



Presidential Special Lectures

Themes and Variations in Circuits and Behavior **CME**

Saturday, Oct. 17, 5:15–6:25 p.m.



Cori Bargmann, PhD
Howard Hughes
Medical Institute
*The Rockefeller
University*

Behavior is variable, both within and between individuals. The nematode worm *C. elegans* allows scientists to explore how genes, neurons, circuits, and the environment interact to give rise to flexible behaviors. Studies of *C. elegans* foraging behaviors have provided insights into three levels of behavioral variability: the gating of information flow by circuit state over seconds, the extrasynaptic regulation of circuits by neuropeptides and neuromodulators over minutes, and natural genetic variation.

The Molecular Logic of Neural Circuits: Implications for Autism and Schizophrenia **CME**

Sunday, Oct. 18, 5:15–6:25 p.m.



Thomas C. Südhof, MD
Howard Hughes
Medical Institute
*Stanford University
School of Medicine*

Neural circuits process information by transmitting and computing signals at synapses. The hypothesis is that interactions between trans-synaptic cell-surface molecules, such as neuroligins, determine the molecular logic of neural circuits, and that some autism and schizophrenia syndromes are produced by impairments in this molecular logic, as evidenced by neuroligin mutations in autism and schizophrenia. With these hypotheses, the lecturer will provide a conceptual framework for understanding neural circuits in health and disease.

Immune Mechanisms of Synapse Loss in Health and Disease **CME**

Monday, Oct. 19, 5:15–6:25 p.m.



Beth Stevens, PhD
Boston Children's
Hospital
Harvard Medical School

How synapses are eliminated in the developing and diseased brain remains a mystery. During development, synaptic pruning is required for precise wiring and emerging evidence implicates immune-related molecules and immune cells called microglia. This talk will review research on how these pathways regulate the formation, refinement, and elimination of specific axons and synapses during development. The discoveries suggest ways of protecting synapses in neurodegenerative and psychiatric disorders involving synapse loss.

Grid Cells and Cortical Maps for Space **CME**

Tuesday, Oct. 20, 5:15–6:25 p.m.



May-Britt Moser, PhD
Kavli Institute for Systems
Neuroscience and
Centre for Neural
Computation
*Norwegian University of
Science and Technology*

The medial entorhinal cortex (MEC) is part of the brain's circuit for dynamic representation of self-location. The metric of this representation is provided by grid cells — cells with spatial firing fields that tile environments in a periodic hexagonal pattern. This lecture will discuss the morphological identity of cells that express this pattern, how they are organized, how they interact with the environment, and how grid cells and place cells contribute to a wider circuit for goal-directed navigation.