

State of the Brain: Genetic Dissection of Brain Circuits and Behavior in Health and Disease

January 14 –18, 2018 | Keystone Resort | Keystone, Colorado | USA

Scientific Organizers:

Sean Hill, École Polytechnique Fédérale de Lausanne, Switzerland

Hongkui Zeng, Allen Institute for Brain Science, USA

Z. Josh Huang, Cold Spring Harbor Laboratory, USA

György Buzsáki, New York University, Langone Medical Center, USA

Identifying and understanding the building blocks of the nervous system and how they interact is a central focus of international efforts to understand the brain. Modern genetic approaches hold the promise of establishing an inventory of cell types, exploring mechanisms of cellular identity, developing tools for experimental manipulations, building a brain-wide cell type atlas, and providing the basis of establishing brain-wide connectivity atlases at cellular resolution. Understanding how diseases and disorders impact cells, synapses and circuitry is essential to guide the development of treatments and therapies. Creating such an atlas of genetically identified cell types and their connectivity will provide key data and knowledge for developing in silico reconstructions of brain circuitry and developing theories of brain structure and function. This conference brings together leading scientists from around the world to present the latest tools, techniques and discoveries in using genetic approaches to understand the cell types of the brain and their role in cognition, behavior, and brain diseases and disorders.

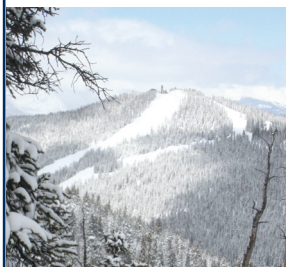
Session Topics:

- Tools and Techniques for Genetic Dissection
- Towards a Census of Cell Types
- Genetic Dissection of Microcircuitry
- Genetic Dissection of Meso and Macrocircuitry
- Data, Modeling, Informatics
- Genetic Dissection of Behavior
- Genetic Dissection of Brain Disorders and Diseases
- From Genetic Dissection to the Clinic

Scholarship Application & Discounted Abstract Deadline: September 21, 2017

Abstract Deadline: October 19, 2017

Discounted Registration Deadline: November 20, 2017



Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Upper image of MRI scan of a fixed cerebral hemisphere from a person with multiple sclerosis courtesy of Govind Bhagavatheeshwaran, Daniel Reich, NINDS, NIH.

Meeting Hashtag: #KSbrain

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SUNDAY, JANUARY 14

Arrival and Registration

MONDAY, JANUARY 15

Welcome and Keynote Session

Catherine C. Dulac, Harvard University, USA
Molecular and Cellular Architecture of Social Behavior Circuits

Walter J. Koroshetz, NINDS, National Institutes of Health, USA
From Genetic Dissection to Neuromodulation: The Promise of the BRAIN Initiative

Tools and Techniques for Genetic Dissection

Anthony Zador, Cold Spring Harbor Laboratory, USA
Genetic Dissection of Brain Connectivity

Edward S. Boyden, Massachusetts Institute of Technology, USA
Technologies for Analyzing and Controlling Neural Circuits

Qingming Luo, Huazhong University of Science and Technology, China
Brain-Wide Genetically Defined Networks

Short Talk(s) Chosen from Abstracts

Towards a Census of Cell Types

Hongkui Zeng, Allen Institute for Brain Science, USA
Building a Path from Cell Types to Connectivity to Circuit Function

Sten Linnarsson, Karolinska Institutet, Sweden
Cell Types from Transcriptomes

Z. Josh Huang, Cold Spring Harbor Laboratory, USA
Transcription Architecture of GABAergic Interneuron Types

Short Talk Chosen from Abstracts

Poster Session 1

TUESDAY, JANUARY 16

Genetic Dissection of Microcircuitry

Botond Roska, Friedrich Miescher Institute, Switzerland
Genetic Dissection of the Retina

Liqun Luo, Stanford University, USA
Genetic Assembly of Brain Circuitry

Andreas Tolias, Baylor College of Medicine, USA
The Fabric of Neocortical Microcircuits

Hideyuki Okano, Keio University School of Medicine, Japan
Mesocircuitry of the Marmoset Brain

Short Talk(s) Chosen from Abstracts

Genetic Dissection of Meso and Macro-circuitry

Ann-Shyn Chiang, National Tsing Hua University, Taiwan
Genetic Dissection of the Whole Drosophila Brain

Attila Losonczy, Columbia University, USA
Dissecting Hippocampal Circuit Dynamics during Navigation and Learning with in vivo Imaging

Suzanaerculano-Houzel, Vanderbilt University, USA
It Takes Three Variables to Build a Cortex (and the Human Cortex is Not Special): Lessons from Comparative Neuroanatomy

Poster Session 2

WEDNESDAY, JANUARY 17

Data, Modeling, Informatics

Kenneth Harris, University College London, UK
The Organization of Activity in Large Neuronal Populations

Sean Hill, École Polytechnique Fédérale de Lausanne, Switzerland
Digital Reconstructions of Brain Circuitry: From Gene Expression to Emergent Network Activity

Surya Ganguli, Stanford University, USA
Talk Title to be Announced

György Buzsáki, New York University, Langone Medical Center, USA
Dynamics of Diversity: Skewed Distributions of Firing Rates, Spike Transmission and Population Cooperation

Short Talk(s) Chosen from Abstracts

Genetic Dissection of Behavior

Yang Dan, University of California, Berkeley, USA
Genetic Dissection of Sleep

Karel Svoboda, Janelia Farm Research Campus & Cold Spring Harbor Laboratory, USA
The Circuitry of Tactile Decision Making

Speaker to be Announced

Short Talk Chosen from Abstracts

Poster Session 3

THURSDAY, JANUARY 18

Genetic Dissection of Brain Disorders and Diseases

Freda D. Miller, SickKids, Canada
Genetically-Defined Cellular Heterogeneity during Normal and Pathological Cortex Development

Steven Petrou, Florey Institute for Neuroscience, Australia
Genetic Dissection of Epilepsy

Lorna W. Role, Stony Brook University, USA
Genetic Dissection of Schizophrenia

Viviana Gradinaru[†], California Institute of Technology, USA
Talk Title to be Announced

Short Talk(s) Chosen from Abstracts

From Genetic Dissection to the Clinic

Anatol Kreitzer, University of California, San Francisco, USA
Cell-Type-Specific Function and Dysfunction in Basal Ganglia Circuits

Karl Deisseroth[†], Stanford University, USA
Talk Title to be Announced

Peter Francis, Retrosense Therapeutics, USA
Using Optogenetics to Restore Vision

Meeting Wrap-Up: Outcomes and Future Directions (Organizers)

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FRIDAY, JANUARY 19

Departure