

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.

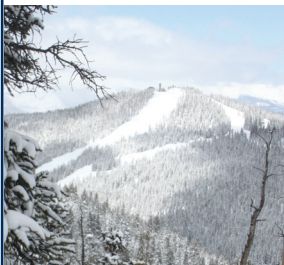
Session Topics:

- 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
Sequencing the Connectome

Qingming Luo, Huazhong University of Science and Technology, China
Brainmatics: 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
Multiscale Anatomy of Drosophila Connectome

Attila Losonczy, Columbia University, USA
Dissecting Hippocampal Circuit Dynamics During Temporal Associative Learning

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
How Does Circuit Modification Support Learning?

Short Talk(s) Chosen from Abstracts

Genetic Dissection of Behavior

Yang Dan, University of California, Berkeley, USA
Neural Circuits Controlling Sleep

Karel Svoboda, Janelia Research Campus & Cold Spring Harbor Laboratory, USA
Cell Type-Specific Analysis of the Cortical Circuits for Motor Planning and Movement Initiation

Short Talk Chosen from Abstracts

Poster Session 3

THURSDAY, JANUARY 18

Genetic Dissection of Brain Disorders and Diseases

Freda D. Miller, Hospital for Sick Children, Canada
Extrinsic Regulation of Cellular Genesis during Normal and Pathological Cortex Development

Samuel Berkovic†, Melbourne Brain Centre, Australia
Talk Title to be Announced

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

Karoly Nikolich†, Stanford University, USA
Talk Title to be Announced

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

Nathalie Isabelle Cartier-Lacave, CEA MIRCen, France
The Role of Impaired Brain Cholesterol Metabolism in Neurodegenerative Diseases: Towards Gene Therapy Strategies

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

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FRIDAY, JANUARY 19

Departure