of Science and Technology, Saudi Arabia)

### **GRS Selected Speakers Supported:**

#### **Silvia Moriano Gutierrez**

(PhD student at University of Hawaii at Manoa, USA)

*"The Vibrio fischeri Non-Coding sRNA, SsrA, Impacts Initiation of the Euprymna scolopes Symbiosis"*

#### **Dylan Shropshire**

(PhD student at Vanderbilt University, USA)

*"The Simple Genetic Basis of Cytoplasmic Incompatibility"*

#### **Daniel Tamarit**

(Postdoctoral researcher at Wageningen University, The Netherlands)

*"Chlamydiae and the symbiogenetic origin of eukaryotic organelles"*

#### **Joany Valentina Mariño Coronado**

(PhD student at Memorial University of Newfoundland, Canada)

*"Predicting the Population-Level Consequences of Trophic Symbiosis in Thyasirid Bivalves Using an Energy Budget Model"*

### **GRC Invited Speaker Supported:**

#### **Nicholas Shikuma**

(Assistant Professor at San Diego State University, USA)

*"The Influence of Bacteria on Animal Metamorphosis"*

## **Countries of Academic Affiliation of GRC Attendees**

Participants came from institutions based in the following countries (number of participants in brackets):

1. United States of America (111)
2. Germany (27)
3. United Kingdom (7)
4. Canada (6)
5. Japan (6)
6. Australia (5)
7. The Netherlands (5)
8. Switzerland (5)
9. Denmark (4)
10. Sweden (4)
11. Austria (3)
12. France (3)
13. Saudi Arabia (2)
14. Brazil (1)
15. Czech Republic (1)
16. Finland (1)
17. Israel (1)
18. Italy (1)
19. Mexico (1)
20. New Zealand (1)
21. Philippines (1)



# Animal-Microbe Symbioses (GRS)

*Gordon Research Seminar*

## Symbiotic Tipping Points: Evolutionary Forces Driving Symbiotic Interactions

June 15-16, 2019

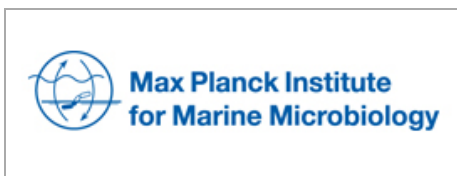
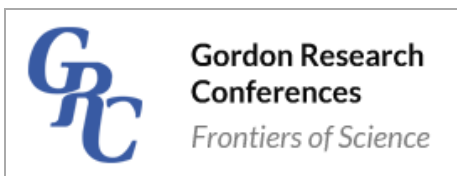
Mount Snow

West Dover, VT

Chairs: Sandra Breum Andersen and Jennah E. Dharamshi

## Contributors

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## Meeting Program

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### Saturday

2:00 pm - 5:00 pm	Arrival and Check-in
3:30 pm - 3:45 pm	Introductory Comments by GRC Site Staff / Welcome by the GRS Conference Chair
3:45 pm - 4:30 pm	<b>Keynote Session: Nested Symbiosis</b>
	Discussion Leader: <b>Eric Gordon</b> (University of Connecticut, USA)
3:45 pm - 4:20 pm	<b>John McCutcheon</b> (University of Montana, USA) "A Functional Metabolic Chimera in the Three-Way Nested Endosymbiosis of Mealybugs"
4:20 pm - 4:30 pm	Discussion
4:30 pm - 6:00 pm	<u>Poster Session</u>
6:00 pm	Dinner

7:30 pm - 9:30 pm

## Understanding the Intricacies of Nutritional Symbioses

Discussion Leaders: **Alejandro Manzano Marin** (Centre de Biologie pour la Gestion des Populations (CBGP), UMR1062, INRA, France) and **Megan Sorensen** (University of Sheffield, United Kingdom)

7:30 pm - 7:45 pm

**Nana Ankrah** (Cornell University, USA)

"Metabolic Reprogramming in Animal-Microbe Symbiosis: A Spittlebug Story"

7:45 pm - 7:50 pm

Discussion

7:50 pm - 8:05 pm

**Céline Loussert** (École Polytechnique Fédérale de Lausanne, Switzerland)

"The 'Language' of Endosymbiotic Partners: A Workflow Combining Cryo-Preparation, Fluo/Electron Microscopy, and NanoSIMS Imaging to 'Listen' to the 'Dialogue' Between Partners in Symbiotic Corals"

