MINISYMPOSIA

All minisymposia will be held in the Walter E. Washington Convention Center.

THEME A: DEVELOPMENT

Short-Circuiting Neurodevelopmental Disorders: Novel Insights and Treatment Strategies CME

Chair: Michela Fagiolini, PhD
Co-Chair: Tommaso Pizzorusso, PhD
Saturday, Nov. 11, 1:30–4 p.m.
Room: Ballroom C

Neurodevelopmental disorders are often associated with aberrant sensory processing and epilepsy, yet the way such deficits contribute to the etiology of the disorders is unknown. This minisymposium will demonstrate how studies of selective central and peripheral neuronal circuits at the micro and macro levels allow a new understanding beyond single genes that can be exploited to design interventions and to establish biomarkers that can be translated from animal models to humans.

The Structure and Function of Specific Cell-Cell Interactions in Neural Development: Protocadherins and Atypical Cadherins CME

Chair: James D. Jontes, PhD
Co-Chair: Joshua A. Weiner, PhD
Tuesday, Nov. 14, 8:30–11 a.m.
Room: 145B

Cell-cell interactions control nearly every process underlying neural circuit assembly. Protocadherins and atypical cadherins comprise a large and diverse group of molecules within the cadherin superfamily that mediates intercellular interactions in a broad range of developmental contexts. This minisymposium will explore recent advances in understanding the structure, function, and disease-associated disruption of these diverse cell-surface proteins.

Epigenetic Etiology of Intellectual Disability CME

Chair: Shigeki Iwase, PhD
Co-Chair: Angel Barco, PhD
Wednesday, Nov. 15, 8:30–11 a.m.
Room: 151B

Intellectual disability (ID) is a prevailing condition associated with impaired cognitive and adaptive behavior. Many epigenetic regulators have been genetically associated with ID. Investigations have begun to reveal the molecular and cellular basis of IDs that are linked to epigenetic dysregulation. In this minisymposium, experts will discuss how the altered functions of histone modifiers, chromatin remodelers, and methyl-DNA binding proteins contribute to impaired neurodevelopment.

THEME B: NEURAL EXCITABILITY, SYNAPSES, AND GLIA

Big News From a Little Region — Hippocampal Area CA2 CME

Chair: Serena M. Dudek, PhD
Sunday, Nov. 12, 8:30–11 a.m.
Room: Ballroom C

Known to be resistant to cell death, neurons in hippocampal area CA2 have only recently been appreciated as having distinct synaptic and firing properties and playing distinct roles in behavior such as social recognition and aggression. In this minisymposium, speakers will discuss how CA2 may be important in diseases such as schizophrenia and epilepsy as well as provide attendees with an overview of this small but exciting module of the hippocampus and its relation to many brain functions.

Emerging Mechanisms Underlying Dynamics of Gabaergic Synapses CME

Chair: Shiva K. Tyagarajan, PhD
Co-Chair: Arianna Maffei, PhD
Sunday, Nov. 12, 1:30–4 p.m.
Room: 145B

In recent years, it has emerged that GABAergic inhibition is flexible, allowing input-specific adaptations at excitatory connections. This minisymposium will address several novel mechanisms for "plastic" GABAergic neurotransmission and highlight mechanisms that are operational during development and in mature neuronal circuits. This event will also showcase a tight molecular interplay between glutamatergic and GABAergic neurotransmission systems.

The Dentate Gyrus: From Microcircuit Function to Information Processing During Behavior CME

Chair: Marlene Bartos, PhD
Co-Chair: Peter Jonas, MD
Wednesday, Nov. 15, 8:30–11 a.m.
Room: 145B

The dentate gyrus (DG) is the input gate of the hippocampus and translates the rich input stream from the entorhinal cortex into sparse nonoverlapping memories. However, the network mechanisms underlying sparse coding are unknown. This minisymposium bridges the gap between recent *in vivo* and *in vitro* studies to highlight new insight on the role of granule, mossy, and GABAergic cell; their output synapses in sparse coding; and the spatio-temporal emergence of DG population activity during learning.

Dendritic Computation: Linking Dendritic Mechanisms to Circuits and Behavior CME

Chair: Wei Wei, PhD
Co-Chair: Jun Ding, PhD
Wednesday, Nov. 15, 1:30–4 p.m.
Room: 146A

A key function of neuronal dendrites is integrating and transforming synaptic inputs to drive appropriate outputs. This minisymposium will focus on the complexity and physiological relevance of dendritic computations in the brain and will explore dendritic processing in various cell types of the sensory and motor systems as well as spatial navigation. The session will also highlight emerging studies

that directly link dendritic mechanisms to neural circuit function and behavior.

