

# 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.*

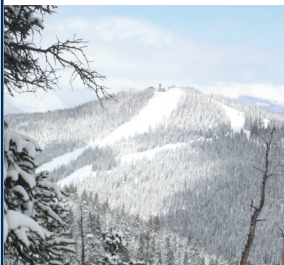
## Session Topics:

- 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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# KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

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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  
*Sequencing the Connectome*

**Qingming Luo**, Huazhong University of Science and Technology, China  
*Brainsmatics: Deciphering Brain Function with Brain-Wide Genetically Defined Networks*

**Viviana Gradinaru**, California Institute of Technology, USA  
*Gene Delivery Across the Blood-Brain-Barrier, Whole-Body Tissue Clearing, and Optogenetics to Understand and Influence Physiology and Behavior*

#### Towards a Census of Cell Types

**Hongkui Zeng**, Allen Institute for Brain Science, USA  
*Building a Cell Type Taxonomy for Mouse Cortical Neurons*

**Sten Linnarsson**, Karolinska Institutet, Sweden  
*Brain Cell Types and Lineages from Transcriptomes*

**Hideyuki Okano**, Keio University School of Medicine, Japan  
*Disease Modeling and Brain Mapping using Genetically Modified Marmosets*

#### 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  
*TRAPing Active Neurons*

**Andreas Tolias**, Baylor College of Medicine, USA  
*The Fabric of the Neocortex*

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

#### 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  
*High-Dimensional Geometry of the Cortical Population Code as Revealed by 10,000-Cell Recordings*

**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  
*Extrinsic Regulation of Cellular Genesis 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 Cholinergic Signaling in Memory Disorders*

#### Short Talk(s) Chosen from Abstracts

#### From Genetic Dissection to the Clinic

**Anatol Kreitzer**, University of California, San Francisco, USA  
*Function of Basal Ganglia Circuitry in Motivation and Decision Making*

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

#### Speaker to be Announced

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

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**FRIDAY, JANUARY 19**

**Departure**