

Symposia and Minisymposia

THEME A: DEVELOPMENT

SYMPOSIUM: Neuronal Guidance in Health and Disease CME

Chair: Alex L. Kolodkin, PhD
Saturday, Nov. 3, 1:30–4 p.m.
San Diego Convention Center: 6A

Investigation into phylogenetically conserved cellular and molecular mechanisms underlying neuronal guidance and connectivity has greatly advanced over the past three decades. This symposium will address the intersections among several of these advances and human neural development. Select evolutionarily conserved guidance cues, receptors, and cytosolic signaling cascades will be considered, along with how mutations that affect them may alter human neural development.

MINISYMPOSIUM: Molecular Mechanisms Underpinning Dopamine Neuron Development, Diversity, and Vulnerability CME

Chair: Raj Awatramani, PhD
Co-Chair: Sandra Blaess, PhD
Sunday, Nov. 4, 8:30–11 a.m.
San Diego Convention Center: 29D

This minisymposium will cover topics including embryonic fate specification events, migration, and axon guidance that ultimately result in a multifunctional, heterogeneous, midbrain dopaminergic system.



SYMPOSIUM: Extracellular Vesicles: Insights Into Cell-to-Cell Communication in the Nervous System CME

Chair: Jason D. Shepherd, PhD
Monday, Nov. 5, 1:30–4 p.m.
San Diego Convention Center: 6A

Cells communicate and signal between each other in multiple ways. Emerging evidence suggests that extracellular vesicles (EVs) mediate intercellular signaling in the nervous system. Moreover, EVs have been implicated in the pathology of various neurodegenerative disorders, as several pathogenic proteins are released from cells associated with EVs. This symposium will highlight the biogenesis of EVs in neurons and the role EVs play in synaptic plasticity and neural circuit development.

SYMPOSIUM: RNA Control of Axonal Functions CME

Chair: Jeffery L. Twiss, MD, PhD
Co-Chair: Michael Fainzilber, PhD
Tuesday, Nov. 6, 8:30–11 a.m.
San Diego Convention Center: 6A

This symposium will highlight new insight on RNA control of axonal functions. Discoveries in different models and paradigms are coming together to provide a comprehensive view of how RNA localization and local translation regulate axon growth, maintenance, and regeneration. Intracellular trafficking, localized regulation, and axon-to-soma communication are key aspects of these mechanisms. The presentations will showcase diverse examples of how these fundamental mechanisms are implemented.

MINISYMPOSIUM: Neural Proteomics in Synapse Development and Function CME

Chair: Brock Grill, PhD
Co-Chair: Kirill A. Martemyanov, PhD
Wednesday, Nov. 7, 8:30–11 a.m.
San Diego Convention Center: 29D

An explosion of proteomic approaches is increasingly playing a greater role in understanding synapse biology, via identification of novel protein interactions and signaling networks that regulate synapses. This minisymposium will explore synapse biology across model systems, with insight stemming from proteomics. Cutting-edge experimental strategies for quantitative profiling and interactome mapping reveal biology underlying synapse formation, function, and its role in physiology and disease.

MINISYMPOSIUM: Sonic Hedgehog and Cell-Specific Programming: Circuits, Disease, and Repair CME

Chair: Corey C. Harwell, PhD
Co-Chair: Rebecca Ihrie, PhD
Wednesday, Nov. 7, 1:30–4 p.m.
San Diego Convention Center: 28A

An emerging body of research has uncovered diverse roles for Sonic Hedgehog signaling in a wide range of neurodevelopmental contexts affecting the function of brain circuits, including the production and maintenance of diverse cell types and the establishment of cell-specific wiring. This minisymposium will highlight recent developments describing the role of Sonic Hedgehog in conferring cell specific identity, circuit connectivity, and injury repair in the developing and mature nervous system.

THEME B: NEURAL EXCITABILITY, SYNAPSES, AND GLIA

MINISYMPOSIUM: Advances in Enteric Neurobiology: The “Brain” in the Gut in Health and Disease CME

Chair: Meenakshi Rao, MD, PhD
Co-Chair: Subhash Kulkarni, PhD
Sunday, Nov. 4, 8:30–11 a.m.
San Diego Convention Center: 28A

The enteric nervous system (ENS) is a large, complex division of the peripheral nervous system that regulates many digestive, immune, hormonal, and metabolic functions. This minisymposium will highlight the latest advances in enteric neurobiology and focus on new model systems for investigating ENS development, mechanisms of adult neurogenesis, enteric glial biology, and the impact of aging on the ENS, as well as the dynamic interactions among microbiota, immune cells, neurons, and glia in the gut.