THEME C: NEURODEGENERATIVE DISORDERS AND INJURY

In Vivo Imaging of CNS Injury and Disease CME

Chair: Binhai Zheng, PhD
Co-Chair: Katerina Akassoglou, PhD
Monday, Nov. 13, 1:30–4 p.m.
Room: Ballroom C

In vivo optical imaging with advanced microscopy (e.g., multiphoton) has emerged as a powerful tool to study cellular responses to injury and disease in the mammalian CNS. Important new insight has been gained on axon degeneration and regeneration, glial responses, changes in the neurovascular unit, and neural transplants. This minisymposium will present recent advances in understanding the neuronal, glial, and other cellular responses to CNS injury and disease with *in vivo* imaging of the brain or spinal cord.

THEME D: SENSORY SYSTEMS

Emerging Roles of Somatostatin Inhibitory Neurons in Sensory Cortex Processing and Plasticity CME

Chair: Hirofumi Morishita, MD, PhD
Co-Chair: Hillel Adesnik, PhD
Saturday, Nov. 11, 1:30–4 p.m.
Room: 145B

Somatostatin-expressing (SOM) neurons are one of the principal classes of GABAergic inhibitory neurons. This minisymposium brings together researchers applying advanced *in vivo* techniques to monitoring and manipulating selective neural circuitries in the sensory cortex to discuss novel findings on how behavioral states and sensory inputs uniquely modulate the activity and rhythm of SOM neurons, and how SOM neurons in turn determine sensory processing and plasticity through specific molecular mechanisms.

State-Dependent Cortical Processing CME

Chair: Yuval Nir, PhD
Co-Chair: Katja Wiech, PhD
Monday, Nov. 13, 1:30–4 p.m.
Room: 145B

How do behavioral states and cognitive factors affect cortical processing? States of wakefulness, sleep, and anesthesia affect neuronal excitability, perception, and plasticity. Vigilance, attention, expectation, and task context dynamically affect local cortical circuits during wakefulness. This minisymposium will discuss recent findings, highlight governing principles, and explore whether behavioral states and cognitive factors may locally modulate cortical processing via common mechanisms.

Good Vibrations: Genetic, Neural, and Behavioral Links Between Auditory and Tactile Perception CME

Chair: Jeffrey M. Yau, PhD
Co-Chair: Saskia Haegens, PhD
Tuesday, Nov. 14, 8:30–11 a.m
Room: 146A

While the neural systems underlying perception have been well studied, it remains debatable whether our senses rely on supramodal mechanisms. Recent evidence suggests that circuits traditionally considered modality-dedicated may support multiple senses. This minisymposium addresses the relationship between audition and touch — senses that signal by mechanotransduction. The speakers will consider cross-species evidence for links between audition and touch spanning genetics, neurophysiology, and behavior.

Sensation in Action CME

Chair: Aman B. Saleem, PhD
Co-Chair: Laura Busse, PhD
Tuesday, Nov. 14, 1:30–4 p.m.
Room: 151B

Under natural conditions, humans constantly engage the sensory system during myriad everyday actions: finding food, detecting threats, or exploring. How do sensory systems work during active behaviors? This minisymposium will share novel perspectives of sensory processing during active, multidimensional behavior in different systems (fly vision, rodent vision, audition, somatosensation) and at different processing levels (fly lobula plate, mammalian thalamus and cortex).

Stratification of Visceral Pain: New Insight Into the Mechanisms of Peripheral Sensitisation From Animal Models and Human Tissue CME

Chair: David Bulmer, PhD
Co-Chair: Guy Boeckxstaens, MD, PhD
Wednesday, Nov. 15, 8:30–11 a.m
Room: 146A

Visceral pain is a common complaint inadequately treated by current analgesics. This minisymposium will describe the stratification of patients with visceral pain by the identification of novel, lipid, and protease mediators of peripheral sensitization using patient tissue samples. The session will also describe their novel endosomal and biased GPCR signaling pathways and report how visceral pain may be further stratified by the presence of discrete populations of visceral nociceptors.

