



Aberrant Circuits to Impaired Function in Epilepsy

August 21 - 26, 2016

Chairs

Steve C. Danzer and Heinz W. Beck

Vice Chairs

Christophe Bernard and Amy Brooks-Kayal

Conference Description

The main goal of the study of seizures is to identify the mechanisms underlying synchronous electrical discharges in neuronal networks – in order to develop more effective treatments and cures for epilepsy. A unique, intellectually challenging aspect of epilepsy is that it encompasses virtually all major levels of biological organization, from genes and ion channels to circuits and behavior. The major purpose of this Gordon Research Conference is to bring together geneticists, molecular biologists, developmental neuroscientists, translational researchers/clinicians, neuroanatomists, electrophysiologists and computational neuroscientists working on basic mechanisms related either directly or indirectly to the generation of synchronous activity, including seizures. In particular, the conference will feature novel and transformative approaches and tools that are highly relevant to dissecting the functional anatomy of neuronal circuits in intact animals. We believe that discussing these novel approaches in the context of neuronal synchronization and epilepsy is timely, and will set the stage for future discoveries.

The program's theme is "Aberrant Circuits to Impaired Function in Epilepsy". The focus will be on examining the disruptive effects epilepsy has on brain development and function. Sessions are organized in a bottom-up fashion, with early sessions focusing on changes at the cellular and microcircuit levels while later sessions focus on higher order cognitive functions and comorbidities. The final session will focus on strategies to prevent and repair epileptogenic brain changes.

Our goals are to disseminate the latest scientific advances, to foster productive new insights and collaborations, to stimulate an interest in epilepsy research among young investigators and to set the stage for new translational studies that will bring the latest discoveries to the treatment of epilepsy in the shortest possible time.

Related Meeting



This GRC will be held in conjunction with the "Mechanisms of Epilepsy and Neuronal Synchronization (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

4:00 pm - 8:00 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: Network Function in the Normal and Diseased Brain**

Discussion Leaders: **Heinz Beck** (University of Bonn Medical Center, Germany) and **Steve Danzer** (Cincinnati Children's Hospital Medical Center, USA)

7:40 pm - 7:50 pm Introduction by Discussion Leader

7:50 pm - 8:25 pm **Gabor Tamas** (University of Szeged, Hungary)
"Similarities and Differences of Human and Rodent Synapses, Neurons and Networks in the Neocortex"

8:25 pm - 8:40 pm Discussion

8:40 pm - 9:15 pm **Yehezkel Ben-Ari** (Institut de Neurobiologie de la Méditerranée (INMED), INSERM, France)
"Treating Autism Beyond Genes and Psychiatry. Is Delivery a Critical Period for the Pathogenesis of Autism?"

9:15 pm - 9:30 pm Discussion

Monday

7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	<p>Network Dysfunction in Genetic Epilepsies</p> <p>Discussion Leader: Jeffrey Noebels (Baylor College of Medicine, USA)</p>
9:00 am - 9:10 am	Introduction by Discussion Leader
9:10 am - 9:35 am	<p>Dirk Isbrandt (German Center for Neurodegenerative Diseases (DZNE), Germany)</p> <p>"Timed Treatments During Vulnerable Developmental Periods for Prevention of Epileptogenesis in Mouse Channelopathies"</p>
9:35 am - 9:45 am	Discussion
9:45 am - 10:10 am	<p>Michael Wong (Washington University in St. Louis, USA)</p> <p>"Cell-Specific Contributions to Epileptogenesis in Tuberous Sclerosis: Neurons and Astrocytes and Microglia! Oh My!"</p>
10:10 am - 10:20 am	Discussion
10:20 am - 10:30 am	<p>Christina Gross (Cincinnati Children's Hospital Medical Center, USA)</p> <p>"MicroRNA-Mediated Regulation of the Potassium Channel Kv4.2 During Seizures"</p>
10:30 am - 10:35 am	Discussion
10:35 am - 11:05 am	Coffee Break
11:05 am - 11:30 am	<p>Holger Lerche (Hertie Institute for Clinical Brain Research / University of Tübingen, Germany)</p> <p>"Novel Genetic Defects in Epilepsy and Therapeutic Implications"</p>
11:30 am - 11:40 am	Discussion
11:40 am - 12:05 pm	<p>Ype Elgersma (Erasmus University, The Netherlands)</p> <p>"Mechanisms Underlying mTOR-Mediated Epilepsy in a Mouse Model of TSC"</p>
12:05 pm - 12:15 pm	Discussion

