

RPPR Final Report

as of 04-Jan-2023

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EIN: 050300482

Report Date: 27-Mar-2023

Date Received: 28-Dec-2022

Final Report for Period Beginning 28-Feb-2022 and Ending 27-Dec-2022

Title: 2022 Sensory Transduction in Microorganisms Gordon Research Conference & Gordon Research Seminar

Begin Performance Period: 28-Feb-2022

End Performance Period: 27-Dec-2022

Report Term: 0-Other

Submitted By: Ph.D. Nancy Gray

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Distribution Statement: 1-Approved for public release; distribution is unlimited.

STEM Degrees: 0

STEM Participants:

Major Goals: The 24th Gordon Research Conference (GRC) on Sensory Transduction in Microorganisms (STIM) focusses on science that seeks to understand how microbes sense and respond to their environment for maximal survival and success. The conference will be held at the Ventura Beach Marriott in Ventura, California, January 16th to 21th, 2022, preceded by a Gordon Research Seminar (GRS) for trainees from January 15th to 16th. GRC conferences are well-known for their attributes that promote scientific interactions between participants and expose all to cutting edge science. First, GRC presentations emphasize unpublished, recent findings of exceptional significance, creating a stimulating atmosphere. The GRC meeting fosters a sense of community due to the relatively small size, and the fact that all the participants stay together at the same location, sharing meals and leisure time with one another. This structure greatly facilitates casual interactions that reduce the barriers between established and junior researchers. In addition, this STIM conference will be the fourth one that will hold a GRS for students and postdocs. The GRS provides a small, welcoming setting where junior scientists are meet each other, present and discuss their research, and examine preparing for various careers.

Accomplishments: The 2022 STIM GRC explored recent advances in understanding the mechanistic basis of microbial signal transduction. The meeting focused on bacterial receptors and the signaling responses they control via conformational changes, phosphorelays, enzymatic manipulation and mechanosensing. The meeting explored the basis by which environmental sensing and response underlie many fundamental aspects of bacterial biology including chemotaxis, pathogenesis, biofilm formation, community interactions, antimicrobial resistance and synthetic biology. Approaches that were covered included molecular genetics, single molecule studies, model host systems, high resolution protein and electron microscopic structures, biochemistry, biophysics and modeling. One feature of the conference was to pair data from high-resolution experiments with modeling to understand and predict the behavior of complex macromolecular assemblies and signaling circuitry. Invited speakers included both established and early-stage investigators from academia and industry. In addition, short talks were chosen from the abstracts to give early-career scientists a chance to speak, and to round out the program. For the fifth time, a Gordon Research Seminar (GRS) for postdocs and graduate students preceded the GRC. The GRS provided a supportive environment for young scientists to present their work, make connections, and receive advice by leaders in the field. Participants in the GRC and GRS benefited from the conference's open, collegial atmosphere that provided multiple opportunities to learn new information, engage in scientific discussion, promote scientific rigor,

RPPR Final Report as of 04-Jan-2023

and foster interdisciplinary collaboration.

The focus of the Gordon Research Seminar on Sensory Transduction in Microorganisms was signaling and adaptability. Here, trainees at the graduate student and post-doctoral fellow levels, from around the globe, presented and discuss the latest developments in the field. This seminar allowed trainees the opportunity for networking with their peers from other institutes, presenting and discussing their latest research, building their confidence for the upcoming GRC, recognition for their own outstanding scientific accomplishments, and career building and mentorship. The 2022 STIM GRS scientific focus was on topics from the latest research revealing how microorganisms sense and adapt to changing conditions. The GRS embraced the interdisciplinary aspect of this field with an array of oral and poster presentations from molecular biology, biochemistry, and microbiology fields.

Training Opportunities: Speakers, discussion leaders, poster presenters and attendees simultaneously contributed to and benefited from the collective skills and experience shared throughout the conference.

Results Dissemination: The final program has been posted on the GRC web.

Honors and Awards: Nothing to Report

Protocol Activity Status:

Technology Transfer: Nothing to Report

Partners

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I certify that the information in the report is complete and accurate:

Signature: Darlene Armstrong

Signature Date: 12/28/22 10:14AM



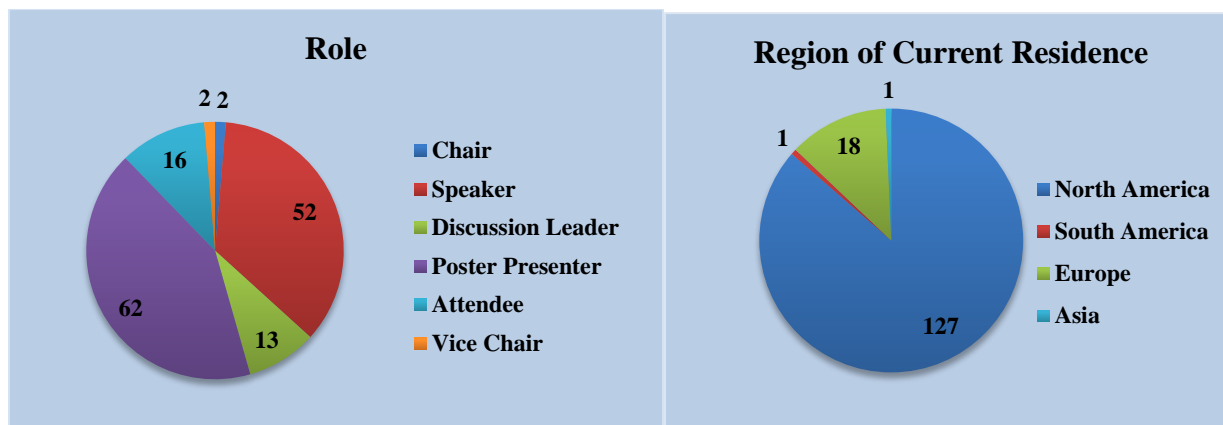
GORDON RESEARCH CONFERENCES
FINAL REPORT
Army Research Office
Sensory Transduction in Microorganisms GRC/GRS
Grant Number W911NF-22-10009

Operational Summary

The Gordon Research Conference (GRC) and Gordon Research Seminar (GRS) on Sensory Transduction in Microorganisms was held at the Four Points Sheraton in Ventura, California from September 24-30, 2022. The meeting covered a variety of scientific topics and the content presented was highly rated by participants.