THEME E: MOTOR SYSTEMS

Individual or Group Patterns of Human Sensorimotor Control and Learning? When the Whole May Not Be Greater Than the Sum of Its Parts CME

Chair: Randy Flanagan, PhD
Co-Chair: Tyler Cluff, PhD
Sunday, Nov. 12, 8:30–11 a.m
Room: 151B

Despite its being widely acknowledged that human sensory and motor function can vary between individuals, studies typically focus on average patterns of behavior in groups of healthy people. Individual patterns of sensorimotor function are thus poorly

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understood and have only recently begun to be unraveled. This minisymposium will highlight recent behavioral, neuroimaging, and modeling work that is helping to explain individual patterns of sensory and motor function in healthy and patient groups.

Advances in Parkinson's Disease Biomarkers and Disease Modeling CME

Chair: Margaret L. Sutherland, PhD
Co-Chair: David J. Stone, PhD
Sunday, Nov. 12, 1:30–4 p.m.
Room: 146A

Parkinson's disease (PD), a chronic movement disorder with no cure, is benefiting from coordinated efforts around high-quality standardized clinical data acquisition and biosample collections that are being broadly shared with the research community to promote biomarker development and disease modeling. Academic and industry researchers will highlight advances in PD genetics, imaging, transcriptomics, wearable technology, and data integration.

Modulation of Spinal Motor Networks: New Perspectives in the Control of Movement CME

Chair: Patrick J. Whelan, PhD
Monday, Nov. 13, 8:30–11 a.m.
Room: 151B

Over the past decade, technological advances have provided tools to identify and activate circuits within the brain and spinal cord. This has led to conceptual advances in our understanding of network connectivity and intracellular properties that contribute to rhythmogenesis. This minisymposium will explore these findings in topics ranging from the descending control of locomotion to changes in pacemaker cells following spinal cord injury.

Delineating the Diversity of Spinal Interneurons in Locomotor Circuits CME

Chair: Ying Zhang, PhD
Co-Chair: Simon Gosgnach, PhD
Tuesday, Nov. 14, 1:30–4 p.m.
Room: 145B

Spinal interneuronal circuits control locomotion. One important breakthrough in understanding the organization of locomotor circuits was the discovery of genetically-defined interneuron classes. However, the recent identification of distinct subsets of interneurons within each cardinal class has posed urgent questions that will be addressed in this minisymposium, including how to discern and define these subpopulations, the specific role each plays during locomotion, and how they are formed during development.

THEME F: INTEGRATIVE PHYSIOLOGY AND BEHAVIOR

Peripheral Neural Modulation of Inflammation, Immunity, and Host Defense CME

Chair: Isaac Ming-Cheng Chiu, PhD
Co-Chair: Valentin A. Pavlov, PhD
Sunday, Nov. 12, 8:30–11 a.m.
Room: 145B

The peripheral nervous system (PNS) and immune system actively communicate to regulate homeostasis and inflammation in health and disease. Nodose/jugular ganglia and DRG sensory neurons detect immune and bacterial mediators to signal danger, and release neuropeptides that regulate immunity. Vagal autonomic neurons potently modulate immune cell activation in sepsis, arthritis, colitis, and other inflammatory conditions. Thus, defining peripheral neuroimmune signaling can improve treatment of inflammatory diseases.

Neuroethology of Listening: Learning, Perception, and Preference in Female Songbirds CME

Chair: Leslie S. Phillmore, PhD
Co-Chair: Sarah C. Woolley, PhD
Monday, Nov. 13, 1:30–4 p.m.
Room: 146A

Songbirds are a diverse order known for producing learned vocalizations. Young songbirds must learn from a tutor to produce species-typical vocalizations as adults. Early research on the neurobiology of song learning focused primarily on males, presumably because males of many species tend to sing more than do the females. More recently, researchers have recognized the importance of females beyond response to male song. This minisymposium will highlight the neuroethology of new female songbird research.

Glia-Neuron Interactions Regulate Sleep CME

Chair: Priyattam J. Shiromani, PhD
Co-Chair: Marcos Frank, PhD
Tuesday, Nov. 14, 8:30–11 a.m.
Room: Ballroom B

Current models of sleep-wake regulation are neuron-centric and cannot explain key aspects of sleep. This minisymposium will present research showing that sleep network models need to be revised to include glia. The session will present new evidence gathered using innovative methods that prove a glial-neuron network modulates sleep architecture and homeostatic sleep drive. This also explains why sleep is necessary, a topic of interest to everyone.