12:15 pm - 12:25 pm	Angel Lopez (Baylor College of Medicine, USA) "AnkG Isoform Imbalance and Interneuronopathy Link Epilepsy and Bipolar Disorder"
12:25 pm - 12:30 pm	Discussion
12:30 pm	Lunch
1:30 pm - 4:30 pm	Free Time
3:00 pm - 4:00 pm	<u>Power Hour</u> <i>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.</i> Organizer: Candi LaSarge (Cincinnati Children's Hospital Medical Center, USA)
4:30 pm - 6:00 pm	<u>Poster Session</u>
6:00 pm - 8:00 pm	Regulation and Mis-Regulation of Neuronal Circuit Development Discussion Leader: Kevin Staley (Harvard Medical School, USA)
6:00 pm - 6:10 pm	Introduction by Discussion Leader
6:10 pm - 6:35 pm	Jack Parent (University of Michigan, USA) "Combining Human Cell and Rodent Models to Decipher Epileptic Encephalopathies"
6:35 pm - 6:45 pm	Discussion
6:45 pm - 7:10 pm	Albert Becker (University of Bonn, Germany) "Loss of STE-20 Like Kinase as Emergent in Human Epileptogenic Malformations Impairs High-Order Dendrite Arborization and Inhibitory Synapse Maintenance"
7:10 pm - 7:20 pm	Discussion

7:20 pm - 7:45 pm **Pierre-Pascal Lenck-Santini** (Institut de Neurobiologie de la Méditerranée (INMED), INSERM, France)
"Network Dynamics in Normal vs. Epileptic Brain"

7:45 pm - 7:55 pm Discussion

7:55 pm - 8:00 pm General Discussion

8:00 pm Dinner

Tuesday

7:30 am - 8:30 am Breakfast

8:30 am Group Photo

9:00 am - 12:30 pm **Regulation of Neuronal Circuits by Astrocytes**

Discussion Leader: **Karen Wilcox** (University of Utah, USA)

9:00 am - 9:10 am Introduction by Discussion Leader

9:10 am - 9:35 am **Christian Henneberger** (University of Bonn Medical School, Germany)
"Rapid Astrocyte Morphology Changes During Epileptogenesis"

9:35 am - 9:45 am Discussion

9:45 am - 10:10 am **Nicola Allen** (Salk Institute for Biological Studies, USA)
"Astrocyte Regulation of Synaptic Glutamate Receptors"

10:10 am - 10:20 am Discussion

10:20 am - 10:30 am **Lauren Lau** (Tufts University, USA)
"Targeting Alpha-2-Delta-1 Prevents Pathological Synaptogenesis and Cell Death Following Neonatal Cortical Insult"