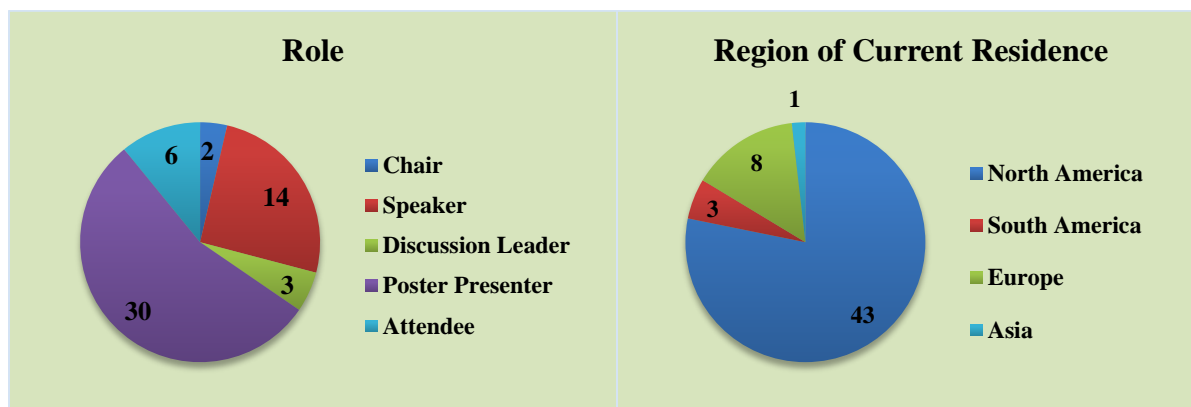
 **Conference Participants**

The Conference was well-attended with 147 participants. Scientists from academia represented 94% of the participants while attendees from government accounted for 3% and those from industry totaled 3%. The meeting also attracted a strong mix of young investigators and senior scientists. Students and post-docs accounted for 44% of all attendees. Approximately 49% of the participants at the 2022 meeting were women.



Seminar Participants

The Seminar was well-attended with 55 participants. Students and post docs combined accounted for 98% of all attendees. Approximately 50% of the participants at the 2022 seminar were women.



Conference Program

The 2022 STIM GRC explored recent advances in understanding the mechanistic basis of microbial signal transduction. The meeting focused on bacterial receptors and the signaling responses they control via conformational changes, phosphorelays, enzymatic manipulation and mechanosensing. The meeting explored the basis by which environmental sensing and response underlie many fundamental aspects of bacterial biology including chemotaxis,

pathogenesis, biofilm formation, community interactions, antimicrobial resistance and synthetic biology. Approaches that were covered included molecular genetics, single molecule studies, model host systems, high resolution protein and electron microscopic structures, biochemistry, biophysics and modeling. One feature of the conference was to pair data from high-resolution experiments with modeling to understand and predict the behavior of complex macromolecular assemblies and signaling circuitry. Invited speakers included both established and early-stage investigators from academia and industry. In addition, short talks were chosen from the abstracts to give early-career scientists a chance to speak, and to round out the program. For the fifth time, a Gordon Research Seminar (GRS) for postdocs and graduate students preceded the GRC. The GRS provided a supportive environment for young scientists to present their work, make connections, and receive advice by leaders in the field. Participants in the GRC and GRS benefited from the conference's open, collegial atmosphere that provided multiple opportunities to learn new information, engage in scientific discussion, promote scientific rigor, and foster interdisciplinary collaboration.

The focus of the Gordon Research Seminar on Sensory Transduction in Microorganisms was signaling and adaptability. Here, trainees at the graduate student and post-doctoral fellow levels, from around the globe, presented and discuss the latest developments in the field. This seminar allowed trainees the opportunity for networking with their peers from other institutes, presenting and discussing their latest research, building their confidence for the upcoming GRC, recognition for their own outstanding scientific accomplishments, and career building and mentorship. The 2022 STIM GRS scientific focus was on topics from the latest research revealing how microorganisms sense and adapt to changing conditions. The GRS embraced the interdisciplinary aspect of this field with an array of oral and poster presentations from molecular biology, biochemistry, and microbiology fields.

Conference Budget

Funding provided by the Army Research Office supported partial registration for 2 professors, 1 assistant professor, 10 graduate students, 6 post docs and 2 research scientists at the GRC and partial registration for 2 post docs and 6 graduate students at the GRS.

Conference Feedback

Participants had an opportunity to provide feedback at the end of the Conference. The feedback collected from the meeting was extremely positive. Evaluations from the GRC included numerous positive remarks regarding the well-organized conference, diversity and excellent interactions between trainees and senior scientists. Evaluations from the GRS included numerous positive comments about the career panel, diverse speaker pool and networking opportunities.

GRC would like to thank the Army Research Office for its continued support of the meetings. The contributions received have been critical to the success of the conferences and are having a measurable impact in advancing the frontiers of science worldwide.

Dr. Karen Ottemann, GRC Chair
University of California, Santa Cruz

Dr. Birgit Scharf, GRC Vice Chair
Virginia Polytechnic Institute and State University

Dr. Yashasvika Duggal, GRS Chair
The Broad Institute of MIT and Harvard

Dr. Lindsey O'Neal, GRS Chair
University of Washington Microbiology

Dr. Nancy Ryan Gray
President and Chief Executive Officer
Gordon Research Conferences

Sensory Transduction in Microorganisms

Gordon Research Conference

Molecular Basis and Applications of Microbial Signal Detection, Transduction and Response

September 25 - 30, 2022

Chair Karen M. Ottemann

Vice Chair Birgit E. Scharf

Four Points Sheraton / Holiday Inn Express

1050 Schooner Drive

Ventura, CA, United States

Conference Program

Sunday

2:00 pm - 9:00 pm Arrival and Check-in

6:00 pm - 7:00 pm Dinner

7:30 pm - 7:40 pm Introductory Comments by GRC Site Staff / Welcome from the GRC Chair

7:40 pm - 9:30 pm Applying the Power of Bacterial Signaling
Discussion Leader: Ming Hammond (University of Utah, United States)

7:40 pm - 7:45 pm Opening Remarks

7:45 pm - 8:00 pm Introduction by Discussion Leader

8:00 pm - 8:20 pm Souvik Bhattacharyya (The University of Texas at Austin, United States)
"Evolution of Antibiotic Resistance in *E. coli* Swarms by Phenotype Surfing"

