



Join Keystone Symposia
for the 2016 conference on:

State of the Brain

May 22–26, 2016

Alpbach Congress Centrum | Alpbach | Austria

Scientific Organizers:

Terrence J. Sejnowski and Sten Grillner

Recent years have seen rapid advances in our understanding of brain biology, driven in part by the development of novel technologies for studying neural networks. Consequently, major national research programs in the EU and US have been launched that will bring together teams of neuroscientists and engineers with the aim of achieving a major advance in understanding brain function and dysfunction. The challenge is to map the circuits of the brain, measure the fluctuating patterns of electrical and chemical activity flowing within those circuits and understand how they give rise to cognitive and behavioral capabilities. This Keystone Symposia conference brings together investigators from around the world to share their discoveries and to plan future projects in this exciting new era for brain research.

Session Topics:

- International Brain Programs
- Discovering Diversity: Identifying Cell Types in the Brain
- The Brain in Action: Large-Scale Monitoring and Manipulating Neurons
- Maps in the Brain: Generating Multi-scale Neural Circuits
- Model Systems: Using Genetics to Deconstruct Neural Circuits
- Advancing Human Neuroscience: Understanding Mental Function and Dysfunction
- Big Data: Analyzing High-Dimensional Brain Datasets
- Discovering Principles: Theory, Models, Computation and Statistics



For additional details, visit
www.keystonesymposia.org/16R1.

KEYSTONE SYMPOSIA™
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KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

State of the Brain (R1)

May 22-26, 2016 • Alpbach Congress Centrum • Alpbach, Austria

Scientific Organizers: Terrence J. Sejnowski and Sten Grillner

Lead Sponsor: Allen Institute for Brain Science

Abstract & Scholarship Deadline: January 21, 2016 / Abstract Deadline: February 23, 2016 / Discounted Registration Deadline: March 22, 2016

SUNDAY, MAY 22

Arrival and Registration

MONDAY, MAY 23

Welcome and Keynote Address

***Sten Grillner**, Karolinska Institutet, Sweden

Cornelia Bargmann, Rockefeller University, USA
Understanding Brain Function and Dysfunction

International Brain Programs

***Terrence J. Sejnowski**, The Salk Institute, USA

Felix Schuermann, École Polytechnique Fédérale de Lausanne, Switzerland
The EU Human Brain Project

Walter J. Koroshetz, NINDS, National Institutes of Health, USA
State of BRAIN: NIH's Initiative

Mu-ming Poo, Institute of Neuroscience, CAS, China
China Brain Project and Non-Human Primate Research

Christof Koch, Allen Institute for Brain Science, USA
Project MindScope - Big Science, Team Science, Open Science to Understand Mouse Cortex

Panel 1: Coordinating International Programs

***Cornelia Bargmann**, Rockefeller University, USA

Sten Grillner, Karolinska Institutet, Sweden

Walter J. Koroshetz, NINDS, National Institutes of Health, USA

Mu-ming Poo, Institute of Neuroscience, CAS, China

Christof Koch, Allen Institute for Brain Science, USA

Thomas Skordas, European Commission, Belgium

Sharif Taha, Kavli Foundation, USA

Discovering Diversity: Identifying Cell Types in the Brain

***Hongkui Zeng**, Allen Institute for Brain Science, USA

Botond Roska, Friedrich Miescher Institute, Switzerland
Cell Types and Circuits in the Visual System

Hongkui Zeng, Allen Institute for Brain Science, USA
Genetic Approaches to Brain Circuit Mapping and Cell Type Characterization

Sara B. Linker, The Salk Institute for Biological Studies, USA
Short Talk: Nuclear RNA-Seq of Single Neurons Reveals Molecular Signatures of Activation Across the Hippocampal Circuit

William Allen, Stanford University, USA
Short Talk: Separately-Coordinated Brainwide Dynamics of Distinct Cell Types during Behavior

Poster Session 1

TUESDAY, MAY 24

The Brain in Action: Large-Scale Monitoring and Manipulating Neurons

Karl Deisseroth, Stanford University, USA
Optogenetic Approaches to Neural Circuits

***Mark J. Schnitzer**, Stanford University, USA

Reading Neural Codes from a Thousand Neurons in Freely Behaving Mice

Susumu Tonegawa, Massachusetts Institute of Technology and RIKEN Brain Science Institute, USA

Monitoring and Engineering Memory Engram Cells and their Circuits

Stuart Trenholm, Friedrich Miescher Institute, Switzerland
Short Talk: Functional Cortical Connectivity Principles Revealed by Single-Cell-Initiated Circuit Tracing with Rabies Viruses

