Featured Lectures

All lectures will take place in Ballroom 20 of the San Diego Convention Center. Overflow viewing will be available in Hall A.

PRESIDENTIAL SPECIAL LECTURE

Circuits for Vocal Communication CME

Sarah M. N. Woolley, PhD

Columbia University
Support contributed by Biogen
Saturday, November 12, 5:15–6:25 p.m.

Social communication reflects the coordinated development of sensory and motor circuits around signals that convey information. The young brain, learning to communicate with hearing and voice, builds auditory and vocal motor circuits that are functionally coupled to perceive and produce similar signals. This lecture describes progress made using songbirds to understand how species' identity dictates the capacities and limits of vocal learning, how early experience shapes auditory and vocal circuits, and how species and learning combine to map auditory tuning onto vocal acoustics.

PETER AND PATRICIA GRUBER LECTURE

Random Walk in Neurobiology

Mu-ming Poo, PhD

University of California-Berkeley and Institute of Neuroscience, Chinese Academy of Science
Support contributed by The Gruber Foundation
Sunday, November 13, 2:30–3:40 p.m.

Beginning as a biophysicist studying diffusion of membrane proteins, I stumbled upon many interesting problems in cellular neurobiology, including neuronal polarization, axon guidance, synaptogenesis, and synaptic plasticity. An underlying theme in all these processes is random diffusion of proteins confined or even directed by localization mechanisms, leading to cellular topography critical for neuronal functions. As it turned out, my own career path resembled a random walk, influenced and sometimes directed by interactions with my students, postdocs, and colleagues.

PRESIDENTIAL SPECIAL LECTURE

Limitations on Visual Development: Neurons and Behavior CME

Lynne Kiorpes, PhD
New York University
Sunday, November 13, 5:15–6:25 p.m.

Vision develops over many months in primate infants. The neural mechanisms that limit visual function are not fully understood. During development, neurons in the visual cortex are more sensitive than would be expected based on visual behavior. Abnormal early experience creates a specific disorder — amblyopia — which permanently disrupts vision. Here also, the sensitivity of neurons in the visual cortex exceeds behavior. This talk will describe the neural limits on normal and abnormal postnatal visual development based on studies of the brain and behavior in human and nonhuman primates.

DAVID KOPF LECTURE ON NEUROETHICS

Reforming Forensic Science: Some Insights from Research on Vision and Memory

Thomas D. Albright, PhD
Salk Institute for Biological Studies
Support contributed by David Kopf Instruments
Monday, November 14, 10–11:10 a.m.

In its 2009 report, *Strengthening Forensic Science in the United States: A Path Forward,* the National Academy of Sciences identified a number of significant weaknesses in forensic science, which have contributed to wrongful convictions and have threatened public confidence in our criminal justice system. These problems have prompted broad calls for reform of the processes by which forensic evidence is acquired, analyzed, and interpreted. Several types of forensic analyses involve evaluation of complex visual patterns or memories of visual experiences. Advances in understanding of brain systems for visual sensation, perception, and memory can help shape forensic reform by illuminating the relevant sensory and cognitive processes, their limitations, and factors that can improve human performance in a forensic context.

ALBERT AND ELLEN GRASS LECTURE

Natural Products as Probes of the Pain Pathway: From Physiology to Atomic Structure CME

David J. Julius, PhD
University of California, San Francisco
Support contributed by The Grass Foundation
Monday, November 14, 3:15–4:25 p.m.

The study of somatosensation, nociception, and pain has undergone a revolution with the application of molecular genetic, biochemical, and biophysical methods. With these approaches, investigators have begun to identify molecules, cells, and circuits that underlie stimulus detection, perception, and maladaptive processes. Together, these studies are providing an intellectual and technical foundation for developing new classes of analgesic agents.

PRESIDENTIAL SPECIAL LECTURE

Toward Whole-Body Connectome in *Drosophila* CME

Ann-Shyn Chiang, PhD
National Tsing Hua University, Taiwan
Support contributed by Janssen Research & Development LLC
Monday, November 14, 5:15–6:25 p.m.

Our brains receive information from sensory neurons about our external environment and internal organs. To understand how the brain processes information and initiates motor outputs, scientists are constructing complete

wiring diagrams called “connectomes” that map all neural connections in the brain and body. Taking *Drosophila melanogaster* as an example, this lecture will address challenges in building whole-body connectomes and how that knowledge may help us better understand normal function and treat disease.