8:05 pm - 8:10 pm

Discussion

8:10 pm - 8:25 pm

**Dustin Dial** (University of Georgia, USA)

"Differential Division of Labor in the Ancient Symbionts of Sap-Sucking Insects (Sternorrhyncha: Adelgidae)"

8:25 pm - 8:30 pm

Discussion

8:30 pm - 8:45 pm

**Filip Husnik** (University of British Columbia, Canada)

"Exploring Protist-Bacteria/Archaea Symbioses in Insect Microbiomes via Single-Cell Genomics"

8:45 pm - 8:50 pm

Discussion

8:50 pm - 9:05 pm

**Charlotte Francoeur** (University of Wisconsin-Madison, USA)

"Garden Bacteria of Fungus-Farming Ants Can Metabolize Plant Secondary Compounds"

9:05 pm - 9:10 pm

Discussion

9:10 pm - 9:25 pm

**Jon Sanders** (Cornell University, USA)

"The Evolution of the Tetrapod Gut Microbiome"

9:25 pm - 9:30 pm

Discussion

## Sunday

7:30 am - 8:30 am

Breakfast

9:00 am - 11:00 am

## The Secrets of Establishment and Maintenance of Symbiosis

Discussion Leaders: **Tobin Hammer** (University of Texas at Austin, USA) and **Susann Rossbach** (King Abdullah University of Science and Technology (KAUST), Saudi Arabia)

9:00 am - 9:15 am

**Nancy Obeng** (Kiel University, Germany)

"Bacterial Perspectives on Evolving an Association with a Host"

9:15 am - 9:20 am

Discussion

9:20 am - 9:35 am

**Joany Valentina Mariño Coronado** (Memorial University of Newfoundland, Canada)

"Predicting the Population-Level Consequences of Trophic Symbiosis in Thyasirid Bivalves Using an Energy Budget Model"

9:35 am - 9:40 am

Discussion



9:40 am - 9:55 am	<b>Dylan Shropshire</b> (Vanderbilt University, USA) "The Simple Genetic Basis of Cytoplasmic Incompatibility"
9:55 am - 10:00 am	Discussion
10:00 am - 10:15 am	<b>Lucia Pita Galan</b> (GEOMAR - Helmholtz Centre for Ocean Research Kiel, Germany) "Microbial Recognition in Marine Sponges"
10:15 am - 10:20 am	Discussion
10:20 am - 10:35 am	<b>Daniel Tamarit</b> (Wageningen University, The Netherlands) "Reassessment of the Chlamydial Genetic Contribution to the Symbiogenetic Origin of Mitochondria and Plastids"
10:35 am - 10:40 am	Discussion
10:40 am - 10:55 am	<b>Silvia Moriano Gutierrez</b> (University of Hawaii at Manoa, USA) "The <i>Vibrio fischeri</i> Non-Coding sRNA, SsrA, Impacts Initiation of the <i>Euprymna scolopes</i> Symbiosis"
10:55 am - 11:00 am	Discussion
11:00 am - 12:30 pm	<u>Poster Session</u> <i>Coffee will be served in the poster area from 11:00 am - 11:30 am</i>
12:30 pm	Lunch
1:30 pm - 2:30 pm	<b>Mentorship Component: Making Science Accessible: From Twitter to Scientific Journalism</b>  Discussion Leaders: <b>Laura Rix</b> (University of Queensland, Australia) and <b>Daniel Tamarit</b> (Wageningen University, The Netherlands)
1:30 pm - 1:50 pm	<b>Elisabeth Bik</b> (Microbiome Digest / Harbers-Bik LLC, USA) "Science and Social Media"
1:50 pm - 2:00 pm	Discussion
2:00 pm - 2:20 pm	<b>Elizabeth Pennisi</b> (Science, AAAS, USA) "Tripartite Symbiosis: Journalist, Scientist and the Public: How Can We Best Communicate?"
2:20 pm - 2:30 pm	Discussion
2:30 pm - 3:00 pm	<u>Evaluation Period</u> <i>Fill in GRS Evaluation Forms</i>
3:00 pm	Seminar Concludes

