



Nervous System Assembly, Plasticity, and Disease

July 31 - August 5, 2016

Chair

Marc R. Freeman

Vice Chair

Rosalind A. Segal

Salve Regina University

100 Ochre Point Avenue
Newport, RI, US

Conference Description

The nervous system is the most complex tissue in the human body. The formation and maintenance of this amazing structure entails sophisticated mechanisms that drive the specification of appropriate cell fates in along the spatial and temporal axes, and the formation and fine-tuning of highly specific cell-cell contacts that are crucial for organisms to properly sense and respond to their environment. The 2016 Gordon Conference on Neural Development in Newport, Rhode Island, will bring together an international group of scientists that have made breakthroughs in our understanding of nervous system development and significantly advanced the field. Topics covered will include neural stem cell biology, specification and morphogenesis of neurons and glia, synaptogenesis, neural circuit refinement, and neural dysfunction in disease, especially in the context of neurodevelopmental disorders. The meeting will additionally highlight recent technological advances in molecular genetics and imaging that have rapidly propelled the field forward, and a diversity of experimental approaches and model systems (*e.g. C. elegans, Drosophila, zebrafish, mammals*) will be represented. Each talk will be followed by extensive discussion and there will be ample opportunity for additional interaction between students, postdoctoral associates, young and senior faculty, in the informal setting of the GRC. Some short talks by participants will be selected from submitted poster abstracts. In addition, the second Neural Development Gordon Research Seminar will be held in conjunction with this long standing GRC to further facilitate participation among young investigators. Members of underrepresented minority groups are especially encouraged to attend.

Related Meeting



This GRC will be held in conjunction with the "Neural Development (GRS)" Gordon Research Seminar (GRS). Those interested in attending both meetings must submit an application for the GRS in addition to an application for the GRC. Refer to the [associated GRS program page](#) for more information.

Conference 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 **Keynote Session: Molecular Control of Connectivity**

Discussion Leaders: **Marc Freeman** (University of Massachusetts Medical School, USA) and **Rosalind Segal** (Harvard Medical School / Dana-Farber Cancer Institute, USA)

7:40 pm - 8:20 pm **Liqun Luo** (Stanford University, USA)
"Assembly of the Fly Olfactory Circuit and Beyond"

8:20 pm - 8:35 pm Discussion

8:35 pm - 9:15 pm **Marc Tessier-Lavigne** (Rockefeller University, USA)
"Molecular Pathways Regulating Axonal Degeneration"

9:15 pm - 9:30 pm Discussion

Monday

7:30 am - 8:30 am Breakfast

9:00 am - 12:30 pm **Patterning the Nervous System**

Discussion Leader: **Claude Desplan** (New York University, USA)

9:00 am - 9:20 am **Jeremy Dasen** (New York University School of Medicine, USA)
"The Ancient Origins of Neural Circuits for Land Walking"

9:20 am - 9:30 am	Discussion
9:30 am - 9:50 am	Kevin Wright (Vollum Institute, Oregon Health and Science University, USA) "Scaffolding Neural Development with Dystroglycan"
9:50 am - 10:00 am	Discussion
10:00 am - 10:30 am	Coffee Break
10:30 am - 10:50 am	Jeremy Reiter (University of California, San Francisco, USA) "Ciliary Signaling with Hedgehog During Neurogenesis"
10:50 am - 11:00 am	Discussion
11:00 am - 11:20 am	Paola Bovolenta (Consejo Superior Investigaciones Cientificas (CSIC) / Universidad Autonoma de Madrid, Spain) "Secreted Frizzled Related Proteins in Forebrain Development"
11:20 am - 11:30 am	Discussion
11:30 am - 11:50 am	Gordon Fishell (NYU Langone Medical Center, USA) "Specification and Survival of Inhibitory Interneurons"
11:50 am - 12:00 pm	Discussion
12:00 pm - 12:10 pm	Selected from Poster Abstracts: Bulent Ataman (Harvard Medical School, USA) "Evolutionary Repurposing of an Activity-Regulated Factor in Primate Neocortex"
12:10 pm - 12:15 pm	Discussion
12:15 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>Power Hour</u>

The GRC Power Hour is an optional informal gathering open to all meeting participants. It is designed to help address the challenges women face in science and support the professional growth of women in our communities by providing an open forum for discussion and mentoring.