MINISYMPOSIUM: Cell Adhesion Molecules at the Intersection of Cell Type Identity and Neural Circuit Connectivity CME

Chair: Csaba Foldy, PhD
Co-Chair: Joris de Wit, PhD
Sunday, Nov. 4, 1:30–4 p.m.
San Diego Convention Center: 29D

Cell adhesion molecules (CAMs) play critical roles in neural circuit assembly and are frequently associated with neurodevelopmental and psychiatric disorders. Because hundreds of CAMs exist in the brain, their functional analysis has been challenging. Single-cell RNAseq, gene isoform-specific, and synapse-specific analyses are breaking barriers. This minisymposium will present the most recent insight into the role of CAMs in defining cell type identity, circuit connectivity, and function.

MINISYMPOSIUM: Neuromodulation of Brain States in Health and Disease: Bridging Experiments and Computational Models CME

Chair: Srikanth Ramaswamy, PhD
Co-Chair: Antoine Adamantidis, PhD
Tuesday, Nov. 6, 8:30–11 a.m.
San Diego Convention Center: 28A

Subcortical neuromodulatory systems dynamically reconfigure the activity of neural microcircuits and regulate shifts between brain states in health and disease. Despite their crucial role in physiology and pathology, the cellular and synaptic mechanisms by which neuromodulators control neural activity remain unclear. This minisymposium will highlight cutting-edge techniques developed in global brain initiatives for a quantitative assessment of neuromodulation in brain function and dysfunction.

MINISYMPOSIUM: Molecular and Nano-Organization of Synapses CME

Chair: Thomas Biederer, PhD
Tuesday, Nov. 6, 1:30–4 p.m.
San Diego Convention Center: 28A

Recent progress has revealed that the nerve terminal, synaptic cleft, and postsynaptic site form a trans-cellular unit that is precisely aligned on a nanoscale to transmit information. This minisymposium will investigate the machinery of each compartment and how compartments are integrated by synaptic adhesion molecules and by glial- and neuron-secreted factors. Going beyond a static picture, the minisymposium will also address dynamic properties of synaptic compartments that contribute to remodeling.

MINISYMPOSIUM: Multitransmitter Neurons: The Function and Regulation of Neurotransmitter Cotransmission CME

Chair: Adam J. Granger, PhD
Wednesday, Nov. 7, 1:30–4 p.m.
San Diego Convention Center: 29D

Many neurons signal through multiple small-molecule neurotransmitters, adding an additional layer of complexity to our understanding of synaptic transmission. This minisymposium will discuss recent examples of multitransmitter neurons, emphasizing the physiological and behavioral function of cotransmission and how the neurotransmitter(s) a neuron releases may be regulated by development or activity.

SYMPOSIUM: Unveiling the Extracellular Space of the Brain: From Super-Resolved Microstructure to *In Vivo* Function CME

Chair: Valentin U. Nägerl, PhD
Co-Chair: Sabina Hrabetova, MD, PhD
Wednesday, Nov. 7, 1:30–4 p.m.
San Diego Convention Center: 6A

The extracellular space (ECS) of the brain provides the physical stage and signaling platform where neuronal and glial players perform in concert. While the ECS takes up a fifth of brain volume, its topology is incredibly complex and miniaturized, defying traditional investigative approaches. This symposium will review our current knowledge of the ECS, evaluating recent methodological and conceptual progress that throws new light on this understudied yet critically important compartment of the brain.

THEME C: NEURODEGENERATIVE DISORDERS AND INJURY

SYMPOSIUM: Repairing the Injured Nervous System: Inhibiting the Inhibitors CME

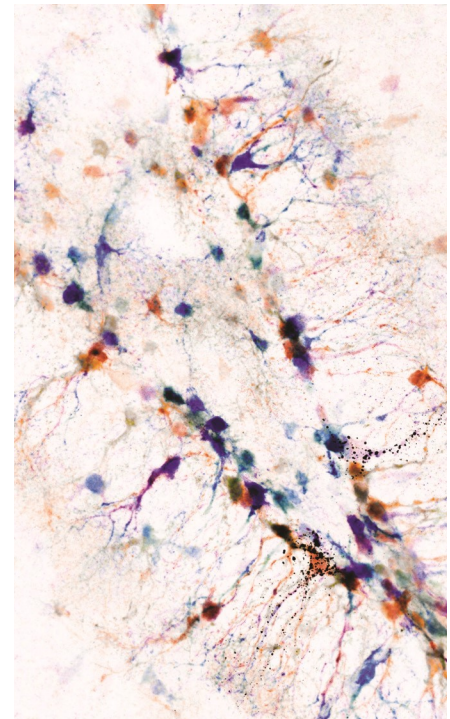
Chair: Elizabeth J. Bradbury, PhD
Co-Chair: Catherina G. Becker, PhD
Monday, Nov. 5, 8:30–11 a.m.
San Diego Convention Center: 6A

This symposium will focus on inhibitory factors that prevent neuroplasticity and functional recovery after central nervous system injury. The panelists will present new advances in understanding how inhibitory molecules present in a tissue injury environment are a barrier to repair and may be therapeutically targeted. The symposium will cover bench-to-bedside approaches that span mammalian and nonmammalian systems, organic chemistry, gene therapy, and clinical trials, with a common goal of repairing the injured nervous system.