# Animal-Microbe Symbioses

*Gordon Research Conference*

## Animal-Microbe Symbioses as Nested Ecosystems

June 16-21, 2019

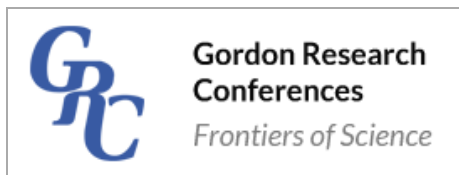
Mount Snow

West Dover, VT

Chair: Ute Hentschel

Vice Chair: Angela Douglas

## Contributors



## Meeting Program

### Sunday

2:00 pm - 9:00 pm	Arrival and Check-in
6:00 pm	Dinner
7:30 pm - 7:40 pm	Welcome / Introductory Comments by GRC Site Staff
7:40 pm - 9:30 pm	<b>Keynote Session: Nested Ecosystems</b>
	Discussion Leader: <b>Nicole Dubilier</b> (Max Planck Institute for Marine Microbiology, Germany)
7:40 pm - 7:55 pm	Introduction by Discussion Leader
7:55 pm - 8:20 pm	<b>Sandie Degnan</b> (University of Queensland, Australia) "Complex Layering of Animal-Bacterial Interactions in a Simple Marine Sponge Holobiont"

8:20 pm - 8:35 pm	Discussion
8:35 pm - 9:00 pm	<b>John Thompson</b> (University of California, Santa Cruz, USA) "The Process of Coevolution Within Webs of Interacting Species"
9:00 pm - 9:15 pm	Discussion
9:15 pm - 9:30 pm	General Discussion

## Monday

7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	<b>Biodiversity: A Microbial World Within Animal Hosts</b> Discussion Leader: <b>Shana Goffredi</b> (Occidental College, USA)
9:00 am - 9:15 am	Introduction by Discussion Leader
9:15 am - 9:40 am	<b>Brendan Bohannon</b> (University of Oregon, USA) "Host-Microbiomes as Metacommunities"
9:40 am - 9:55 am	Discussion
9:55 am - 10:10 am	Talk Selected from the GRS
10:10 am - 10:15 am	Discussion
10:15 am - 10:45 am	Coffee Break
10:45 am - 11:10 am	<b>Katherine Amato</b> (Northwestern University, USA) "A Case for Comparative Research: What Our Primate Cousins Have to Teach Us About the Human Gut Microbiome"
11:10 am - 11:25 am	Discussion
11:25 am - 11:40 am	Selected from Poster Abstracts: <b>Benjamin Rubin</b> (Princeton University, USA) "Social Behavior in Bees Influences the Abundance of Microbial Symbionts"
11:40 am - 11:45 am	Discussion
11:45 am - 12:10 pm	<b>Amy Apprill</b> (Woods Hole Oceanographic Institution, USA) "The Less Secret Lives of Coral Microbes"
12:10 pm - 12:25 pm	Discussion
12:25 pm - 12:30 pm	General Discussion
12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
3:00 pm - 4:00 pm	<u>The GRC Power Hour™</u> <i>The GRC Power Hour™ is designed to address challenges women face in science and issues of diversity and inclusion. The program supports the professional growth of all members of our communities by providing an open forum for discussion and mentoring.</i> Organizer: <b>Angela Douglas</b> (Cornell University, USA)
4:00 pm - 6:00 pm	<u>Poster Session</u>
6:00 pm	Dinner

7:30 pm - 9:30 pm

## The Molecular Language of Symbiosis

Discussion Leader: **Ursula Hofer** (Nature Reviews Microbiology, United Kingdom)

7:30 pm - 7:45 pm

Introduction by Discussion Leader

7:45 pm - 8:10 pm

**Edward Ruby** (University of Hawaii, USA)

"Modes of Signal-Response Underlying the Squid-*Vibrio* Association on Squid Symbioses"

8:10 pm - 8:25 pm

Discussion

8:25 pm - 8:40 pm

Selected from Poster Abstracts: **Jessamyn Perlmutter** (Vanderbilt University, USA)

"A Single Phage Candidate Gene for Male Killing in a Bacterial Endosymbiont"

8:40 pm - 8:45 pm

Discussion

8:45 pm - 9:10 pm

**Federico Rey** (University of Wisconsin-Madison, USA)

"Using Host Genetics to Decipher Gut Microbial Metabolism"

9:10 pm - 9:25 pm

Discussion

9:25 pm - 9:30 pm

General Discussion

## Tuesday

7:30 am - 8:30 am

Breakfast

8:30 am

Group Photo

9:00 am - 12:30 pm

## Looking at Symbiosis Through the Host's Lens

Discussion Leader: **Denise Dearing** (University of Utah, USA)

