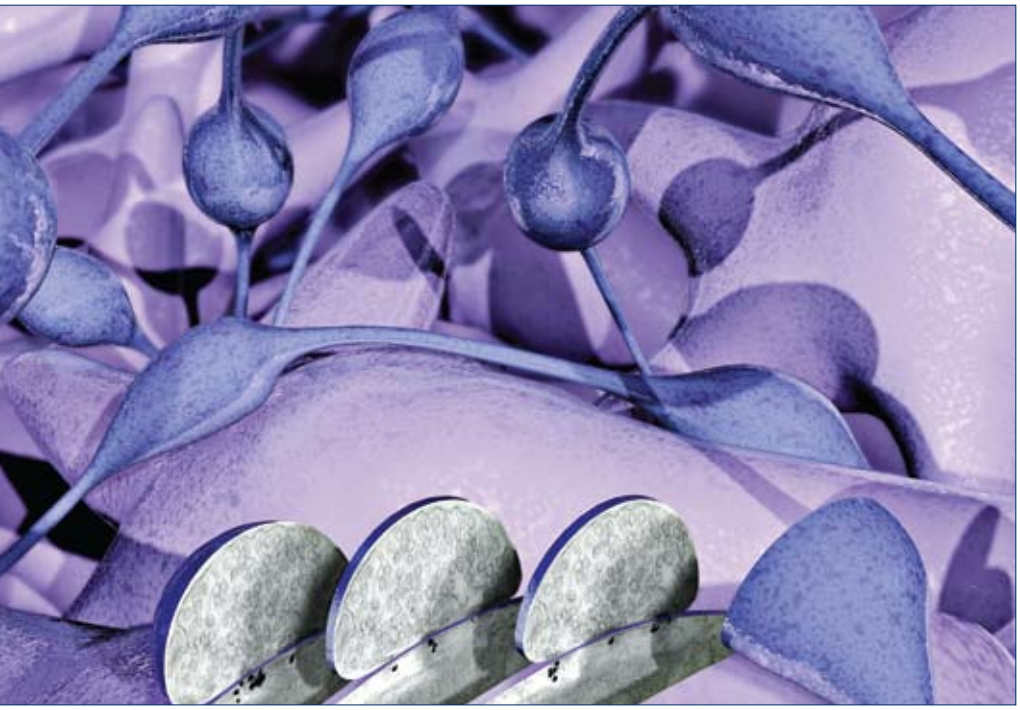

## Theme A: Development

***Modes and Mishaps of Neuronal Migration in the Mammalian Brain*** **CME**
*Chaired by:* Pradeep Bhide, PhD
The ability of specific neuronal populations to migrate to their appropriate positions in the developing brain is critical to brain architecture and function. Recent research has elucidated different modes of neuronal migration and the involvement of a host of signaling factors in orchestrating the migration, as well as vulnerabilities of this process to environmental and genetic factors. This symposium will review the latest developments in the field and discuss mechanisms underlying impaired neuronal migration under pathological conditions.

***Genetic Determinants Specifying Neuronal Connections*** **CME**
*Chaired by:* Yimin Zou, PhD
*Co-Chaired by:* Silvia Arber, PhD
The specificity of neuronal connections results from interactions between genetic programs and neural activity. This symposium focuses on recent progress in understanding the intrinsic genetic determinants controlling wiring specificity in vertebrates and invertebrates. Transcriptional programs, intracellular signaling pathways, and cell surface recognition and guidance molecules, with the goal of highlighting common themes emerging from these studies, will be discussed.

## Theme B: Neural Excitability, Synapses, and Glia: Cellular Mechanisms

***Inherited Neuronal Ion Channelopathies: New Windows on Complex Diseases*** **CME**
*Chaired by:* William A. Catterall, PhD
Studies of inherited epilepsy, chronic pain, and migraine caused by ion channel mutations give insights into molecular mechanisms, pathogenesis, and therapeutics. Speakers will introduce ion channelopathies and will present research on a mouse model of severe pediatric epilepsy, molecular and systems studies of chronic pain, and inherited migraine caused by mutations in sodium and calcium channels. Each presentation will range from molecular defect, to pathogenesis, to potential therapy.