8:20 pm - 8:25 pm Discussion

8:25 pm - 8:45 pm Mehmet Tatli (Senior Organism Engineer, United States)
"Biology by Design: Engineering Living Therapeutics at Ginkgo Bioworks"

8:45 pm - 8:50 pm Discussion

8:50 pm - 9:10 pm Steven Rutherford (Genentech, United States)
"Interfering with Beta-Barrel Folding"

9:10 pm - 9:15 pm Discussion

9:15 pm - 9:25 pm Anand Muthusamy (Caltech, United States)
"Engineering Periplasmic Binding"

9:25 pm - 9:30 pm Discussion

Monday

7:30 am - 8:30 am Breakfast

8:30 am - 9:00 am Group Photo

9:00 am - 12:30 pm	High Resolution Studies and Signaling Mechanisms Discussion Leader: Gerald Hazelbauer (University of Missouri, United States)
9:00 am - 9:15 am	Introduction by Discussion Leader
9:15 am - 9:35 am	Peijun Zhang (University of Oxford, United Kingdom) "High Resolution CryoEM/ET Studies of Chemotaxis Signaling Complexes"
9:35 am - 9:40 am	Discussion
9:40 am - 10:00 am	Thomas Shimizu (AMOLF, The Netherlands) "Why Are <i>E. coli</i> Chemoreceptors Tuned so Close to Criticality?"
10:00 am - 10:05 am	Discussion
10:05 am - 10:15 am	Adam Sidi Mabrouk (Leiden University, The Netherlands) "Structural Changes of The Chemoreceptor Array in Response to Clinically Relevant Conditions"
10:15 am - 10:20 am	Discussion
10:20 am - 10:45 am	Coffee Break
10:45 am - 11:05 am	Gabriela Schlau-Cohen (Massachusetts Institute of Technology, United States) "Conformational States and Dynamics of the <i>E. coli</i> Chemoreceptor from Single-Molecule FRET Measurements"
11:05 am - 11:10 am	Discussion
11:10 am - 11:30 am	Lynmarie Thompson (University of Massachusetts Amherst, United States) "Stabilization of Dynamic Domains Plays a Key Role in Chemoreceptor Control of CheA"
11:30 am - 11:35 am	Discussion
11:35 am - 11:55 am	John Parkinson (University of Utah, United States) "Conformational Communication Between Receptor Signaling Elements"
11:55 am - 12:00 pm	Discussion
12:00 pm - 12:10 pm	Gerald Hazelbauer (University of Missouri, United States) "Conformational Communication Between Receptor Signaling Elements"
12:10 pm - 12:15 pm	Discussion
12:15 pm - 12:25 pm	Patricia Ross (The Ohio State University, United States) "Extracellular Sensory Domains in Human Gut Microbiome Commensal Bacteria"
12:25 pm - 12:30 pm	Discussion
12:30 pm - 1:30 pm	Lunch

1:30 pm - 4:00 pm	Free Time
3:00 pm - 4:00 pm	<p>The GRC Power Hour™</p> <p><i>The GRC Power Hour™ is designed to address diversity and inclusion in the scientific workplace by providing a safe environment for informal and meaningful conversations amongst colleagues of all career stages. The program supports the professional growth of all members of our communities, including ethnicity, race and/or gender identity by providing an open forum for discussion and mentoring.</i></p> <p>Organizer: Heidi Kaplan (McGovern Medical School, UT Houston, United States)</p>
4:00 pm - 6:00 pm	Poster Session
6:00 pm - 7:00 pm	Dinner
7:30 pm - 9:30 pm	<p>Mechanisms of Environmental Detection</p> <p>Discussion Leader: Tino Krell (Spanish National Research Council , Spain)</p>
7:30 pm - 7:45 pm	Introduction by Discussion Leader
7:45 pm - 8:05 pm	<p>Elizabeth Boon (Stony Brook University, United States)</p> <p>"Regulation of Biofilm and Virulence by a Nitric Oxide-Responsive Hemoprotein"</p>
8:05 pm - 8:10 pm	Discussion
8:10 pm - 8:30 pm	<p>Victoria Korolik (Griffith University, Australia)</p> <p>"Interplay Between Attractants and Repellents at the Chemosensor Ligand-Binding Site(s)"</p>
8:30 pm - 8:35 pm	Discussion
8:35 pm - 8:55 pm	<p>Julia van Kessel (Indiana University, United States)</p> <p>"Integration of Environmental Signals: Quorum Sensing and Nutrient Availability"</p>
8:55 pm - 9:00 pm	Discussion
9:00 pm - 9:10 pm	<p>Bao Nguyen (University of California, Santa Cruz, United States)</p> <p>"Arginine Sensing Modulates c-di-GMP Levels and Motility in Vibrio Cholerae"</p>
9:10 pm - 9:15 pm	Discussion
9:15 pm - 9:25 pm	<p>Miguel Matilla (EEZ-CSIC, Spain)</p> <p>"Mechanisms of Auxin Sensing in Phytobacteria and Their Implications for Antibiotic Production and Chemotaxis"</p>
9:25 pm - 9:30 pm	Discussion
Tuesday	
7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	Signaling Mechanisms in Transcriptional Responses

Discussion Leader: Ann Stock (Rutgers University, United States)

9:00 am - 9:15 am Introduction by Discussion Leader

9:15 am - 9:35 am Sean Crosson (Michigan State University, United States)
"Regulation of Cell Adhesion by Two-Component Systems"

9:35 am - 9:40 am Discussion

9:40 am - 10:00 am Ann West (University of Oklahoma, United States)
"Two-Component Signaling in *Clostridiodes difficile*: Sporulation Checks and Balances"

10:00 am - 10:05 am Discussion

10:05 am - 10:15 am Ryan Butcher (Rice University, United States)
"Real-Time Detection of Response Regulator Phosphorylation in Live Bacteria"

10:15 am - 10:20 am Discussion

10:20 am - 10:45 am Coffee Break

10:45 am - 11:05 am Dimitris Georgellis (National Autonomous University of Mexico, Mexico)
"Z Nucleotide-Dependent Activation of Two Component Systems"

11:05 am - 11:10 am Discussion

11:10 am - 11:30 am Robert Bourret (University of North Carolina, United States)
"A General Strategy to Identify Factors that Functionally Differentiate Individual Members of a Protein Family"