Organizer: **Rosalind Segal** (Harvard Medical School / Dana-Farber Cancer Institute, USA)

4:00 pm - 6:00 pm

Poster Session

6:00 pm

Dinner

7:30 pm - 9:30 pm

Generating Diversity in Neural Cell Fate and Function

Discussion Leader: **Liqun Luo** (Stanford University, USA)

7:30 pm - 7:50 pm

Claude Desplan (New York University, USA)

"Evolutionary Leaps in Patterning of the Retina"

7:50 pm - 8:00 pm

Discussion

8:00 pm - 8:20 pm

Corey Harwell (Harvard Medical School, USA)

"Mammalian Cortical Diversity and Precision in Wiring"

8:20 pm - 8:30 pm

Discussion

8:30 pm - 8:50 pm

Fiona Doetsch (University of Basel, Switzerland)

"Stem Cell Dynamics in the Adult Brain"

8:50 pm - 9:00 pm

Discussion

9:00 pm - 9:10 pm

Selected from Poster Abstracts: **Jay Bikoff** (Columbia University, USA)

"Spinal Inhibitory Interneuron Diversity and Position Delineate Variant Motor Microcircuits"

9:10 pm - 9:15 pm

Discussion

9:15 pm - 9:25 pm Selected from Poster Abstracts: **Daniel Pederick** (The University of Adelaide, Australia)
"Mosaic Expression of Pcdh19 Causes Segregation of Pcdh19-Wild Type and Pcdh19-Null Neurons in the Developing Mouse Cortex Leading to an Epileptic Phenotype"

9:25 pm - 9:30 pm Discussion

Tuesday

7:30 am - 8:30 am Breakfast

8:30 am Group Photo

9:00 am - 12:30 pm **Stem Cells in Circuit Assembly and Repair**

Discussion Leader: **Fiona Doetsch** (University of Basel, Switzerland)

9:00 am - 9:20 am **Yukiko Gotoh** (University of Tokyo, Japan)
"Intrinsic and Extrinsic Regulators of Neural Stem Cells"

9:20 am - 9:30 am Discussion

9:30 am - 9:50 am **Soo-Kyung Lee** (Oregon Health and Science University, USA)
"miRNAs in Motor Neuron Fate and Differentiation"

9:50 am - 10:00 am Discussion

10:00 am - 10:30 am Coffee Break

10:30 am - 10:50 am **Pierre Vanderhaeghen** (University of Brussels, Belgium)
"From Stem Cells to Neural Networks in the Cerebral Cortex"

10:50 am - 11:00 am Discussion

11:00 am - 11:15 am **Simon Hippenmeyer** (Institute of Science and Technology Austria, Austria)
"Molecular Mechanisms of Neural Stem Cell Lineage Progression"

11:15 am - 11:20 am Discussion

11:20 am - 11:35 am	Mary Hynes (Rockefeller University, USA) "Widespread Differential Expression of Coding Region and 3' UTR Sequences in Neurons and Other Tissues"
11:35 am - 11:40 am	Discussion
11:40 am - 11:55 am	Peri Kurshan (Stanford University, USA) "How Are New Synapses Added to Existing Circuits? Diverse Roles for Two Cell Adhesion Molecules"
11:55 am - 12:00 pm	Discussion
12:00 pm - 12:15 pm	Debby Silver (Duke University Medical Center, USA) "Dynamic mRNA Transport and Translation in Neural Stem Cells of the Developing Brain"
12:15 pm - 12:20 pm	Discussion
12:20 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	Wiring Neural Circuits Discussion Leader: Kelly Monk (Washington University School of Medicine, USA)
7:30 pm - 7:50 pm	Samuel Pfaff (Howard Hughes Medical Institute / Salk Institute for Biological Studies, USA) "Establishing Connectivity in Locomotor Circuits"
7:50 pm - 8:00 pm	Discussion
8:00 pm - 8:20 pm	Cagla Eroglu (Duke University Medical Center, USA) "Control of Synapse Formation and Plasticity by Astrocytes"
8:20 pm - 8:30 pm	Discussion

8:30 pm - 8:50 pm **David Ginty** (Howard Hughes Medical Institute / Harvard Medical School, USA)
"The Organization and Development of Light Touch Sensitive Neurons"

8:50 pm - 9:00 pm Discussion

9:00 pm - 9:20 pm **Alex Kolodkin** (Johns Hopkins School of Medicine / Howard Hughes Medical Institute, USA)
"Neuropilin-2/Plexin A3 Regulation of Sema3F-Mediated AMPA Receptor Homeostatic Scaling"

9:20 pm - 9:30 pm Discussion

Wednesday

7:30 am - 8:30 am Breakfast

9:00 am - 12:30 pm **Neuron-Glia Interactions During Development**

Discussion Leader: **Cagla Eroglu** (Duke University Medical Center, USA)

9:00 am - 9:20 am **Kelly Monk** (Washington University School of Medicine, USA)
"Mechanisms of Myelinating Glial Cell Development"

9:20 am - 9:30 am Discussion

9:30 am - 9:50 am **William Talbot** (Stanford University, USA)
"Genetic Analysis of Glial Development and Function in Zebrafish"

9:50 am - 10:00 am Discussion

10:00 am - 10:30 am Coffee Break

10:30 am - 10:50 am **Shai Shaham** (Rockefeller University, USA)
"Glial Control of Neuron Receptive Ending Shape and Function"