Kishore Kuchibhotla, New York University School of Medicine, USA
Short Talk: A Synaptic and Circuit Switch for Control of Flexible Behavior

Panel 2: Bridging the Gap between Circuits and Behavior

***Mu-ming Poo**, Institute of Neuroscience, CAS, China

Karl Deisseroth, Stanford University, USA

Mark J. Schnitzer, Stanford University, USA

Susumu Tonegawa, Massachusetts Institute of Technology and RIKEN Brain Science Institute, USA

Winfried Denk, Max Planck Institute of Neurobiology, Germany

R. Clay Reid, Allen Institute for Brain Science, USA

Maps in the Brain: Generating Multi-Scale Neural Circuits

Winfried Denk, Max Planck Institute of Neurobiology, Germany
Towards a Connectome of the Whole Mouse Brain

***R. Clay Reid**, Allen Institute for Brain Science, USA
Integrating Circuits, Recordings and Behavior

Terrence J. Sejnowski, The Salk Institute, USA
Global Circular Waves in Human Cortex

Zeinab Fazlali, Institute for Research in Fundamental Sciences, Iran
Short Talk: Locus Coeruleus Activity and Brain State: Implications for Sensory Coding in Rat Barrel Cortex

Poster Session 2

WEDNESDAY, MAY 25

Advancing Human Neuroscience: Understanding Brain Function and Dysfunction

John Donoghue, Wyss Center for Bio- and Neuro-Engineering, Switzerland

Brain Computer Interfaces

Helen S. Mayberg, Emory University, USA
Iterative Strategies to Refine and Optimize DBS for Depression

***Patricia K. Kuhl**, University of Washington, USA
What Can Babies' Brains Tell Us About What it Means to be Human?

Niels Janssen, University of La Laguna, Spain
Short Talk: Whole-Brain fMRI Activity at a High Temporal Resolution: A New Analytic Technique

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Panel 3: What are the Prospects for Helping Humans with Brain Disorders?

***John Donoghue**, Wyss Center for Bio- and Neuro-Engineering, Switzerland

Helen S. Mayberg, Emory University, USA

Patricia K. Kuhl, University of Washington, USA

Emery N. Brown, MIT-Harvard Division of Health Sciences and Technology, USA

Botond Roska, Friedrich Miescher Institute, Switzerland

Discovering Principles: Theory, Models, Computation and Statistics

***Terrence J. Sejnowski**, The Salk Institute, USA

Emery N. Brown, MIT-Harvard Division of Health Sciences and Technology, USA

Deciphering the Dynamics of the Unconscious Brain under General Anesthesia

Sten Grillner, Karolinska Institutet, Sweden

Multi-Scale Modeling of Neuronal Networks - From Ion Channels to Selection of Behavior

Astrid Prinz, Emory University, USA

Embracing Variability: Ensemble Modeling in Neuroscience

Suresh J. Jesuthasan, LKC School of Medicine, Singapore

Short Talk: Investigating Neural Dynamics in the Zebrafish Habenula

Poster Session 3

THURSDAY, MAY 26

Model Systems: Using Genetics to Deconstruct Neural Circuits

Gerald M. Rubin, Janelia Research Campus, USA

A Comprehensive Approach to Understanding the Fly Brain

Florian Engert, Harvard University, USA

From Whole-Brain Data to Functional Circuit Models: The Zebrafish Optomotor Response

***Hideyuki Okano**, Keio University School of Medicine, Japan

Disease Modeling and Brain Mapping Using Transgenic Marmosets

Ashiq Hussain, Max Planck Institute for Neurobiology, Germany

Short Talk: Neuropeptides Modulate Female Chemosensory Processing Upon Mating in Drosophila

Processing Upon Mating in Drosophila

Justus Kiebschull, Cold Spring Harbor, USA

Short Talk: MAPseq: Massively Multiplexed Mapping of Single Neuron Projections by Sequencing of Barcoded RNA

Panel 4: Evolutionary Perspectives in Understanding the Brain

***Sten Grillner**, Karolinska Institutet, Sweden

Gerald M. Rubin, Janelia Research Campus, USA

Florian Engert, Harvard University, USA

Cornelia Bargmann, Rockefeller University, USA

Hongkui Zeng, Allen Institute for Brain Science, USA

Big Data: Analyzing High-Dimensional Brain Datasets

***Sten Grillner**, Karolinska Institutet, Sweden

Joshua T. Vogelstein, Johns Hopkins University, USA

NeuroData: Enabling Petascale Neuroscience

Sean Hill, Centre for Addiction and Mental Health, Canada

Neuroinformatics: From Big Data to Knowledge Discovery

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

FRIDAY, MAY 27

Departure