Featured Lectures

All featured lectures will be held at the San Diego Convention Center, Ballroom 20. Overflow viewing will be available in Hall A.

Presidential Special Lecture

The Mind of a Worm: Learning From the *C. elegans* Connectome **CME**

Scott W. Emmons, PhD
Albert Einstein College of Medicine
Support contributed by:
Janssen
Saturday, Nov. 9, 5:15–6:25 p.m.

The connectome of the roundworm *C. elegans* reveals the neural pathways that underlie its motivated and purposeful behavior. New connectomics data suggest the topology of a neural network contributes to integration of multiple sensory inputs in a decision-making process that guides a multistep behavioral pathway. Our thoughts, memories, and behavior are emergent collective properties of a vast network of neurons. Determining the wiring diagram of the nervous system of a tiny animal is a first step toward learning how patterns of connectivity contribute to the rapid, robust, and economic function of the brain.

Peter and Patricia Gruber Lecture

Understanding Circuit Dynamics: Variability, Modulation, and Homeostasis

Eve E. Marder, PhD
Brandeis University
Support contributed by:
The Gruber Foundation
Sunday, Nov. 10, 2:30–3:40 p.m.

Circuit function arises from the interplay between the intrinsic properties of neurons and their synaptic connections. This lecture will present combined experimental and computational work suggesting that robust circuit performance can arise from highly variable circuit components. Animal-to-animal variability in circuit parameters raises interesting challenges for reliable neuromodulation and responses to environmental perturbation but allows important substrates for evolution.

Presidential Special Lecture

A Molecular Geneticist's Approach to Understanding the Fly Brain **CME**

Gerald M. Rubin, PhD
Janelia Farm Research Campus, Howard Hughes Medical Institute
Support contributed by:
Amgen Inc.
Sunday, Nov. 10, 5:15–6:25 p.m.

To probe the workings of the nervous system, we will need to be able to assay and manipulate the function of individual neuronal cell types. The intellectual framework for such an approach has been apparent for many years, but the available tools have been inadequate for the job. This lecture addresses efforts to develop and apply an advanced set of tools that will be required for a comprehensive analysis of the anatomy and function of the fly brain at the level of individual cell types and circuits.

David Kopf Lecture on Neuroethics

Blaming the Brain: Behavioral Sciences in the Courtroom

Nita Farahany, JD, PhD
Duke University
Support contributed by:
David Kopf Instruments
Monday, Nov. 11, 10–11:10 a.m.

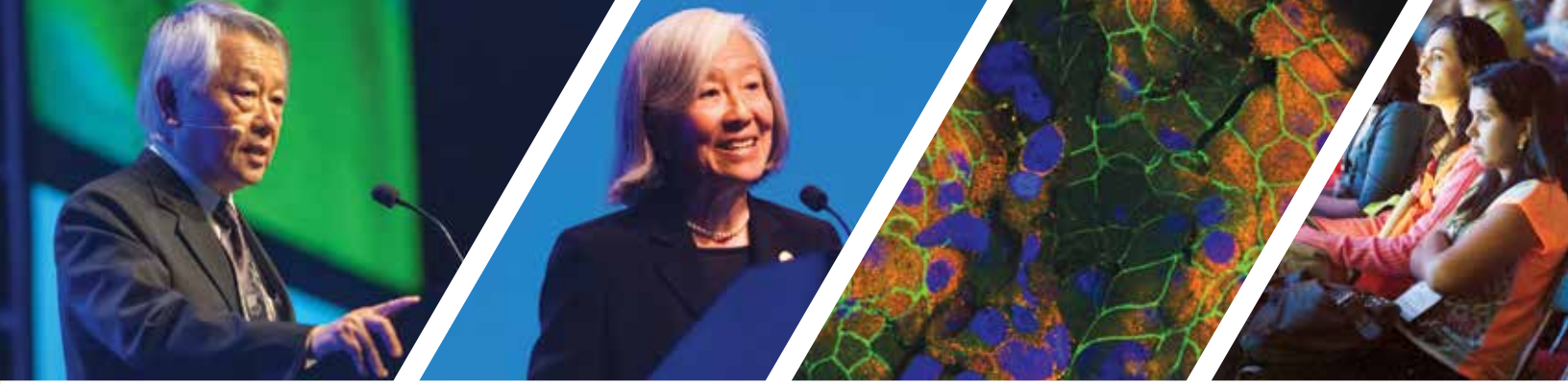
Recent scientific progress has dramatically advanced our understanding of biological, neurological, and environmental contributions to normal and deviant human behavior. This lecture will present the first comprehensive empirical study on the use of biosciences in the United States and other legal systems. Focusing on criminal law and tort law, the lecture will cover the nature of claims being advanced, shifting attitudes toward scientific evidence in the legal system, and future implications for the relationship between law and neuroscience.