11:30 am - 11:35 am Discussion

11:35 am - 11:55 am Victoria Stone (University of California, Santa Cruz, United States)
"The Transcription Factor IscR Promotes Yersinia Virulence by Antagonizing the Repressive H-NS-YmoA Histone-Like Protein Complex"

11:55 am - 12:00 pm Discussion

12:00 pm - 12:10 pm Bruno Lima (University of Minnesota, United States)
"Streptococcus Gordonii Response to the Salivary Mucin MUC5B"

12:10 pm - 12:15 pm Discussion

12:15 pm - 12:25 pm GAURAV SANKHE (MEMORIAL SLOAN KETTERING CANCER CENTER, United States)
"Differential Binding of the Mycobacterium Tuberculosis ANTA Domain Response Regulator PdtaR to Distinct Loops Within the PPE1 5' RNATo Enable Screen Reader Support"

12:25 pm - 12:30 pm Discussion

12:30 pm - 1:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	Poster Session
6:00 pm - 7:00 pm	Dinner
7:30 pm - 9:30 pm	Signaling in Polymicrobial Communities Discussion Leader: Karine Gibbs (University of California, Berkeley, United States)
7:30 pm - 7:45 pm	Introduction by Discussion Leader
7:45 pm - 8:05 pm	Karen Visick (Loyola University Chicago, United States) "Role of c-di-GMP in <i>Vibrio fischeri</i> Motility and Biofilm Formation"
8:05 pm - 8:10 pm	Discussion
8:10 pm - 8:30 pm	Joshua Shrouf (University of Notre Dame, United States) "Type IV Pili-Dependent Group Behaviors of <i>Pseudomonas aeruginosa</i> "
8:30 pm - 8:35 pm	Discussion
8:35 pm - 8:55 pm	Fitnat Yildiz (University of California, Santa Cruz, United States) "Emergent Properties of <i>Vibrio cholerae</i> Biofilms"
8:55 pm - 9:00 pm	Discussion
9:00 pm - 9:10 pm	Kaitlin Yarrington (The University of Iowa, United States) "A c-di-GMP and cAMP-controlled Signaling Module Directs <i>Pseudomonas Aeruginosa</i> Sensing and Response to Interspecies Secreted Signals"
9:10 pm - 9:15 pm	Discussion
9:15 pm - 9:25 pm	Tiffany Zarrella (National Cancer Institute, United States) " <i>Pseudomonas Aeruginosa</i> Increases Antimicrobial Production in Response to <i>Staphylococcus Aureus</i> "
9:25 pm - 9:30 pm	Discussion
Wednesday	
7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	Signaling During Host Interactions Discussion Leader: Gladys Alexandre (University of Tennessee, United States)
9:00 am - 9:15 am	Introduction by Discussion Leader
9:15 am - 9:35 am	Rita Tamayo (University of North Carolina at Chapel Hill, United States) "Global Regulation by Phase Variation in <i>Clostridioides difficile</i> "

9:35 am - 9:40 am	Discussion
9:40 am - 10:00 am	Maria Hadjifrangiskou (Vanderbilt University Medical Center, United States) "Subversion of Mitochondrial Metabolism Supports Intracellular Bacterial Pathogenesis During Urinary Tract Infection"
10:00 am - 10:05 am	Discussion
10:05 am - 10:15 am	Lindsey O'Neal (University of Washington Microbiology, United States) "The Wsp System of Pseudomonas Aeruginosa Links Surface Sensing and Cell Envelope Stress"
10:15 am - 10:20 am	Discussion
10:20 am - 10:45 am	Coffee Break
10:45 am - 11:05 am	Shumin Tan (Tufts University School of Medicine, United States) "Illuminating the Link Between Mycobacterium Tuberculosis Environmental Cue Response and Replication at the Single Bacterium Level in Vivo"
11:05 am - 11:10 am	Discussion
11:10 am - 11:30 am	Christine Szymanski (University of Georgia, United States) "Multifunctional Roles for Campylobacter jejuni flagella"
11:30 am - 11:35 am	Discussion
11:35 am - 11:55 am	Late-Breaking Topic
11:55 am - 12:00 pm	Discussion
12:00 pm - 12:10 pm	Chelsea Blankenchip (University of California San Diego, United States) "Control of Bacterial Immune Signaling by a WYL Domain Transcription Factor"
12:10 pm - 12:15 pm	Discussion
12:15 pm - 12:25 pm	Grace Wang (California Institute of Technology, United States) "Staphylococcal Secreted Cytotoxins are "Competition Sensing" Signals for Pseudomonas Aeruginosa"
12:25 pm - 12:30 pm	Discussion
12:30 pm - 1:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	Poster Session
6:00 pm - 7:00 pm	Dinner

7:00 pm - 7:30 pm Business Meeting
*Nominations for the Next Vice Chair(s); Complete the GRC Evaluation Forms;
Discuss Future Dates and Venue; Election of the Next Vice Chair(s)*

7:30 pm - 9:30 pm New Ways to Think About Signaling
Discussion Leader: Barbara Kazmierczak (Yale University, United States)

7:30 pm - 7:45 pm Introduction by Discussion Leader

7:45 pm - 8:05 pm David Hendrixson (U. Texas Southwestern Medical Center, United States)
"A Sensor Phosphatase-Driven Bacterial Two-Component System Mediates Intestinal Metabolite Sensing"

8:05 pm - 8:10 pm Discussion

8:10 pm - 8:30 pm Daniel Pfeiffer (University of Bayreuth, Germany)
"Insights into the Complex Chemosensory Network and Flagellar Motility System in Magnetotactic Bacteria"

8:30 pm - 8:35 pm Discussion

8:35 pm - 8:45 pm Natasha George (Michigan State University, United States)
"Structural Insight into Antibiotic Detection, Detoxification, and Signaling by the Bacillus subtilis BceABRS Module"

8:45 pm - 8:50 pm Discussion

8:50 pm - 9:10 pm Abhishek Shrivastava (Arizona State University, United States)
"The Controllers of Bacterial Type 9 Secretion System and Gliding Motility"

9:10 pm - 9:15 pm Discussion

9:15 pm - 9:25 pm Jaewoo Lee (Max Planck Institute for Terrestrial Microbiology, Germany)
"Regulation of Flagellar Gene Expression by Truncated Trg Receptor in Pathogenic Escherichia Coli"