FRED KAVLI HISTORY OF NEUROSCIENCE LECTURE

Sixty Years of Research on Neurotransmitter Release in the Light of Recent Results from the Calyx of Held Synapse

Erwin Neher, PhD
Max Planck Institute for Biophysical Chemistry
Support contributed by The Kavli Foundation
Tuesday, November 15, 2:30–3:40 p.m.

In the 1950s, Sir Bernhard Katz and co-workers laid the foundation for our present understanding of neurotransmitter release and its short-term plasticity. Their terms “units available” (for release) and “units responding to one impulse” have been replaced with terms like vesicle pools, release probability, and quantal content. Since then, the description of certain aspects of short-term plasticity has gained considerable complexity. Research on the Calyx of Held has described this complexity including heterogeneity of vesicle pools, refractoriness of release sites, and a phenomenon called “superpriming.” Nevertheless, this talk will argue that the original Katz view is still a useful framework on which to build.

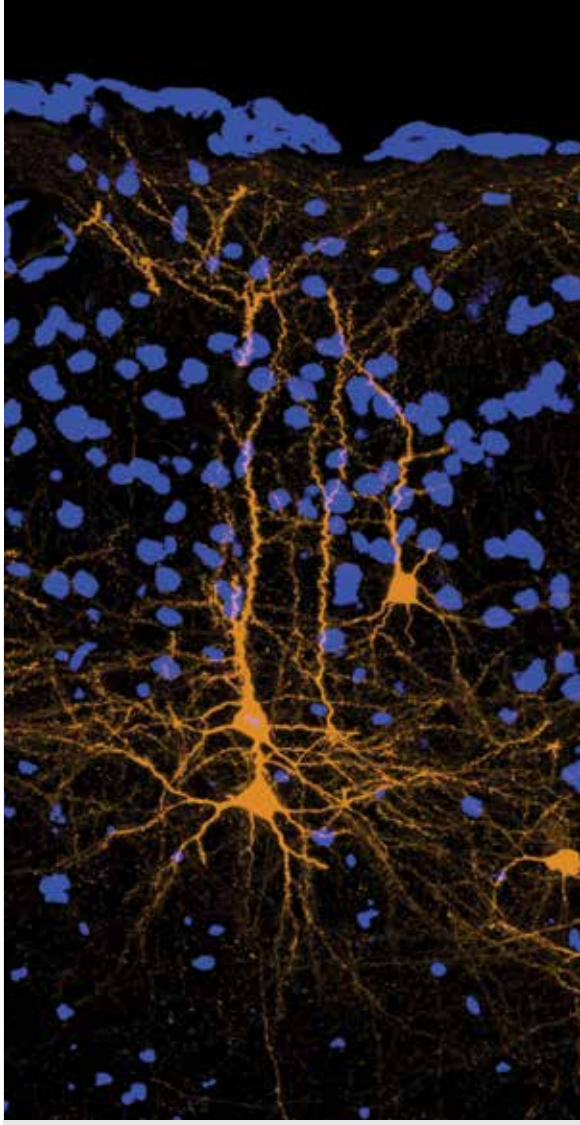
PRESIDENTIAL SPECIAL LECTURE

Neurobiology of the and Young Adult Brain Reveals Unique Strengths and Vulnerabilities: Debunking Myths CME

Frances E. Jensen, MD

Perelman School of Medicine, University of Pennsylvania
Tuesday, November 15, 5:15–6:25 p.m.

Experimental and human evidence reveal that adolescence is a paradoxical state, with enhanced synaptic plasticity yet incomplete myelination and regional connectivity. Full maturity is not reached until the third decade. Adolescent brain neuroscience impacts our understanding of patterns of onset of psychiatric illness, the long-term effects of exposure to substances of abuse and stress, and also explains their advantage in learning and memory, and why they exhibit “signature” behaviors such as impulsivity, emotional liability, altered sleep cycle, and susceptibility to addiction.



DIALOGUES BETWEEN NEUROSCIENCE AND SOCIETY

Global Mental Health and Neuroscience: Challenges and Opportunities

Shekhar Saxena, MD
World Health Organization
Support contributed by Elsevier
Saturday, November 12, 11 a.m.–1 p.m.

Global mental health is slowly but steadily coming out of the shadows. It is benefiting from advances in neuroscience, but not adequately. The potential is much greater. This lecture will present a background of the current state of mental health in the world and then focus on how a closer collaboration between mental health and neuroscience could enhance knowledge and improve population health. Examples from the areas of autism, substance dependence, psychoses, and dementia will help illustrate this potential.