Deep-Layer Projection Neurons of the Neocortex: Specialized Subpopulations Exhibiting Distinct Integration and Output CME

Chair: Nikolai C. Dembrow, PhD
Co-Chair: Arielle Leigh Baker
Wednesday, Nov. 15, 1:30–4 p.m.
Room: 151B

Charting the six-layered cortical microcircuit dates back to the days of Ramón y Cajal, yet how information is processed by this network remains elusive. This minisymposium will focus on recent advances regarding the distinct

subpopulations of deep-layer pyramidal neurons that provide output from this network to various cortical and subcortical targets. Comparing across multiple cortices, this session aims to identify fundamental mechanisms that contribute to the diversity of cortical output channels.

THEME G: MOTIVATION AND EMOTION

Adolescence and Reward: Making Sense of Neural and Behavioral Changes Amid the Chaos CME

Chair: Deena M. Walker, PhD
Co-Chair: Matthew J. Paul, PhD
Saturday, Nov. 11, 1:30–4 p.m.
Room: 151B

Adolescence is a time of significant change in the brain and behavior. Evidence suggests that many adolescent-typical changes in behavior are related to increased value placed on rewards and are driven by interactions between pubertal hormones, dopaminergic reward circuitry, and the prefrontal cortex. This minisymposium highlights recent developments in our understanding of neural and hormonal contributions to adolescent-typical reward-associated behaviors and increased vulnerability to neurological disorders.

Neuroscience of Maternal Psychopathology CME

Chair: Jodi Pawluski, PhD
Co-Chair: Joseph S. Lonstein, PhD
Monday, Nov. 13, 8:30–11 a.m.
Room: Ballroom B

Motherhood involves striking structural and chemical neuroplasticity, which is associated with increased susceptibility to anxiety and depression. These disorders have unique profiles of neural activation when experiencing postpartum, and because the underlying systems overlap with those for caregiving, mother-infant interactions can be disrupted. Therefore, there is intricate interplay among maternal mental health, the mother-infant relationship, and neurobiological mechanisms mediating them.

Functional Diversity of Prefrontal Cortical Regions and Networks CME

Chair: David E. Moorman, PhD
Co-Chair: Sarah Heilbronner, PhD
Tuesday, Nov. 14, 8:30–11 a.m.
Room: 151B

The prefrontal cortex (PFC) is a complex structure that plays diverse roles in cognition and emotion and is disrupted in multiple diseases. Despite decades of research into rodent PFC, there is no formal model of how its heterogeneous anatomy predicts its multifaceted role in behavior and disease. This minisymposium will present recent research using a range of modern techniques to advance new perspectives on the intersection between structure and function in medial and orbital PFC networks.

Updated Perspectives on the Direct and Indirect Pathways in Neuropsychiatric Disorders CME

Chair: Meaghan Creed, PhD
Co-Chair: Yonatan Michael Kupchik, PhD
Wednesday, Nov. 15, 8:30–11 a.m.
Room: Ballroom C

The striatum is implicated in emotional processing; its dysfunction is linked to addiction, depression, and schizophrenia. Striatal projection neurons (SPNs) are segregated into either the Dopamine D1R-expressing direct pathway or the D2-expressing indirect pathway. Molecular, electrophysiological, and imaging tools have yielded surprising discoveries about how these two pathways drive emotional behavior and how this function is perturbed in disease states that give rise to maladaptive behavior.

THEME H: COGNITION

Computational Psychiatry: Multiscale Models of Mental Illnesses CME

Chair: Michele Ferrante, PhD
Co-Chair: Xiao-Jing Wang, PhD
Sunday, Nov. 12, 8:30–11 a.m.
Room: 146A

This minisymposium will provide an in-depth introduction to the nascent and burgeoning field of computational psychiatry (CP). CP applies cutting-edge quantitative methods and theoretical models to investigating neural or cognitive phenomena relevant to psychiatric diseases. Talks will cover practical examples of theory- and data-driven computational models of cognitive deficits associated with schizophrenia, emotion regulation, anxiety, and drug addiction.

New Breakthroughs in Understanding the Role of Functional Interactions Between the Neocortex and the Claustrum CME

Chair: Solange P. Brown, MD, PhD
Co-Chair: Brian N. Mathur, PhD
Sunday, Nov. 12, 1:30–4 p.m.
Room: Ballroom C

The claustrum is highly interconnected with almost all areas of the neocortex, yet the function of this corticoclaustral system has remained largely mysterious. Recent work has sparked new hypotheses regarding the corticoclaustral system based on analyses from the microcircuit to the behavioral level. This minisymposium will bring together a diverse array of researchers to discuss emerging views of the claustrum's influence on cortical activity and its role in cognitive function.