10:30 am - 10:35 am Discussion

10:35 am - 11:05 am Coffee Break

11:05 am - 11:30 am	Catherine Christian (University of Illinois at Urbana-Champaign, USA) "Bidirectional Astrocytic Modulation of GABA _A R-Mediated Synaptic Transmission"
11:30 am - 11:40 am	Discussion
11:40 am - 12:05 pm	Nathalie Rouach (Collège de France, France) "Unraveling the Role of Astroglial Networks in Neuronal Coordination"
12:05 pm - 12:15 pm	Discussion
12:15 pm - 12:25 pm	Frances Cho (Gladstone Institutes, University of California, San Francisco, USA) "Selective Astrogliosis Increases Thalamic Circuit Excitability and Oscillations"
12:25 pm - 12:30 pm	Discussion
12:30 pm	Lunch
1:30 pm - 4:30 pm	Free Time
4:30 pm - 6:00 pm	<u>Poster Session</u>
6:00 pm - 8:00 pm	GABAergic Circuit Function and Neuronal Oscillations Discussion Leader: Douglas Coulter (Children's Hospital of Philadelphia, USA)
6:00 pm - 6:10 pm	Introduction by Discussion Leader
6:10 pm - 6:35 pm	Scott Baraban (University of California, San Francisco, USA) "Functional Integration of GABA Progenitor Cells in Host Circuits"
6:35 pm - 6:45 pm	Discussion
6:45 pm - 7:10 pm	Ilan Lampl (Weizmann Institute of Science, Israel) "A Novel Chemo-Optogenetic Model of Focal Epilepsy"
7:10 pm - 7:20 pm	Discussion

7:20 pm - 7:45 pm **Laura Colgin** (University of Texas at Austin, USA)
"Slow and Fast Gamma Oscillations in the Hippocampus"

7:45 pm - 7:55 pm Discussion

7:55 pm - 8:00 pm General Discussion

8:00 pm Dinner

Wednesday

7:30 am - 8:30 am Breakfast

9:00 am - 12:30 pm **Normal Circuit Function in Cognition**

Discussion Leader: **Ivan Soltesz** (Stanford University, USA)

9:00 am - 9:10 am Introduction by Discussion Leader

9:10 am - 9:35 am **Carol Barnes** (University of Arizona, USA)
"Memory Circuits in Normal Aging: Excitability and Adaptation"

9:35 am - 9:45 am Discussion

9:45 am - 10:10 am **Anton Sirota** (Ludwig Maximilian University of Munich, Germany)
"Anatomical Perspective on High-Frequency Oscillations in the LFP"

10:10 am - 10:20 am Discussion

10:20 am - 10:30 am **Jiadong Chen** (University of California, San Francisco, USA)
"Novel GABAergic Long-Range Projection in Cortical Development and Disease"

10:30 am - 10:35 am Discussion

10:35 am - 11:05 am Coffee Break

11:05 am - 11:30 am **Florian Mormann** (University of Bonn, Germany)
"Single Neuron Correlates of Perception and Memory in the Human Medial Temporal Lobe"

11:30 am - 11:40 am Discussion

11:40 am - 12:05 pm	Ueli Rutishauser (Cedars-Sinai Medical Center, USA) "The Microcircuits of Human Declarative Memory: The Role of Theta-Mediated Coordination"
12:05 pm - 12:15 pm	Discussion
12:15 pm - 12:25 pm	Michael Wenzel (Columbia University, USA) " <i>In Vivo</i> Population Imaging of Seizure Progression Within and Across Cortical Layers"
12:25 pm - 12:30 pm	Discussion
12:30 pm	Lunch
1:30 pm - 4:30 pm	Free Time
4:30 pm - 6:00 pm	<u>Poster Session</u>
6:00 pm - 8:00 pm	Pathological Circuit Function in Epilepsy Discussion Leader: Viji Santhakumar (Rutgers New Jersey Medical School, USA)
6:00 pm - 6:10 pm	Introduction by Discussion Leader
6:10 pm - 6:35 pm	Valerie Crepel (Institut de Neurobiologie de la Méditerranée (INMED), INSERM, France) "Pathophysiology of Temporal Lobe Epilepsy: Role of Ectopic Kainate Receptors"
6:35 pm - 6:45 pm	Discussion
6:45 pm - 7:10 pm	Peyman Golshani (University of California, Los Angeles, USA) "Dentate Gyrus Interneuron Desynchronization in Epilepsy"
7:10 pm - 7:20 pm	Discussion
7:20 pm - 7:45 pm	Liset Menendez de la Prida (Cajal Institute, Spanish National Research Council (CSIC), Spain) "Common Circuits of Hippocampal Rhythmopathies in Temporal Lobe Epilepsy"
7:45 pm - 7:55 pm	Discussion