Dialogues Between Neuroscience and Society

The Creative Culture

Ed Catmull, PhD
President, Walt Disney and Pixar Animation Studios
Support contributed by: Elsevier
Saturday, Nov. 9, 11 a.m.–1 p.m.

Many think creativity is the result of singular genius. However, the reality of creativity is far more complex and interesting. The central issues include removing hidden barriers to creativity and candor. We pay special attention to protecting barely formed ideas; the dynamic balance between technology and art; the necessity of structured processes to get the job done; and the random, unpredictable nature of what we do. In particular, we need to give thoughtful attention to the culture itself, for out of this culture arises new technology, new ideas, and artistic expression.



Special Presentation

Understanding New Brain Initiatives in the United States and Europe

Monday, Nov. 11, 1:15–3 p.m.

Thomas R. Insel, MD
National Institute of Mental Health, National Institutes of Health

Story C. Landis, PhD
National Institute for Neurological Disorders and Stroke, National Institutes of Health

Geoffrey S.F. Ling, MD, PhD
Defense Sciences Office, Defense Advanced Research Projects Agency

Cora B. Marrett, PhD
National Science Foundation

Daniel Pasini
European Commission Directorate General for Communications Networks, Content & Technology (DG CONNECT)

The Special Presentation will feature a panel discussion about emerging neuroscience projects in the United States and Europe. The panel will include key leaders from the U.S. Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative and the Human Brain Project, a European Flagship program. Learn more about recent investments in brain research initiatives, the scientific foci, and the public policy implications and opportunities in neuroscience.

Albert and Ellen Grass Lecture

The Neural Circuitry of Sex and Violence **CME**

David J. Anderson, PhD
California Institute of Technology

Support contributed by:
The Grass Foundation

Monday, Nov. 11, 3:30–4:40 p.m.

Arousal states are integral to our emotional responses. Both mating and fighting are associated with high states of arousal and, furthermore, these behaviors can reinforce one another. For example, sexual experience enhances aggressiveness in mice; however, at the same time, these behaviors are typically mutually exclusive. How can these behaviors be so opposed while reinforcing each other? This talk will describe efforts to address this problem by elucidating the functional neural circuitry underlying aggression and its relationship to circuits controlling mating behavior in both mice and fruit flies.

Presidential Special Lecture

Connectomics: What, How, and Why **CME**

Jeff W. Lichtman, MD, PhD
Harvard University

Support contributed by:
Medimmune

Monday, Nov. 11, 5:15–6:25 p.m.

Connectional maps of the brain have value in modeling how the brain works and fails when subsets of neurons or synapses are missing or misconnected. Such maps also provide information about how brain circuits develop and age. Efforts to obtain complete wiring diagrams of peripheral motor and autonomic axons provide insight into the way mammalian nervous systems mold in response to experience. Automated electron microscopy used to collect tapes of brain sections then imaged at high resolution will be discussed. This imaging pipeline will make large-scale connectomic analysis of brain circuits more routine.

History of Neuroscience Lecture

Reward Circuitry in the Brain

Roy A. Wise, PhD
Intramural Research Program of the National Institute on Drug Abuse, NIH

Tuesday, Nov. 12, 2:30–3:40 p.m.

The discovery that rats would work for brief electrical stimulation of the brain led to the notion of specialized brain circuitry for the "stamping in" of learning. Longer stimulation at the same brain sites induced drive states for feeding, predatory attack, and other motivated behaviors. Subsequent pharmacological and parametric studies implicated forebrain dopamine systems as the final common path for these effects. These findings formed the early basis for our current view and new optogenetic studies of the special role of dopamine in learning, motivation, and addiction.

Presidential Special Lecture

Understanding Cortical Hierarchies: The Six-Piece Puzzle of Face Perception **CME**

Doris Y. Tsao, PhD
California Institute of Technology

Tuesday, Nov. 12, 5:15–6:25 p.m.

How the brain distills a representation of meaningful objects from retinal input is one of the central challenges of systems neuroscience. Functional imaging experiments in the macaque reveal that one ecologically important class of objects, faces, is represented by a system of six discrete, strongly interconnected regions. Electrophysiological recordings show that these "face patches" have unique functional profiles. By understanding the distinct visual representations maintained in these six face patches, the sequence of information flow between them, and the role each plays in face perception, we can gain new insights into hierarchical information processing in the brain.

CME *This activity has been approved for AMA PRA Category 1 Credit™. See page 62 and visit SfN.org/cme for details.*