Featured Lectures

All featured lectures will be held at the Walter E. Washington Convention Center, Hall D.

Presidential Special Lecture
The Living Record of Memory: Genes, Neurons, and Synapses CME
Kelsey C. Martin, MD, PhD
University of California, Los Angeles
Saturday, Nov. 15, 5:15–6:25 p.m.
Support contributed by: MedImmune

Memory requires stimulus-induced changes in gene expression, which, in turn, alters synaptic connectivity and wiring in the brain. In this way, experience combines with our genome to determine who we are as individuals. This talk describes efforts to understand how experience regulates gene expression within neurons, how stimulus-induced signals are transported from distal synapses to the nucleus to alter gene expression, and how gene expression is spatially restricted to specific subcellular compartments.

David Kopf Lecture on Neuroethics
Mind, Brain, and the Ethics of Intergroup Behavior
Mahzarin Banaji, PhD
Harvard University
Sunday, Nov. 16, 11:30 a.m.–12:40 p.m.
Support contributed by: David Kopf Instruments

From the moment of birth, every human is a member of many groups. Group memberships create affiliations of “us” and “them” and sensitivity to status in social hierarchies. Human minds reflect these in myriad attitudes and beliefs that contain deep knowledge about the hidden presence or surprising absence of group love. Unveiling them by observing brain activity and behavior allows understanding of the natural and cultivated ways in which the meanings of in-group and out-group (self and other) are represented and group love is elusively tuned up and down.

Peter and Patricia Gruber Lecture
Circuits and Strategies for Skilled Motor Behavior
Thomas Jessell, PhD
Columbia University, Howard Hughes Medical Institute
Sunday, Nov. 16, 2:30–3:40 p.m.
Support contributed by: The Gruber Foundation

The capacity to generate movement on demand is a reflection of neural computations that integrate internal command and external feedback for the purpose of patterned motor output. Advances in deciphering the logic of motor systems have not yet resolved the strategies and mechanisms through which neural circuits direct motor behavior. This lecture probes this issue through an analysis of motor circuits in the mammalian spinal cord, focusing on the functions of interneurons assigned to two feedback circuits, one that evaluates the fidelity of intended motor acts and a second that filters external sensory reports.

Presidential Special Lecture
The Integration of Interneurons Into Cortical Circuits: Both Nurture and Nature CME
Gordon J. Fishell, PhD
New York University Neuroscience Institute
Sunday, Nov. 16, 5:15–6:25 p.m.

Since the seminal finding that cortical GABAergic interneurons originate within the subpallium, extraordinary mechanisms must exist to ensure they are precisely and reliably embedded into cortical circuitry. Considerable efforts indicate that genetic programs initiated within progenitors assign interneurons into specific cardinal classes. It is less clear whether their synaptic specificity also is intrinsically determined. Fishell will discuss recent evidence concerning how intrinsic genetic programs within interneurons are shaped by local activity-dependent cues. These results suggest that sensory information complements earlier established genetic programs to shape the way interneuronal subtypes integrate into nascent cortical circuits.

Dialogues Between Neuroscience and Society
Food for Thought: Tastes, Aromas, and Memories of Food
Bryan Voltaggio, Chef
Saturday, Nov. 15, 11 a.m.–1 p.m.
Support contributed by: Elsevier

From the alluring smells and colors of a prepared dish to the deep emotions surrounding the act of sharing a meal, food unites us. The rich sensory experience that takes place every time we eat is made possible by the brain, which shapes perception of taste and smell, and seals the meal to memory. Hear noted chef, restaurateur, and Top Chef contestant Bryan Voltaggio discuss how he strives to create culinary treasures that not only satiate but entertain and transform how his guests think about food.
Long-term potentiation (LTP) has remained the most compelling cellular model for learning and memory since its discovery nearly 50 years ago by Bliss and Lomo. The thousands of papers published on LTP can be overwhelming to sift through for experts and novices alike. In this lecture, Nicoll will probe the core properties of LTP, arguing that the dozens of proteins linked to the phenomenon are not essential, but rather modulate the threshold and/or magnitude of LTP.

At the cellular and molecular levels of operation, neurons and their circuits achieve brain functions by chemical signals, in which the principle agents, neurotransmitters, convey the signal from the sending neuron to the receiving neuron. The discovery of each of the chemical families of neurotransmitters (amino acids, amines, and neuropeptides) provides important insight on understanding how brains function, changing our concepts of the complexities of short-term and long-term brain events, and how medications can intervene in brain dysfunctions.

Glia play key roles in brain development, homeostasis, plasticity, and injury. Specialized glia are stem cells both during development and in adults, and continuously generate new neurons in restricted brain regions throughout life. Doetsch will review the current understanding of the nature of specialized glia cells in the brain and the unique features of the niche in which they reside. Illuminating the biology of endogenous neural stem cells has important implications for brain repair.