Beyond Place Cells: Recent Surprises From Hippocampal Neurophysiology CME

Chair: Mayank R. Mehta, PhD
Co-Chair: Carol A. Barnes, PhD
Monday, Nov. 13, 8:30–11 a.m.
Room: Ballroom C

Hippocampal neurons called place cells show spatially selective responses. This minisymposium will highlight recent advances that elucidate the mechanisms governing place cells and demonstrate hippocampal responses beyond allocentric spatial selectivity. This knowledge is obtained using diverse species — mice, rats, bats, and primates — and a range of behavioral, physiological, and computational techniques.

MINISYMPOSIA (CONT.)

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The results provide significant new insight into hippocampal function.

Neural Circuits Supporting Cognitive Maps for Goal-Directed Behavior CME

Chair: Thorsten Kahnt, PhD
Co-Chair: Erie D. Boorman, PhD
Tuesday, Nov. 14, 1:30–4 p.m.
Room: 146A

Animals must represent various types of information, such as associations between events and outcomes and contextual and spatial contingencies. These features constitute a cognitive map for goal-directed behavior. Different brain regions including the hippocampus, entorhinal cortex, orbitofrontal cortex, and ventromedial prefrontal cortex have been shown to encode aspects of this map. This session will bring together recent findings across methods and species to discuss how maps observed in different brain areas may converge to guide behavior.

THEME I: TECHNIQUES

Nonhuman Primate Optogenetics: Recent Advances and Future Directions CME

Chair: Adriana Galván, PhD
Co-Chair: William R. Stauffer, PhD
Saturday, Nov. 11, 1:30–4 p.m.
Room: 146A

Nonhuman primates (NHP) are the best animal model for studying human cognition and mental health disorders, yet because of their size, complexity, and genetic intractability, the application of optogenetics to NHP studies has been slow. Nevertheless, optogenetic methods are critical to understanding the circuit and systems basis for cognition and mental health disorders. This minisymposium will highlight scientific advances using optogenetics in NHPs, demonstrate technical achievements, and identify the challenges ahead.

Open-Source Hardware for Neuroscience Research CME

Chair: Alexxai Kravitz, PhD
Monday, Nov. 13, 8:30–11 a.m.
Room: 145B

Neuroscientists often invent new devices to further their experiments. In recent years, neuroscientists have published several open-source inventions that rival commercial solutions. In this minisymposium, attendees will learn from the creators of six open-source projects including a head-mounted mini-microscope, a high-channel count electrophysiology system, multiple operant behavioral systems, and novel experiment control software, all of which are freely available to be built, used, and modified.

Innovative Approaches for Multimodal Neural Interfaces CME

Chair: Flavia Vitale, PhD
Co-Chair: Samantha Rose Santacruz, PhD
Monday, Nov. 13, 1:30–4 p.m.
Room: 151B

The generation and transmission of neural potentials involves multiple chemical and physical processes. Traditional neurotechnologies interact with neural circuits electrically, and many issues in their implementation, such as achieving a stable tissue interface and adequate spatiotemporal resolution, still exist. Focusing on emergent principles for recording and manipulating neural activity, this minisymposium will present state-of-the-art multimodal neural interfaces.

After the Data Deluge: Grappling With Transcriptional Complexity in the Brain CME

Chair: Jesse Gillis, PhD
Co-Chair: Vilas Menon, PhD
Wednesday, Nov. 15, 1:30–4 p.m.
Room: Ballroom C

Advances in gene expression analysis have vastly improved the scale and diversity of information that can be used to characterize neurons in the brain. In this minisymposium, we will describe how sophisticated analytical approaches exploit large-scale data, particularly at the cellular level, to provide novel insights into the regulation of neuronal identity. A focus will be on how the lessons learned from big data can improve the design and interpretation of smaller-scale experiments.

THEME J: HISTORY AND EDUCATION

The Science of Storytelling and Storytelling in Science

Chair: Paula L. Croxson, PhD
Co-Chair: Daniela Schiller, PhD
Sunday, Nov. 12, 1:30–4 p.m.
Room: 151B

Now more than ever, it is essential that scientists actively engage with the public. Through storytelling, the use of a personal narrative to bringe science to life, we can improve communication not only with the public, but also within the community, promoting better scientific progress. Through presentations about the science of storytelling, why and how to do it, and three powerful personal stories, this session aims to demonstrate how storytelling can transform science communication.