10:50 am - 11:00 am Discussion

11:00 am - 11:15 am **Michelle Monje** (Stanford University, USA)
"Adaptive Myelination"

11:15 am - 11:20 am	Discussion
11:20 am - 11:35 am	Jan Pielage (University of Kaiserslautern, Germany) "Axonal Transport Defects and Neurodegeneration - Cause or Consequence?"
11:35 am - 11:40 am	Discussion
11:40 am - 11:55 am	Megan Corty (University of Massachusetts Medical School, USA) "Analysis of Axon Ensheathment"
11:55 am - 12:00 pm	Discussion
12:00 pm - 12:15 pm	Simone Mayer (University of California, San Francisco, USA) "A High Throughput Screen in the Developing Human Neocortex Integrates Single-Cell Physiology and Transcriptomics"
12:15 pm - 12:20 pm	Discussion
12:20 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	Establishing and Maintaining Functional Circuits Discussion Leader: Dorothy Schafer (University of Massachusetts Medical School, USA)
7:30 pm - 7:50 pm	Pelin Volkan (Duke University, USA) "Stability and Plasticity in the <i>Drosophila</i> Olfactory System Across Timescales"

7:50 pm - 8:00 pm	Discussion
8:00 pm - 8:20 pm	Luisa Cochella (Research Institute of Molecular Pathology (IMP), Austria) "Roles for miRNAs in Neural Cell Fate and Function"
8:20 pm - 8:30 pm	Discussion
8:30 pm - 8:50 pm	Marc Hammarlund (Yale University, USA) "Wiring and Re-Wiring the Nervous System of <i>C. elegans</i> "
8:50 pm - 9:00 pm	Discussion
9:00 pm - 9:20 pm	Nils Brose (Max Planck Institute for Experimental Medicine, Germany) "Neuroligins at Inhibitory Synapses - From Synapse Formation to Neuropsychiatric Disorders"
9:20 pm - 9:30 pm	Discussion










Thursday

7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	Neurite Polarity, Outgrowth, and Survival Discussion Leader: Corey Harwell (Harvard Medical School, USA)
9:00 am - 9:20 am	Frank Bradke (German Center for Neurodegenerative Diseases, Germany) "Regulation of Axonal Growth in Development and Injury"
9:20 am - 9:30 am	Discussion
9:30 am - 9:50 am	Shane Liddelow (Stanford University, USA) "What Do Reactive Astrocytes Do?"
9:50 am - 10:00 am	Discussion
10:00 am - 10:30 am	Coffee Break

10:30 am - 10:50 am	Michael Greenberg (Harvard Medical School, USA) "Signaling Networks that Regulate Synapse Development and Cognitive Function"
10:50 am - 11:00 am	Discussion
11:00 am - 11:20 am	Claudia Bagni (University of Rome Tor Vergata, Italy / University of Lausanne, Switzerland) "The Multi-Tasking CYFIP1 Protein Orchestrates Brain Wiring and Social Behaviour"
11:20 am - 11:30 am	Discussion
11:30 am - 11:50 am	Daniel Colon-Ramos (Yale University, USA) "Synaptic Position Requires Neuronal Autophagy and Glial Instructions"
11:50 am - 12:00 pm	Discussion
12:00 pm - 12:15 pm	Georgia Rapti (The Rockefeller University, USA) "Glia and Pioneer Neurons Direct Hierarchical Assembly of the <i>C. elegans</i> Brain"
12:15 pm - 12:20 pm	Discussion
12:20 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	Neurodevelopmental Disorders and Pruning Discussion Leader: Alex Kolodkin (Johns Hopkins School of Medicine / Howard Hughes Medical Institute, USA)
7:30 pm - 7:50 pm	Oren Schuldiner (Weizmann Institute of Science, Israel) "A Systematic Exploration of Neuronal Remodeling Reveals a Transcription Factor Hierarchy"

7:50 pm - 8:00 pm	Discussion
8:00 pm - 8:20 pm	Angelique Bordey (Yale University, USA) "Alterations in Cortical Development in Neurogenetic Disorders"
8:20 pm - 8:30 pm	Discussion
8:30 pm - 8:50 pm	Dorothy Schafer (University of Massachusetts Medical School, USA) "Activity-Dependent Mechanisms of Microglial Synaptic Pruning"
8:50 pm - 9:00 pm	Discussion
9:00 pm - 9:15 pm	Summer Thyme (Harvard University, USA) "Functional Analysis of Schizophrenia-Associated Genes During Zebrafish Development"
9:15 pm - 9:20 pm	Discussion
9:20 pm - 9:30 pm	General Discussion
Friday	
7:30 am - 8:30 am	Breakfast
9:00 am	Departure

Contributors

The conference also gratefully acknowledges a contribution from the Joelson Foundation.