***Regulatory RNA Mechanisms in Mammalian Brain*** **CME**
*Chaired by:* Claes Wahlestedt, MD, PhD
*Co-Chaired by:* Georges St. Laurent, III, MS
In the seven years since the first publication of the human genome, the number and general architecture of coding genes has remained remarkably stable. By contrast, surprising changes have come from noncoding regions, which have created an entirely new paradigm for genome-related research. Several high-throughput efforts have provided strong evidence that, in contrast to earlier understanding, a great majority of the mammalian genome is transcribed. Nowhere is this more evident than in the mammalian brain. To better understand the function or regulatory RNAs, it is important to develop improved techniques and tools, notably based on RNA interference (RNAi) mechanisms.

***Action Potential Initiation by the Proximal Axon: Reconciling Molecular and Physiological Perspectives*** **CME**
*Chaired by:* Edward C. Cooper, MD, PhD
Vertebrate action potentials (APs) arise preferentially in the proximal axon. Because proximal axons are tiny, sparse, and heterogeneous, finding the mechanisms underlying their heightened excitability has been challenging. This symposium will integrate new data from anatomical, molecular, genomic, electrophysiological, and computational approaches, in search of a unifying view of AP initiation. Disorders involving abnormal initiation, including pain and epilepsy syndromes, will be reviewed.

***The Immediate Early Gene Arc/Arg3.1: Regulation, Mechanisms, and Function*** **CME**
*Chaired by:* Clive R. Bramham, MD, PhD
This symposium will integrate current knowledge on the immediate early gene Arc/Arg3.1, spanning from transcriptional and translational regulation, to Arc protein function in LTP, LTD and homeostatic plasticity, to neural network functions in behaving animals. With Arc as a thread, this symposium will highlight novel concepts in dendritic protein synthesis, interactions among multiple forms of synaptic plasticity, and neural network encoding of memories.

## Theme C: Disorders of the Nervous System

***Astrocytes, Reactive Gliosis, and Regeneration in the Central Nervous System*** **CME**
*Chaired by:* Milos Pekny, MD, PhD
This symposium will present a novel view of astroglial cells and outline their importance for the development of novel strategies for brain repair. This discussion will focus on astrocytes as a key component of the neurogenic niche in the adult brain, and address the function of astrocytes in brain and spinal cord repair. Further,



recent data which points to reactive astrocytes as a source of multipotent stem cells in brain injury will be introduced.

***Retrotrapezoid Nucleus, PHOX2B and the Congenital Central Hypoventilation Syndrome*** CME
*Chaired by:* Ruth L. Stornetta, PhD
Congenital Central Hypoventilation Syndrome (CCHS) is an autosomal dominant human genetic disorder of autonomic regulation caused by mutations in the transcription factor PHOX2B. Ninety-two percent of cases are due to polyalanine expansion mutations and the remainder are due to missense, nonsense, and frameshift mutations in the PHOX2B gene. The retrotrapezoid nucleus (RTN), a PHOX2B-containing brainstem nucleus described in rodents, is involved in the central chemoreflex and is perhaps paramount in the unconscious drive to breathe. This symposium will examine CCHS and how the genetic defects in PHOX2B may be specifically affecting the RTN.

***Functional Neuroimaging Evidence for a Brain Network Underlying Impaired Insight into Illness in Drug Addiction*** CME
*Chaired by:* Rita Z. Goldstein, PhD
*Co-Chaired by:* Steven J. Grant, PhD
Impaired insight may underlie core addiction characteristics (craving, compulsion, relapse). This symposia will discuss the role of the insula and prefrontal cortex in impaired awareness, concern, and interoception in cigarette smoking and stimulant dependence; the anterior cingulate in blunted awareness to errors and compromised behavioral monitoring in cocaine addiction; and drug-related stimuli, even when outside of conscious awareness, in predicting emotional reactions and behavior in drug addiction.