9:25 pm - 9:30 pm Discussion

Thursday

7:30 am - 8:30 am Breakfast

9:00 am - 12:30 pm Signaling and Control of Motility Responses
Discussion Leader: Katja Taute (University of Munich (LMU), Germany)

9:00 am - 9:15 am Introduction by Discussion Leader

9:15 am - 9:35 am Kelly Hughes (University of Utah, United States)
"The Mechanism of the Flagellar Type 3 Secretion-Specificity Switch"

9:35 am - 9:40 am Discussion

9:40 am - 10:00 am	Marc Erhardt (Humboldt-Universität zu Berlin, Germany) "Self-Assembly Mechanisms of the Bacterial Flagellum"
10:00 am - 10:05 am	Discussion
10:05 am - 10:15 am	Steven Johnson (National Institutes of Health/National Cancer Institute, United States) "Structural Insights into Directional Switching of the Bacterial Flagellum"
10:15 am - 10:20 am	Discussion
10:20 am - 10:45 am	Coffee Break
10:45 am - 11:05 am	Yuhai Tu (IBM Thomas J. Watson Research Center, United States) "A Multi-State Dynamic Process Confers Adaptive Remodeling to the Bacterial Flagellar Motor"
11:05 am - 11:10 am	Discussion
11:10 am - 11:30 am	Nuris Figueroa-Morales (University of Colorado Boulder, United States) "3D Spatial Exploration by E. coli Echoes Motor Temporal Variability"
11:30 am - 11:35 am	Discussion
11:35 am - 11:55 am	Lori Burrows (McMaster University, Canada) "Uncoupling Twitching Motility and Surface Sensing in Pseudomonas Aeruginosa"
11:55 am - 12:00 pm	Discussion
12:00 pm - 12:10 pm	Wangbiao Guo (Yale university, United States) "FliL-ring Provides Structural Basis for Maximal Torque Generation in Bacterial Flagellar Motor"
12:10 pm - 12:15 pm	Discussion
12:15 pm - 12:25 pm	Deborah Ribardo (University of Texas Southwestern Medical Center, United States) "Life in the Fast Lane: Factors Required for High Velocity Motility of Campylobacter Jejuni in Low Viscosity"
12:25 pm - 12:30 pm	Discussion
12:30 pm - 1:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	Poster Session
6:00 pm - 7:00 pm	Dinner
7:30 pm - 9:30 pm	Mechanosensing and Signaling Discussion Leader: Linda Kenney (University of Texas Medical Branch, United States)

7:30 pm - 7:45 pm	Introduction by Discussion Leader
7:45 pm - 7:55 pm	Matthew Parsek (University of Washington, United States) "Deploying the Air Bags: The Pseudomonas Aeruginosa Wsp System Links Surface Sensing and Cell Envelope Stress"
7:55 pm - 8:05 pm	Discussion
8:05 pm - 8:15 pm	Pushkar Lele (Texas A&M University, United States) "Precise Adaptation to Mechanical Signals in the Chemotaxis Network"
8:15 pm - 8:25 pm	Discussion
8:25 pm - 8:35 pm	Dhruva Nair (Cornell University, United States) "Probing the Function of SwrD, a Potential Flagellar Motor Power Enhancer"
8:35 pm - 8:45 pm	Discussion
8:45 pm - 8:55 pm	Lisa-Marie Nisbett (Stony Brook University, United States) "Elucidating the Role of a NosP Signaling Pathway in Regulating C-di-GMP Concentration and Biofilm Formation in Shewanella Oneidensis"
8:55 pm - 9:00 pm	Discussion
9:00 pm - 9:10 pm	Guy Townsend (Penn State College of Medicine, United States) "Harnessing the Gut Microbiota to Detect, Isolate, and Quantify Glycans"
9:10 pm - 9:15 pm	Discussion
9:15 pm - 9:25 pm	Tina Drobic (Imperial College London, United Kingdom) "In-situ Molecular Model Reveals Protein Adaptations in a High-torque Flagellar Motor"
9:25 pm - 9:30 pm	Discussion

Friday

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

Contributors

 <p>Gordon Research Conferences <i>Frontiers of Science</i></p>	 <p>Carl Storm Underrepresented Minority Fellowship Program</p>
 <p>Predominantly Undergraduate Institution Fund</p>	



National Institute of Allergy and Infectious Diseases

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Hazelbauer Lab, University of Missouri



Zakaria Family Foundation
on behalf of the

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Sensory Transduction in Microorganisms (GRS)

Gordon Research Seminar

Signalling and Adaptation: Microbes and Scientists Adapting to a Changing Environment

September 24 - 25, 2022

Chairs Yashasvika Duggal and Lindsey O'Neal

Four Points Sheraton / Holiday Inn Express

1050 Schooner Drive

Ventura, CA, United States

Conference Program

Saturday

1:00 pm - 5:00 pm	Arrival and Check-in
3:30 pm - 3:45 pm	Introductory Comments by GRC Site Staff / Welcome from the GRS Chair
3:45 pm - 4:30 pm	Antibiotic Resistance: Evolving Through Changing Times Discussion Leader: Brittany Sanders (North Carolina A&T State University, United States)
3:45 pm - 3:50 pm	Opening Remarks
3:50 pm - 4:05 pm	Michael Brasino (Oregon Health and Science University, United States) "Re-Engineering the ComR Pheromone Receptor for Cancer Detection"
4:05 pm - 4:10 pm	Discussion
4:10 pm - 4:25 pm	Conrad Fihn (University of Minnesota, United States) "Development of Histidine Kinase Targeted Inhibitors as Anti-Virulence Agents in Pseudomonas aeruginosa"
4:25 pm - 4:30 pm	Discussion
4:30 pm - 6:00 pm	Poster Session
6:00 pm - 7:00 pm	Dinner
7:30 pm - 9:30 pm	Chemotaxis: Adapting to New Environments Discussion Leaders: Tiffany Zarrella (National Cancer Institute, United States)
7:30 pm - 7:45 pm	Luís Carreira (Max Planck Institute for Terrestrial Microbiology, Germany) "Two Roadblock Domain Proteins Act in Concert to Establish Polarity in M. xanthus: MglB and MglC"
7:45 pm - 7:50 pm	Discussion
7:50 pm - 8:05 pm	Matthias Koch (Texas A&M University, United States) "Sensing Local Changes in Pilin Concentration During Type IV Pilus Extension-Retraction Allows Pseudomonas Aeruginosa to Distinguish Substrates by Stiffness"
8:05 pm - 8:10 pm	Discussion