SYMPOSIUM: Global Efforts to Build More Predictive Animal Models of Neurodegenerative Disease CME

Chair: Bruce T. Lamb, PhD
Co-Chair: Rudolph E. Tanzi, PhD
Monday, Nov. 5, 1:30–4 p.m.
San Diego Convention Center: 6B

Neurodegenerative diseases are an increasingly common form of disability and death. Despite intensive efforts, no effective therapeutic strategies have been developed, perhaps in part due to inadequate animal models. This symposium will highlight global initiatives to develop and characterize novel animal models of Alzheimer's disease using state-of-the-art technologies, including genome editing, that will be critical for building animal models more predictive for therapeutic efficacy.



MINISYMPOSIUM: Mechanisms of Tau Oligomer-Induced Synaptic Impairment and Potential Treatment Strategies CME

Chair: Ottavio Arancio, MD, PhD
Co-Chair: Frank M. Longo, MD, PhD
Tuesday, Nov. 6, 8:30–11 a.m.
San Diego Convention Center: 6E

Soluble oligomeric forms of the Alzheimer's disease protein tau are gaining a lot of attention because they likely promote cell-to-cell propagation of pathology and are more toxic than large insoluble aggregates. This minisymposium will discuss evidence supporting a role for tau oligomers in disease initiation and progression and explore therapeutic strategies for inhibiting formation of tau oligomers and/or counteracting synaptic impairment and degeneration caused by tau oligomers.

SYMPOSIUM: Organelle Dynamics and Proteostasis in Neuronal Homeostasis and Degeneration CME

Chair: Xinnan Wang, PhD
Tuesday, Nov. 6, 1:30–4 p.m.
San Diego Convention Center: 6A

Neuronal organelles are highly dynamic, and their biogenesis is tightly regulated in the extended extremities of a neuron. How to maintain organelle homeostasis is a fundamental cellular concern and crucial to neuronal survival. Defects in organelle function have emerged as key contributors to several neurodegenerative disorders, including Alzheimer's and Parkinson's disease. This symposium will present cutting-edge research at the intersection of neuronal cell biology and neurodegeneration.

MINISYMPOSIUM: The Endolysosomal System and Proteostasis: From Development to Degeneration CME

Chair: Huaye Zhang, PhD
Co-Chair: Bettina R. Winckler, PhD
Wednesday, Nov. 7, 8:30–11 a.m.
San Diego Convention Center: 28A

Intracellular membrane trafficking represents a very unique challenge for neurons because of their highly elaborate cellular architecture. Genes regulating endocytosis and subsequent endosomal routing, in particular, are frequently linked to neurological diseases. This minisymposium will discuss novel insight into the mechanisms of endosomal trafficking in neurons, the effects on proteostasis, and the functional impact on neuronal development and degeneration.

THEME D: SENSORY SYSTEMS

MINISYMPOSIUM: How to Get Out of Harm's Way: New Insight Across Multiple Species Into the Neural Mechanisms of Visually Guided Collision Avoidance CME

Chair: Fabrizio Gabbiani, PhD
Co-Chair: Florian Engert, PhD
Saturday, Nov. 3, 1:30–4 p.m.
San Diego Convention Center: 6E

Visually guided collision avoidance is critical to survival for many animals. Recently, common neural rules governing such behaviors have unexpectedly been identified across a wide range of species, as different as fruit flies and mice. This minisymposium will summarize shared themes and species-specific advances in understanding the biophysics, neural circuitry, brain areas, and sensorimotor programs that implement collision avoidance behaviors across species from insects to primates.

MINISYMPOSIUM: Algorithms for Olfactory Search Across Species CME

Chair: Matt Smear, PhD
Co-Chair: Katherine Nagel, PhD
Monday, Nov. 5, 8:30–11 a.m.
San Diego Convention Center: 28A

Olfactory navigation provides a unique model for understanding how neural computations shape a behavior critical for survival. This minisymposium will present recent advances in the understanding of olfactory search in flies and rodents. While many cross-species commonalities have emerged, important questions about the neural circuits that implement search behavior remain. This minisymposium will take a multidisciplinary approach to provide an update on progress on these questions.

