

## Dialogues between Neuroscience and Society

*Dance: Movement in Time and Space*

Speaker: Mark Morris

Mark Morris Dance Group

Support contributed by Elsevier

Saturday, Nov. 15

Noon – 1 p.m.



Mark Morris, founder of the Mark Morris Dance Group, is a world-acclaimed dancer and choreographer. This event will include a panel discussion with Morris, SfN President Eve Marder, and neuroscientist Bevil Conway, followed by questions from the audience. Issues to be addressed include how meaning is encoded in time and space, the relationship between

internally and externally generated rhythms, the importance of proprioception for dance, and how dancers learn movement sequences and achieve movement precision in time and space.

## Presidential Special Lecture

*What Songbirds Can Teach Us About Learning and the Brain* **CME**

Speaker: Allison J. Doupe, MD, PhD

University of California

Saturday, Nov. 15

5:15 – 6:15 p.m.



Songbirds provide one of the few animal models for speech learning. Like humans, they must hear the sounds of adults during a sensitive period, and must hear their own voice while learning to vocalize. They also possess networks of brain regions required for song learning, with many similarities to mammalian brains, that enable investigation of the neural mechanisms involved. This talk will review

questions posed by songbird behavior and discuss some recent progress, including surprisingly general insights into the neural bases of perceptual processing and sensorimotor learning.

## Fred Kavli Distinguished International Scientist Lecture

*Anatomy and the Problem of Behavior* **CME**

Speaker: Michael Bate, PhD

University of Cambridge

Support contributed by The Kavli Foundation

Sunday, Nov. 16

10 – 11 a.m.



In the 80 years since Coghill lectured on anatomy and the problem of behavior, there have been spectacular advances in our understanding of the developing nervous system. However, we know far more about neurogenesis, axon guidance, and the formation of connections than we do about the development of behavior. What can developmental genetics and neuroscience

tell us about the transition from growth and patterning to the onset of function in a network and the emergence of behavior?

## Peter and Patricia Gruber Lecture

*The Role of Theta Frequency Oscillations in Spatial Processing in the Hippocampal Formation*

Speaker: John O'Keefe

University College London

Support contributed by The Peter and Patricia Gruber Foundation

Sunday, Nov. 16

2:30 – 3:30 p.m.



A major function of the hippocampal formation is to generate cognitive maps of the environment. These maps are built from single units which represent the abstract notions of place, direction, and perhaps distance. Is there a role in the construction and operation of these cognitive maps for the network theta oscillations which are reflected in the hippocampal EEG? Research suggests that some aspects of both hippocampal and entorhinal cellular

activity might be due to beat-interference patterns between two theta-like oscillations of slightly different frequencies. This lecture will describe the experimental and theoretical bases for this idea.

## Presidential Special Lecture

*Memory and Hippocampal Networks: The Impact of Aging* **CME**

Speaker: Carol A. Barnes, PhD

University of Arizona

Support contributed by Pfizer, Inc.

Sunday, Nov. 16

5:15 – 6:15 p.m.



An understanding of the neural basis of cognition requires examination of the dynamics of large populations of neurons in behaviorally-driven networks. Developments in ensemble electrophysiological recording and functional imaging methods provide a framework for understanding how the hippocampus stores and retrieves information.

This lecture reviews how changes in plasticity mechanisms and network dynamics during aging impact the computations that presumably underlie initial episodic memory formation and contribute to cognitive deficits observed in older mammals.



## David Kopf Lecture on Neuroethics

### *How Do Brains Navigate Their Social/Moral Worlds?*

**Speaker:** Patricia S. Churchland, B.Phil  
*University of California, San Diego*  
*Support contributed by David Kopf Instruments*  
Monday, Nov. 17  
10 – 11 a.m.



Brains navigate the social world by relying on the same mechanisms they use for navigating the wider causal world. Relative to ecological conditions, a complex balance of drives, emotions, learned habits, pattern recognition, and sensitivity to time-constraints are the currents that typically bring the system to a workable decision in both pragmatic and moral domains. Reliance on rules is not typically a factor, even in human decision making. The dogma that “you cannot infer an ‘ought’ from an ‘is’” squares poorly with how, in fact, successful humans determine what they ought to do.

## Albert and Ellen Grass Lecture

*The Right Synapse in the Right Place* **CME**  
**Speaker:** Joshua R. Sanes, PhD  
*Harvard University*  
*Support contributed by The Grass Foundation*  
Monday, Nov. 17  
3:15 – 5 p.m.



Formation of synapses involves matching of pre- and postsynaptic partners, coordination of their differentiation, and activity-dependent synaptic maturation. Defects in all of these steps have been implicated in the most mysterious of all human maladies, behavioral disorders. This lecture will focus primarily on the first of these processes: how axons “choose” a particular target and, in many cases, a particular part of the target cell’s surface. New methods for analyzing how these choices are made and for mapping the specific circuits to which they give rise will also be discussed.

## Presidential Special Lecture **CME**

*Sleep: Studying a Human Behavior in an Insect*  
**Speaker:** Leslie C. Griffith, MD, PhD  
*Brandeis University*  
*Support contributed by Merck & Co., Inc.*  
Monday, Nov. 17  
5:15 – 6:15 p.m.



Why and how we sleep have been a matter of speculation and study for millennia. Primate and rodent model systems have provided insight into sleep, but the circuitry is not completely understood. The recent finding that insects sleep suggests that *Drosophila*, a genetically tractable organism with powerful circuit-breaking tools, can be used to study this process. This lecture will present behavioral and molecular evidence that strategies used by the fly brain to generate sleep mirror those of the human brain, and that understanding the fly sleep circuits will shed light on the human state.

## History of Neuroscience Lecture

*Reflecting on the Field of Brain and Memory*  
**Speaker:** Brenda A. Milner, DSc  
*McGill University*  
*Support contributed by AstraZeneca*  
Tuesday, Nov 18  
2:30 – 3:30 p.m.



This talk reviews how, in the early 1950s, the study of a few patients with amnesia resulting from bilateral medial temporal-lobe damage provided early evidence for multiple memory systems in the brain, and it will show how recent technological advances, such as functional neuroimaging, have permitted a more precise delineation of brain-behavior relationships in memory processes.

## Presidential Special Lecture

*Sex and Smell* **CME**  
**Speaker:** Catherine G. Dulac, PhD  
*Harvard University*  
*Support contributed by Lundbeck Research USA*  
Tuesday, Nov. 18  
5:15 – 6:15 p.m.



Recent research has been instrumental in identifying genes and components of neuronal circuits associated with sex-specific pheromone-evoked responses in the mouse. Understanding of the basic principles of signal processing leading to sex- and species-specific instinctive behaviors is still in its infancy, and the genes and circuits identified in earlier work are providing precious tools for further, more mechanistic, investigations.