8:10 pm - 8:25 pm Zhining Sun (University of Massachusetts Amherst, United States)
"Live-Cell Imaging of Guanosine Tetra- and Pentaphosphate (p)ppGpp with RNA-
Based Fluorescent Sensors"

8:25 pm - 8:30 pm Discussion

8:30 pm - 8:45 pm Richard Sobe (Virginia Tech, United States)
"Characterization of a Novel Flagellar Motor Protein MotF in *Sinorhizobium Meliloti*"

8:45 pm - 8:50 pm Discussion

8:50 pm - 9:05 pm Alexis Waller (UT Southwestern Medical Center, United States)
"Flagellar Filament Length Regulation in Polarly-Flagellated Pathogens"

9:05 pm - 9:10 pm Discussion

9:10 pm - 9:25 pm Tina Drobnic (Imperial College London, United Kingdom)
"Molecular model of a flagellar motor in situ"

9:25 pm - 9:30 pm Discussion

Sunday

7:30 am - 8:30 am Breakfast

9:00 am - 11:00 am Multi-Species Interactions
Discussion Leader: Mark Aronson (Boston University, United States)

9:00 am - 9:15 am David Giacalone (Tufts University School of Medicine, United States)
"The Essential Transcription Factor PrrA is Critical for *Mycobacterium Tuberculosis*
Response to Multiple Environmental Cues"

9:15 am - 9:20 am Discussion

9:20 am - 9:35 am Julia Dreifus (University of Washington, United States)
"The SiaABCD Signaling Pathway Regulates Planktonic Psl Production Post-
Translationally"

9:35 am - 9:40 am Discussion

9:40 am - 9:55 am Kaitlin Yarrington (The University of Iowa, United States)
"A c-di-GMP and cAMP-controlled Signaling Module Directs *Pseudomonas*
Aeruginosa Sensing and Response to Interspecies Secreted Signals"

9:55 am - 10:00 am Discussion

10:00 am - 10:15 am Grace Wang (California Institute of Technology, United States)
"Staphylococcal Secreted Cytotoxins are "Competition Sensing" Signals for
Pseudomonas aeruginosa"

10:15 am - 10:20 am Discussion

10:20 am - 10:35 am	Marion Fernandez (UTMB Galveston, United States) "Cysteine Metabolism is Uniquely Required for Intracellular Survival of Salmonella Typhi"
10:35 am - 10:40 am	Discussion
10:40 am - 10:55 am	Lisa-Marie Nisbett (Stony Brook University, United States) "Elucidating the Role of a NosP Signaling Pathway in Regulating c-di-GMP Concentration and Biofilm Formation in Shewanella Oneidensis"
10:55 am - 11:00 am	Discussion
11:00 am - 12:30 pm	Poster Session <i>Coffee will be served in the poster area from 11:00 am - 11:30 am</i>
12:30 pm - 1:30 pm	Lunch
1:30 pm - 2:30 pm	Mentorship Component: Exploring Career Paths After Graduation Discussion Leader: Alfred Agbekudzi (Virginia Polytechnic Institute , United States)
1:30 pm - 2:30 pm	Panel Discussion <i>Careers</i> <ul style="list-style-type: none"> • Susanna Harris (Vibe Bio, United States) • Maya Kostman (Boston University Biology, United States)
2:30 pm - 3:00 pm	Evaluation Period <i>Complete the GRS Evaluation Forms; Election of Future Chair(s)</i>
3:00 pm	Seminar Concludes

Contributors



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The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army or U.S. Government position, policy, or decision, unless so designated by other documentation.

GRC Attendee List

The list of attendees appears below, sorted by the role recorded in their registration record.

Name	Affiliation	Participation	Gender
Ottemann, Karen M	University of California, Santa Cruz	Chair	Female
Scharf, Birgit E	Virginia Polytechnic Institute and State University	Vice Chair	Female
Bhattacharyya, Souvik	The University of Texas at Austin	Speaker	Male
Blankenchip, Chelsea L	University of California San Diego	Speaker	Female
Boon, Elizabeth M	Stony Brook University	Speaker	Female
Bourret, Robert	University of North Carolina	Speaker	Male
Burrows, Lori L	McMaster University	Speaker	Female
Butcher, Ryan J	Rice University	Speaker	Male
Crosson, Sean	Michigan State University	Speaker	Male
Drobnic, Tina	Imperial College London	Speaker	Female
Erhardt, Marc	Humboldt-Universität zu Berlin	Speaker	Male
Figuroa-Morales, Nuris	University of Colorado Boulder	Speaker	Female
George, Natasha	Michigan State University	Speaker	Female
Georgellis, Dimitris	National Autonomous University of Mexico	Speaker	Male
Guo, Wangbiao	Yale university	Speaker	Male
Hadjifrangiskou, Maria	Vanderbilt University Medical Center	Speaker	Female
Hazelbauer, Gerald L	University of Missouri	Speaker	Male
Hendrixson, David	U. Texas Southwestern Medical Center	Speaker	Male
Hughes, Kelly	University of Utah	Speaker	Male
Johnson, Steven	National Institutes of Health/National Cancer Institute	Speaker	Male
Korolik, Victoria	Griffith University	Speaker	Female
Lee, Jaewoo	Max Planck Institute for Terrestrial Microbiology	Speaker	Male
Lele, Pushkar	Texas A&M University	Speaker	No Answer
Lima, Bruno P	University of Minnesota	Speaker	Male
Matilla, Miguel A.	EEZ-CSIC	Speaker	Male
Muthusamy, Anand K	Caltech	Speaker	Male
Nair, Dhruva	Cornell University	Speaker	Male
Nguyen, Bao	University of California, Santa Cruz	Speaker	Female
Nisbett, Lisa-Marie P	Stony Brook University	Speaker	Female
O'Neal, Lindsey	University of Washington Microbiology	Speaker	Female
Parkinson, John S	University of Utah	Speaker	Male
Parsek, Matthew R	University of Washington	Speaker	Male
Pfeiffer, Daniel	University of Bayreuth	Speaker	Male
Ribardo, Deborah A	University of Texas Southwestern Medical Center	Speaker	Female
Ross, Patricia	The Ohio State University	Speaker	Female