9:00 am - 9:15 am

Introduction by Discussion Leader

9:15 am - 9:40 am

**Bruno Lemaître** (École Polytechnique Fédérale de Lausanne, Switzerland)

"The Foreign Within: *Drosophila-Spiroplasma* Interaction as a Model of Insect Endosymbiosis"

9:40 am - 9:55 am

Discussion

9:55 am - 10:10 am

Selected from Poster Abstracts: **Michael Shapira** (University of California, Berkeley, USA)

"Genetic Control of Enterobacter Commensal Abundance and Function in *C. elegans*"

10:10 am - 10:15 am

Discussion

10:15 am - 10:45 am

Coffee Break

10:45 am - 11:10 am

**Katharina Ribbeck** (Massachusetts Institute of Technology, USA)

"Finding a Niche: Microbial Colonization of Host Mucosal Barriers"

11:10 am - 11:25 am

Discussion

11:25 am - 11:40 am

Selected from Poster Abstracts: **Sarah McAnulty** (University of Connecticut, USA)

"Development of the Accessory Nidamental Gland in the Hawaiian Bobtail Squid, *Euprymna scolopes*"

11:40 am - 11:45 am	Discussion
11:45 am - 12:10 pm	<b>John Rawls</b> (Duke University, USA) "Gut Feeling: Mechanisms of Microbial and Nutritional Perception in the Vertebrate Intestine"
12:10 pm - 12:25 pm	Discussion
12:25 pm - 12:30 pm	General Discussion
12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	<u>Poster Session</u>
6:00 pm	Dinner
7:30 pm - 9:30 pm	<b>Experimental Models for Host-Microbe Interactions</b>
	Discussion Leader: <b>Thomas Bosch</b> (University of Kiel, Germany)
7:30 pm - 7:45 pm	Introduction by Discussion Leader
7:45 pm - 8:10 pm	<b>Annika Guse</b> (Heidelberg University, Germany) "Uncovering the Molecular Mechanisms of Intracellular Coral-Algal Symbiosis Using an Anemone Model"
8:10 pm - 8:25 pm	Discussion
8:25 pm - 8:40 pm	Selected from Poster Abstracts: <b>Megan Sorensen</b> (University of Sheffield, United Kingdom) "Convergent and Divergent Metabolic Routes to the Evolution of Stable Symbiosis"
8:40 pm - 8:45 pm	Discussion
8:45 pm - 9:10 pm	<b>Buck Samuel</b> (Baylor College of Medicine, USA) "Cultivating Relationships: Genetic Landscapes that Shape Microbiome Form and Function"
9:10 pm - 9:25 pm	Discussion
9:25 pm - 9:30 pm	General Discussion

## Wednesday

7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	<b>Goods and Services Provided by Microbial Symbionts</b>
	Discussion Leader: <b>Hassan Salem</b> (Smithsonian Institution, USA)
9:00 am - 9:15 am	Introduction by Discussion Leader
9:15 am - 9:40 am	<b>Jillian Petersen</b> (University of Vienna, Austria) "Coordinating Communal Living in Chemosynthetic Symbioses"
9:40 am - 9:55 am	Discussion
9:55 am - 10:10 am	Selected from Poster Abstracts: <b>Laura Rix</b> (University of Queensland, Australia) "Dissolved Organic Matter Cycling by the Marine Sponge Holobiont: From Microbes to Ecosystems"

