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 ability of neuroprosthetics to restore functional communication in patients with disorders of consciousness has the potential to reintegrate patients into the nexus of family and community. As a worthy scientific pursuit, Fins will argue that this effort is a moral imperative that links respect for persons with the reemergence of voice out of covert consciousness. As such, it is a human rights issue for a population too long marginalized. For rights to come to mind, patients will need greater access to medical care and research and the skilled engagement of the neuroscience community.

The taste system is one of our fundamental senses, responsible for detecting and responding to sweet, bitter, umami, salty, and sour stimuli. Zuker’s laboratory studies the logic of taste coding as a platform to understand how our brain creates an internal representation of the outside world and transforms sensory signals at the periphery into percepts, actions, and behaviors.
PRESIDENTIAL SPECIAL LECTURE
Immune Mechanisms of Synapse Loss in Health and Disease
Beth Stevens, PhD
Boston Children’s Hospital
Harvard Medical School
Support contributed by: MedImmune
Monday, Oct. 19, 5:15–6:25 p.m.

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.

SPECIAL PRESENTATION
Embracing An Era of Unprecedented Advances in Neuroscience
Francis Collins, MD, PhD
National Institutes of Health
Tuesday, Oct. 20, 4–5 p.m.

Despite many challenges, the last decade has seen tremendous progress in neuroscience. To support continued progress, the National Institutes of Health (NIH) has taken a lead role in implementing the President’s Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative. The NIH Director will discuss how his agency, working with the neuroscience community, is catalyzing development of technologies to provide dynamic pictures of the brain, both in disease and in health. He will also examine challenges that cut across biomedical disciplines, and reflect upon opportunities for neuroscientists to face such challenges and generate tomorrow’s advances.

DIALOGUES BETWEEN NEUROSCIENCE AND SOCIETY
Neuroscience and the Law: Strange Bedfellows
Honorable Jed S. Rakoff, JD
U.S. District Court, Southern District of New York
Support contributed by: Elsevier
Saturday, Oct. 17, 11 a.m.–1 p.m.

Neuroscience is a hot topic with lawyers and judges, as recent advances in our understanding of the brain have raised important and unexpected implications for the development and application of legal principles. These implications, however, can be overstated, which presents a potential for abuse and warrants caution. Hear Senior U.S. District Judge Jed S. Rakoff, a founding member of the MacArthur Foundation Project on Law and Neuroscience, explore the legal and ethical questions raised as neuroscience enters the courtroom and affects the judicial system.

FRED KAVLI HISTORY OF NEUROSCIENCE LECTURE
100 Years of Stress and the HPA Axis
Mary F. Dallman, PhD
University of California, San Francisco
Support contributed by: The Kavli Foundation
Tuesday, Oct. 20, 2:30–3:40 p.m.

In 1915, Walter B. Cannon described responses to a variety of stressors and concluded that stress causes changes in the brain and body that are preparatory for behaviors such as fight or flight. From subcellular to psychological levels, enormous conceptual and methodological advances have occurred in understanding stress and responses of the brain-HPA and sympathetic nervous system axes in the last century. These advances tend to be isolated within, but not across, disciplines. Our current knowledge provides far greater detail of understanding and it does not change the conclusions drawn by Cannon.

PRESIDENTIAL SPECIAL LECTURE
Grid Cells and Cortical Maps for Space
May-Britt Moser, PhD
Neuroscience and Centre for Neural Computation
Norwegian University of Science and Technology
Support contributed by: Takeda
Tuesday, Oct. 20, 5:15–6:25 p.m.

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.

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