***Axon Transport Defects in Motor Neurons Provide New Insight into Neuronal Function*** CME
*Chaired by:* Michael Strong, MD, FRCPC
*Co-Chaired by:* Cynthia Joyce, MS
The complex biology of axonal transport has opened many avenues for studying normal neuronal development, function, and dysfunction. This program will highlight recent evidence suggesting that transport dysfunction in motor neurons may play a pivotal role in various disease states, including spinal muscular atrophy and amyotrophic lateral sclerosis, and will demonstrate how these findings can be used to identify potential new targets for therapeutics development.

***Gene Therapy Approaches in Epilepsy: Focus on Neuropeptides and Neurotrophic Factors*** CME
*Chaired by:* Annamaria Vezzani, PhD
*Co-Chaired by:* Matthew J. During, MD, DSc
Gene therapy techniques may provide a realistic therapeutic option for CNS disorders that are difficult to treat with conventional drugs, such as drug-resistant epilepsies. Preclinical studies using "therapeutic" genes delivered into the rodent brain by AAV and HSV vectors showed dramatic effects on the natural history of the disease (e.g., reduction of seizures and inhibition of epileptogenesis). Recent technical advances make this innovative approach a concrete possibility of therapeutic intervention.

## Theme D: Sensory and Motor Systems

***The Neurobiology of Itch*** CME
*Chaired by:* Robert H. LaMotte, PhD
Chronic itch, a symptom of many diseases, is not often relieved by antihistamines. Recent human psychophysics, electrophysiological recordings from humans and/or monkeys, and molecular studies in mice suggest that histamine and non-histaminergic pruritic stimuli may activate different receptors and/or distinct populations of peripheral and spinothalamic-tract neurons. But such neurons respond to algesic stimuli — a dilemma — yet, one with possible solutions for the coding of itch.

***Cortical Networks in Action*** CME
*Chaired by:* Apostolos P. Georgopoulos, MD
New technology allows us to begin to understand how neural networks generate brain function and behavioral output. Development of multi-sensor recording techniques allow a rich sampling of the neuronal populations active during behavior. Computational approaches inspired by complex systems algorithms allow us to describe and analyze patterns within the recorded networks. Our results show how physiological networks change during learning, resemble hidden layers, and are structured into sub-groups.

***Persistent Inward Current — From Cellular Mechanisms to Integrative Behavior*** CME
*Chaired by:* Hans R. Hultborn, DMSci
*Co-Chaired by:* Ronald Harris-Warrick, PhD
In this symposium, speakers will address how specific ionic conductances produce persistent inward currents that underlie bistability and plateau potentials in the lobster stomatogastric ganglion and in vertebrate neurons, ranging from spinal motoneurons and interneurons, to subthalamic neurons. These cellular properties will be linked to integrative functions, including motor output gain, generation of motor patterns, control of sensory information transfer, short- and long-term nociceptive plasticity, and cognitive and motor functions of the basal ganglia.

***State Dependence of Network Output: Modeling and Experiments*** CME
*Chaired by:* Farzan Nadim, PhD
This symposium will demonstrate the use of computational modeling and mathematical analysis in describing how the activity state of a network can modulate its input-output relationships. Factors that can result in changes in network state include the history of network activity, sensory input, synaptic noise, and neuromodulation. The presentations will focus on the principles through which the network activity state can modify how the network or its individual neurons respond to input.

## Theme E: Homeostatic and Neuroendocrine Systems

***Unraveling the Neuropeptidome: New Approaches and Novel Insights*** CME
*Chaired by:* Jonathan V. Sweedler, PhD
Neuropeptides modulate the physiological activity of almost every neuronal circuit in the brain. New technologies are forever transforming neuropeptide characterization. The combination of peptidomic technologies with functional information is highlighted and is broadly applicable to many research efforts. Specific areas include neuropeptide changes on feeding and exposure to drugs, novel insights into processing of neuropeptide prohormones, and characterization of unknown peptides involved in the synchronization of our circadian rhythms.