10:10 am - 10:15 am	Discussion
10:15 am - 10:45 am	Coffee Break
10:45 am - 11:10 am	<b>Philipp Engel</b> (University of Lausanne, Switzerland) "Strain-Level View on the Gut Microbiota of Social Bees"
11:10 am - 11:25 am	Discussion
11:25 am - 11:40 am	Selected from Poster Abstracts: <b>Laura Flórez</b> (Johannes Gutenberg University Mainz, Germany) "Multiple Bodyguards or a Single Strong One? Coexistence of Defensive Symbiont Strains in a Beetle"
11:40 am - 11:45 am	Discussion
11:45 am - 12:10 pm	<b>Nicholas Shikuma</b> (San Diego State University, USA) "The Influence of Bacteria on Animal Metamorphosis"
12:10 pm - 12:25 pm	Discussion
12:25 pm - 12:30 pm	General Discussion
12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	<u>Poster Session</u>
6:00 pm	Dinner
7:00 pm - 7:30 pm	<u>Business Meeting</u> <i>Nominations for the Next Vice Chair; Fill in Conference Evaluation Forms; Discuss Future Site and Scheduling Preferences; Election of the Next Vice Chair</i>
7:30 pm - 9:30 pm	<b>Endosymbiosis and the Evolution of Eukaryotic Cells</b> Discussion Leader: <b>John McCutcheon</b> (University of Montana, USA)
7:30 pm - 7:45 pm	Introduction by Discussion Leader
7:45 pm - 8:10 pm	<b>Anja Spang</b> (Royal Netherlands Institute for Sea Research, The Netherlands) "Archaeal Genomes as Window into the Role of Symbiosis in Key Evolutionary Events"
8:10 pm - 8:25 pm	Discussion
8:25 pm - 8:40 pm	Selected from Poster Abstracts: <b>Harald Gruber-Vodicka</b> (Max Planck Institute for Marine Microbiology, Germany) "Two Intracellular and Cell Type-Specific Bacterial Symbionts in the Placozoan Trichoplax H2"
8:40 pm - 8:45 pm	Discussion
8:45 pm - 9:10 pm	<b>John Archibald</b> (Dalhousie University, Canada) "Mergers and Acquisitions: Endosymbiosis and Gene Flow in Microbial Eukaryotes"
9:10 pm - 9:25 pm	Discussion
9:25 pm - 9:30 pm	General Discussion



## Thursday

7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	<b>Symbiosis, Pathogenesis and Parasitism</b> Discussion Leader: <b>Joel Sachs</b> (University of California, Riverside, USA)
9:00 am - 9:15 am	Introduction by Discussion Leader
9:15 am - 9:40 am	<b>Manuel Kleiner</b> (North Carolina State University, USA) "Assessing Metabolism and Interspecies Interactions in Microbial Symbioses via Metaproteomics"
9:40 am - 9:55 am	Discussion
9:55 am - 10:10 am	Selected from Poster Abstracts: <b>Miguel Ángel González Porras</b> (Max Planck Institute for Marine Microbiology, Germany) "Hijacking the Cell's Command Center: Transcriptional Profiling of the Interaction Between an Intranuclear Bacterial Parasite and Its Deep-Sea Mussel Host"
10:10 am - 10:15 am	Discussion
10:15 am - 10:45 am	Coffee Break
10:45 am - 11:10 am	<b>Melanie Blokesch</b> (Swiss Federal Institute of Technology Lausanne, Switzerland) "Molecular Insights into <i>Vibrio cholerae</i> 's Intra-Amoebal Replication Niche"
11:10 am - 11:25 am	Discussion
11:25 am - 11:40 am	Selected from Poster Abstracts: <b>Frances Blow</b> (Cornell University, USA) "Metabolic Costs of a Defensive Symbiont for Its Insect Host"
11:40 am - 11:45 am	Discussion
11:45 am - 12:10 pm	<b>Colleen Mangold</b> (Pennsylvania State University, USA) "Zombie Ants: Manipulation of Animal Behavior by a Fungal Parasite"
12:10 pm - 12:25 pm	Discussion
12:25 pm - 12:30 pm	General Discussion
12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	<u>Poster Session</u>
6:00 pm	Dinner
7:30 pm - 9:30 pm	<b>Microbial Therapy</b> Discussion Leader: <b>Raquel Peixoto</b> (University of California, Davis, USA / Federal University of Rio de Janeiro, Brazil)
7:30 pm - 7:45 pm	Introduction by Discussion Leader
7:45 pm - 8:10 pm	<b>Jens Walter</b> (University of Alberta, Canada) "Modulation of the Gut Microbiota: An Ecological Perspective"
8:10 pm - 8:25 pm	Discussion

8:25 pm - 8:40 pm	Selected from Poster Abstracts: <b>Sean Leonard</b> (University of Texas at Austin, USA) "Engineered Symbionts Trigger RNA Interference to Protect Honey Bees from Viruses and Parasitic Mites"
8:40 pm - 8:45 pm	Discussion
8:45 pm - 9:10 pm	<b>Douglas Woodhams</b> (University of Massachusetts Boston, USA) "Responding to Amphibian Disease Emergence with Microbial Therapy"
9:10 pm - 9:25 pm	Discussion
9:25 pm - 9:30 pm	General Discussion

## Friday

7:30 am - 8:30 am	Breakfast
9:00 am	Departure