Name	Affiliation	Participation	Gender
Rutherford, Steven T	Genentech	Speaker	Male
Sankhe, Gaurav	Memorial Sloan Kettering Cancer Center	Speaker	Male
Schlau-Cohen, Gabriela S	Massachusetts Institute of Technology	Speaker	Female
Shimizu, Thomas	AMOLF	Speaker	Male
Shrivastava, Abhishek	Arizona State University	Speaker	Male
Shrout, Joshua D	University of Notre Dame	Speaker	Male
Sidi Mabrouk, Adam	Leiden University	Speaker	Male
Stone, Victoria A	University of California, Santa Cruz	Speaker	Female
Szymanski, Christine M.	University of Georgia	Speaker	Female
Tamayo, Rita	University of North Carolina at Chapel Hill	Speaker	Female
Tan, Shumin	Tufts University School of Medicine	Speaker	Female
Tatli, Mehmet	Senior Organism Engineer	Speaker	Male
Thompson, Lynmarie K	University of Massachusetts Amherst	Speaker	Female
Townsend, Guy E	Penn State College of Medicine	Speaker	Male
Tu, Yuhai	IBM Thomas J. Watson Research Center	Speaker	Male
van Kessel, Julia C	Indiana University	Speaker	Female
Visick, Karen L	Loyola University Chicago	Speaker	Female
Wang, Grace Zimu	California Institute of Technology	Speaker	Female
West, Ann H	University of Oklahoma	Speaker	Female
Yarrington, Kaitlin D	The University of Iowa	Speaker	Female
Yildiz, Fitnat H	University of California, Santa Cruz	Speaker	Female
Zarrella, Tiffany	National Cancer Institute	Speaker	Female
Zhang, Peijun	University of Oxford	Speaker	Female
Alexandre, Gladys	University of Tennessee	Discussion Leader	Female
Gibbs, Karine A	University of California, Berkeley	Discussion Leader	Female
Hammond, Ming C	University of Utah	Discussion Leader	Female
Kazmierczak, Barbara	Yale University	Discussion Leader	Female
Kenney, Linda J	University of Texas Medical Branch	Discussion Leader	Female
Krell, Tino	Spanish National Research Council	Discussion Leader	Male
Stock, Ann M	Rutgers University	Discussion Leader	Female
Taute, Katja M	University of Munich (LMU)	Discussion Leader	Female
Agbekudzi, Alfred	Virginia Polytechnic Institute	Poster Presenter	Male
Aronson, Mark S	Boston University	Poster Presenter	Male
Berry, Marissa	Ohio State University	Poster Presenter	Female
Bhattarai, Nabin	University of Texas, Austin	Poster Presenter	Male
Brasino, Michael DK	Oregon Health and Science University	Poster Presenter	Male
Brock, Aaron M	Virginia Polytechnic Institute and State University	Poster Presenter	Male
Carey, Jeffrey N	University of Washington	Poster Presenter	Male
Carreira, Luís	Max Planck Institute for Terrestrial Microbiology	Poster Presenter	Male

Name	Affiliation	Participation	Gender
Cohen, Eli J	Imperial College London	Poster Presenter	Male
Crane, Brian R	Cornell University	Poster Presenter	Male
Deshpande, Maithili	Cornell University	Poster Presenter	Female
Dreifus, Julia	University of Washington	Poster Presenter	Female
Einenkel, Rosa Marie	Humboldt-Universität zu Berlin	Poster Presenter	Female
Engel, Joanne	University of California, San Francisco	Poster Presenter	Female
Fekete, Florian	Penn State University	Poster Presenter	Male
Fernandez, Marion C.J	UTMB Galveston	Poster Presenter	Female
Fihn, Conrad A	University of Minnesota	Poster Presenter	Non-Binary
Fischer, Svenja	Humboldt-Universität zu Berlin	Poster Presenter	Female
Fuentes, Ernesto J	University of Iowa	Poster Presenter	Male
Ganusova, Elena E	University of Tennessee	Poster Presenter	Female
Garcia, Augusto E	New England Biolabs	Poster Presenter	Male
Giacalone, David	Tufts University School of Medicine	Poster Presenter	Male
Giralt Zuniga, Maria	Humboldt-Universität zu Berlin	Poster Presenter	Female
Gosai, Jitendrapuri	Arizona State University	Poster Presenter	Male
Gray, Todd A	Wadsworth Center, New York State Department of Health	Poster Presenter	Male
Gu, Yangqi	Yale University	Poster Presenter	Male
Gulati, Aakanksha	Wyss Institute at Harvard University	Poster Presenter	Female
Guo, Shuaiqi	Yale University	Poster Presenter	Male
Hatstat, A. Katherine	University of California, San Francisco	Poster Presenter	Female
Hood, Kara	Houston Methodist Research Institute	Poster Presenter	Female
Hwang, YuneSahng	The University of Texas at Austin	Poster Presenter	Male
Jean-Pierre, Fabrice	Geisel School of Medicine at Dartmouth	Poster Presenter	Male
Jiang, Shan	Max Planck Institute for Terrestrial Microbiology	Poster Presenter	Female
Jouline, Igor B.	The Ohio State University	Poster Presenter	Male
Junkermeier, Eike H.	Humboldt-Universität zu Berlin, Germany	Poster Presenter	Male
Kempfer, Megan L	University of Oklahoma	Poster Presenter	Female
Kitts, Giordan	University of California, Santa Cruz	Poster Presenter	Male
Klose, Karl E	University of Texas San Antonio	Poster Presenter	Male
Koch, Matthias D	Texas A&M University	Poster Presenter	Male
Konovalova, Anna	University of Texas Health Science Center at Houston	Poster Presenter	Female
Kostman, Maya	Boston University Biology	Poster Presenter	Unspecified
Lau, Rebecca K	University of California, San Diego	Poster Presenter	Female
Liu, Xiaolin	University of California, Santa Cruz	Poster Presenter	Male
Liu, Jane M	Pomona College	Poster Presenter	Female
Lopez-Magana, Raymond	UC Santa Cruz	Poster Presenter	Male
Mendoza, Alicia G	Stony Brook University	Poster Presenter	Female