***Sleep, Neuroenergetics, and Neural Plasticity*** **CME**
*Chaired by:* Giulio Tononi, MD
*Co-Chaired by:* Pierre Magistretti, MD, PhD
This symposium will review recent progress made on the emerging role of sleep in modulating synaptic plasticity and hence, learning and memory. The question of the metabolic cost of synaptic plasticity and the role of neuron-glia metabolic coupling in contributing to the expression of synaptic plasticity will be discussed. Data relating to gene expression patterns will complement physiological and functional imaging data obtained in animals and humans.

## Theme F: Cognition and Behavior

***Sources, Signals, and Synchrony: New Perspectives on the Neural Mechanisms of Attention*** **CME**
*Chaired by:* Tirin Moore, PhD
*Co-Chaired by:* Amy F.T. Arnsten, PhD
There has been much progress in understanding the neural basis of attention in recent years. This progress has moved beyond just evidence of correlates of attention, and has begun to identify the neural circuits and neural computations necessary and sufficient to drive the selective filtering of sensory inputs. The symposium will highlight the more significant recent advances, including a consideration of the clinical implications of these findings.

***New Views of Long-Term Memory Storage: Probing Paradigms*** **CME**
*Chaired by:* Yadin Dudai, PhD
Although persistence is a defining attribute of memory, only little is known about how long-term memory persists in the brain. Recent data raise the possibility that textbook accounts of the cellular mechanisms of long-term memory storage deserve updating. Furthermore, these findings suggest new possibilities to modulate long-term memory, which are of potential clinical importance. This symposium will present new findings that relate to the mechanisms of long-term memory storage and reorganization over time. The theoretical and practical implications of these findings will be discussed.

## PHYSICIANS: IMPROVE COMPETENCIES WHILE EARNING CME CREDIT

The Society for Neuroscience annual meeting is a forum for the education of physicians in the field of neuroscience. By attending lectures, symposia, and mini-symposia, the physician will receive both a broad overview of the field and information about the most recent, detailed research in the topic of the session. The abstract of each plenary or specific session contains brief descriptions of the material to be presented. By attending any of the activities, the physician will better understand the basic science that underlies his or her clinical practice.

### Statement of Need

It is important that physicians comprehend the basic science that underlies clinical medicine. The Society for Neuroscience annual meeting is the premier venue for this educational opportunity. Physicians learn about the most up-to-date, cutting-edge discoveries regarding the nervous system.

### Global Learning Objective

Given a patient with a neurological or psychiatric condition, physicians will integrate the most up-to-date information and research on the mechanism, treatment, and diagnosis of conditions related to neurological and psychiatric disorders into their diagnostic and therapeutic modalities of practice in order to determine the best course of action in treating the patient.

### Accreditation

The Society for Neuroscience is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

### CME Registration

CME registration must be completed before or during the annual meeting. Those who do not register at these times will not receive the necessary documentation should they request it after the meeting. CME registrants will receive, via e-mail two weeks before the meeting, the CME Supplemental Program, which contains important information regarding the CME Program, including disclosure information and instructions for obtaining CME credits.

**WWW.SFN.ORG/CME**

***Habenula: Crossroad Between the Basal Ganglia and the Limbic System*** **CME**
*Chaired by:* Okihide Hikosaka, MD, PhD
There has been a recent surge of interest in the habenula, a pair of nuclei located above the caudal thalamus, which receives inputs from both the limbic system and the basal ganglia. Studies suggest that the habenula plays a pivotal role in emotive decision-making by influencing the activity of dopamine and serotonin neurons. Dysfunctions of the habenula have also been implicated in psychiatric disorders. Symposium participants will discuss recent advances in habenular research.

## Theme G: Novel Methods and Technology Development

***Advanced Neurotechnologies for Chronic Neural Interfaces: New Horizons and Clinical Opportunities*** **CME**
*Chaired by:* Daryl R. Kipke, PhD
*Co-Chaired by:* William Shain, PhD
Recent scientific, clinical, and technological advances in chronic neural interfaces are enabling previously unobtainable access to neural signals, leading to new insights into brain function and repair. Neuroscientists, engineers, and clinicians will discuss their findings and emerging ideas on the study of large populations of signals and new insights to CNS function, the use of these signals as control elements for brain-computer interfaces, and the translation of research developments to clinical application in functional neurosurgery and neural stimulation.