7:55 pm - 8:00 pm General Discussion

8:00 pm Dinner

Thursday

7:30 am - 8:30 am Breakfast

8:30 am - 9:00 am Business Meeting

Nominations for the Next Vice Chair; Fill in Conference Evaluation Forms; Discuss Future Site and Scheduling Preferences; Election of the Next Vice Chair

9:00 am - 12:30 pm

Circuit Dysfunction in Epilepsy Comorbidities

Discussion Leader: **Nigel Jones** (University of Melbourne, Australia)

9:00 am - 9:10 am Introduction by Discussion Leader

9:10 am - 9:35 am **Lennart Mucke** (Gladstone Institute of Neurological Disease, University of California, San Francisco, USA)
"Overlapping Mechanisms and Therapeutic Opportunities in Epilepsy and Alzheimer's Disease"

9:35 am - 9:45 am Discussion

9:45 am - 10:10 am **Jamie Maguire** (Tufts University School of Medicine, USA)
"Seizure-Induced Plasticity in the GABAergic Control of the HPA Axis: Relevance to Comorbid Depression"

10:10 am - 10:20 am Discussion

10:20 am - 10:30 am **Aynara Wulsin** (Cincinnati Children's Hospital Medical Center, USA)
"Glucocorticoid Receptor Inhibition as a Novel Treatment for Epilepsy"

10:30 am - 10:35 am Discussion

10:35 am - 11:05 am Coffee Break

11:05 am - 11:30 am	Tallie Z. Baram (University of California, Irvine, USA) "Circuit and Cellular Dysfunction Contribute to Cognitive Impairment After Febrile Status Epilepticus"
11:30 am - 11:40 am	Discussion
11:40 am - 12:05 pm	Laura Cancedda (Italian Institute of Technology, Italy) "Protocadherin 19 Downregulation Affects Hippocampal Development and Increases Seizure Susceptibility in Rats"
12:05 pm - 12:15 pm	Discussion
12:15 pm - 12:25 pm	Julia Kahn (University of Pennsylvania, USA) "Epilepsy-Associated Dentate Granule Cell Hyperactivity Critically Contributes to Cognitive Comorbidities"
12:25 pm - 12:30 pm	Discussion
12:30 pm	Lunch
1:30 pm - 4:30 pm	Free Time
4:30 pm - 6:00 pm	<u>Poster Session</u>
6:00 pm - 8:00 pm	Using Circuit-Level Insights to Repair and Manipulate the Epileptic Brain Discussion Leader: Istvan Mody (David Geffen School of Medicine, University of California, Los Angeles, USA)
6:00 pm - 6:10 pm	Introduction by Discussion Leader
6:10 pm - 6:35 pm	Esther Krook-Magnuson (University of Minnesota, USA) "Optogenetic Dissection of Circuits in Temporal Lobe Epilepsy"
6:35 pm - 6:45 pm	Discussion
6:45 pm - 7:10 pm	Jeanne Paz (Gladstone Institutes, University of California, San Francisco, USA) "Bi-Directional Control of Seizures by the Thalamus: Dravet Syndrome"
7:10 pm - 7:20 pm	Discussion

7:20 pm - 7:45 pm	Luke Lavis (Janelia Research Campus, Howard Hughes Medical Institute, USA) "From Drugs to Dyes and Back Again"
7:45 pm - 7:55 pm	Discussion
7:55 pm - 8:00 pm	General Discussion
8:00 pm	Dinner
Friday	
7:30 am - 8:30 am	Breakfast
9:00 am	Departure

Contributors

		
		
		
		