Name	Affiliation	Participation	Gender
Meng, Fanyin	Indiana University School of Medicine	Poster Presenter	Male
Offer, Ronja	Humboldt-University Berlin	Poster Presenter	Female
Reyes, Georgina I	University of Utah, SBS, Parkinson Lab	Poster Presenter	Female
Roberge, Nathan	McMaster University	Poster Presenter	Male
Rocha, Sofia	Arizona State University	Poster Presenter	Female
Rosinke, Kyle	University of Georgia	Poster Presenter	Male
Salar, Safoura	Virginia Tech	Poster Presenter	Female
Samaroo, Jason	Boston University	Poster Presenter	Male
Sanders, Brittany R	North Carolina A&T State University	Poster Presenter	Female
Sarwar, Zaara	The College of New Jersey	Poster Presenter	Female
Sobe, Richard C	Virginia Tech	Poster Presenter	Male
Sun, Zhining	University of Massachusetts Amherst	Poster Presenter	Male
Tachiyama, Shoichi	Yale University	Poster Presenter	Male
Thomas, Misty D	North Carolina A&T State University	Poster Presenter	Female
Trebino, Michael	UC Santa Cruz	Poster Presenter	Male
Trivedi, Abhishek	Post doctoral fellow	Poster Presenter	Male
Van Loon, Jaime	University of Toronto	Poster Presenter	Female
Waller, Alexis	UT Southwestern Medical Center	Poster Presenter	Female
Weinert, Emily E	Pennsylvania State University	Poster Presenter	Female
Xing, Jiawei	The Ohio State University	Poster Presenter	Male
Yang, Zichu	Cornell University	Poster Presenter	Male
Zhou, Bibi	University of Georgia	Poster Presenter	Female
Berkmen, Mehmet	New England BioLabs	Attendee	Male
Briegel, Ariane	Leiden University	Attendee	Female
Felix, Ansley S	Emory University	Attendee	Female
Heinrichs, David E	University of Western Ontario	Attendee	Male
Kaplan, Heidi B	McGovern Medical School, UT Houston	Attendee	Female
Limoli, Dominique H	University of Iowa	Attendee	Female
Madukoma, Chinedu	University of Notre dame	Attendee	Male
Motaleb, Md A.	East Carolina University	Attendee	Male
O'Toole, George A	Geisel School of Medicine at Dartmouth	Attendee	Male
Pince, Ercag	University of Pennsylvania	Attendee	Male
Ruby, Edward G	Carnegie Institution for Science	Attendee	Male
Smyer, Sydney	Ottemann Lab UCSC	Attendee	Female
Verma, Garima	Rutgers University	Attendee	Female

GRS Attendee List

The list of attendees appears below, sorted by the role recorded in their registration record.

Note: Only one primary role is recorded for each registration record, even if the attendee served in multiple roles at the meeting. The recorded role is based on the order of precedence listed below.

Name	Affiliation	Participation	Gender
Duggal, Yashasvika	The Broad Institute of MIT and Harvard	Chair	Female
O'Neal, Lindsey	University of Washington Microbiology	Chair	Female
Berkmen, Mehmet	New England BioLabs	Speaker	Male
Brasino, Michael DK	Oregon Health and Science University	Speaker	Male
Carreira, Luís	Max Planck Institute for Terrestrial Microbiology	Speaker	Male
Dreifus, Julia	University of Washington	Speaker	Female
Drobnic, Tina	Imperial College London	Speaker	Female
Fernandez, Marion C.J	UTMB Galveston	Speaker	Female
Fihn, Conrad A	University of Minnesota	Speaker	Non-Binary
Giacalone, David	Tufts University School of Medicine	Speaker	Male
Harris, Susanna L	Vibe Bio	Speaker	Female
Koch, Matthias D	Texas A&M University	Speaker	Male
Kostman, Maya	Boston University Biology	Speaker	Unspecified
Nisbett, Lisa-Marie P	Stony Brook University	Speaker	Female
Sobe, Richard C	Virginia Tech	Speaker	Male
Sun, Zhining	University of Massachusetts Amherst	Speaker	Male
Waller, Alexis	UT Southwestern Medical Center	Speaker	Female
Wang, Grace Zimu	California Institute of Technology	Speaker	Female
Yarrington, Kaitlin D	The University of Iowa	Speaker	Female
Agbekudzi, Alfred	Virginia Polytechnic Institute	Discussion Leader	Male
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Blankenchip, Chelsea L	University of California San Diego	Poster Presenter	Female
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Fekete, Florian	Penn State University	Poster Presenter	Male
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Gulati, Aakanksha	Wyss Institute at Harvard University	Poster Presenter	Female
Guo, Shuaiqi	Yale University	Poster Presenter	Male
Guo, Wangbiao	Yale university	Poster Presenter	Male
Hatstat, A. Katherine	University of California, San Francisco	Poster Presenter	Female
Hood, Kara	Houston Methodist Research Institute	Poster Presenter	Female

Name	Affiliation	Participation	Gender
Jiang, Shan	Max Planck Institute for Terrestrial Microbiology	Poster Presenter	Female
Junkermeier, Eike H.	Humboldt-Universität zu Berlin, Germany	Poster Presenter	Male
Kempfer, Megan L	University of Oklahoma	Poster Presenter	Female
Liu, Xiaolin	University of California, Santa Cruz	Poster Presenter	Male
Lopez-Magana, Raymond	UC Santa Cruz	Poster Presenter	Male
Madukoma, Chinedu	University of Notre dame	Poster Presenter	Male
Mendoza, Alicia G	Stony Brook University	Poster Presenter	Female
Offer, Ronja	Humboldt-University Berlin	Poster Presenter	Female
Reyes, Georgina I	University of Utah, SBS, Parkinson Lab	Poster Presenter	Female
Salar, Safoura	Virginia Tech	Poster Presenter	Female
Samaroo, Jason	Boston University	Poster Presenter	Male
Sankhe, Gaurav	Memorial Sloan Kettering Cancer Center	Poster Presenter	Male
Sidi Mabrouk, Adam	Leiden University	Poster Presenter	Male
Tachiyama, Shoichi	Yale University	Poster Presenter	Male
Thomas, Misty D	North Carolina A&T State University	Poster Presenter	Female
Van Loon, Jaime	University of Toronto	Poster Presenter	Female
Verma, Garima	Rutgers University	Poster Presenter	Female
Yang, Zichu	Cornell University	Poster Presenter	Male
Zhou, Bibi	University of Georgia	Poster Presenter	Female