MINISYMPOSIUM: Multidimensional Neuronal Cell Type Classification in the Cerebral Cortex CME

Chair: Jochen F. Staiger, MD
Co-Chair: Staci A. Sorensen, PhD
Monday, Nov. 5, 1:30–4 p.m.
San Diego Convention Center: 29D

There is general agreement in the field that meaningful cell type classification requires multimodal descriptors. These descriptors come from data modalities including morphology, physiology, molecular biology, and connectivity and are ideally linked to a circuit function. This minisymposium will present six recent studies using different multimodal approaches, ranging from molecular to functional, to objectively and systematically describe neuronal cell types in the rodent and human neocortex.

SYMPOSIUM: The Feeling Within: Molecules to Behavior Underlying Interoception CME

Chair: Lisa Stowers, PhD
Co-Chair: Ardem Patapoutian, PhD
Tuesday, Nov. 6, 8:30–11 a.m.
San Diego Convention Center: 6B

How does the brain monitor and react to our constantly changing internal physiology? While there has been rapid progress in understanding exteroception, less is known about how organisms sense and process information from within, such as hunger, respiration, circulation, excretion, and gut-brain interactions. This symposium will take a multidisciplinary approach to describe recent advances in interoception, from defining the signals that monitor internal states to identifying critical neuronal circuits that drive behavior.

MINISYMPOSIUM: Novel Molecular Targets for the Treatment of Pain CME

Chair: John M. Streicher, PhD
Co-Chair: Tally Largent-Milnes, PhD
Wednesday, Nov. 7, 8:30–11 a.m.
San Diego Convention Center: 6E

The opioid crisis and the side effects of opioid therapy have illustrated the great medical and scientific need for new pain therapies that do not have the drawbacks of opioids. Covering topics ranging from downstream molecular signaling effectors of opioid receptors to new receptor targets, this minisymposium will highlight recent advances in finding new molecular targets for the treatment of pain and explore how these targets can be manipulated to improve pain and/or opioid therapy.

THEME E: MOTOR SYSTEMS

MINISYMPOSIUM: Latent Factors and Dynamics in Motor Cortex and Their Application to Brain-Machine Interfaces CME

Chair: Chethan Pandarinath, PhD
Saturday, Nov. 3, 1:30–4 p.m.
San Diego Convention Center: 28A

Increasing evidence suggests that the activity of large populations of neurons in motor cortical areas exhibits low-dimensional structure that obeys dynamic rules. A better understanding of this structure and its dynamics is shedding new light on how motor cortex commands muscles and how different cortical areas interact. Further, these features have critical implications for designing robust, versatile brain-machine interfaces that restore function to people with paralysis.



MINISYMPOSIUM: The Dynamic Interaction of Vision and Eye Movements CME

Chair: J. Patrick Mayo, PhD
Sunday, Nov. 4, 8:30–11 a.m.
San Diego Convention Center: 6E

A resurgence in the study of eye movements and visual perception has been driven by new experimental approaches (data modeling, the use of clinical populations, and simultaneous recordings of neuronal populations) and comparisons between primate models of vision (humans, macaques, and marmosets). This minisymposium will use these innovations to reveal insight into the effects of exploratory (saccades) and tracking (smooth pursuit) eye movements on vision, cognition, and motor control.

MINISYMPOSIUM: More Than Just a “Motor”: Recent Surprises From the Frontal Cortex CME

Chair: Christian L. Ebbesen, PhD
Sunday, Nov. 4, 1:30–4 p.m.
San Diego Convention Center: 28A

Motor and premotor cortices are crucial for motor control. While classic primate

studies have emphasized a role for motor cortices in movement generation, recent rodent studies implicate motor cortical neurons in sensory integration, behavioral strategizing, working memory, and decision making — underrated higher-order functions of the motor cortex that deserve better attention and study. This minisymposium will review recent findings, which highlight that the motor cortex is much more than just a “motor.”

SYMPOSIUM: Targeted Therapies for Parkinson’s Disease: From Genetics to the Clinic CME

Chair: Lamya S. Shihabuddin, PhD
Co-Chair: Patrik Brundin, MD, PhD
Monday, Nov. 5, 8:30–11 a.m.
San Diego Convention Center: 6B

The greatest unmet need in Parkinson’s disease (PD) is the development of treatments that slow the relentless progression of the neurodegenerative process. The discovery of genomic and biochemical biomarkers for PD is starting to revolutionize its diagnosis, prognosis, and treatment. This symposium will focus on therapeutic paradigms under active clinical

development and highlight a wide range of outstanding questions that need to be addressed to advance the field of disease modification in PD.

MINISYMPOSIUM: Cortical Control of Locomotion and Posture CME

Chair: Irina N. Beloozerova, PhD
Wednesday, Nov. 7, 8:30–11 a.m.
San Diego Convention Center: 31C

Understanding mechanisms of complex natural movements is the ultimate goal of motor systems neuroscience. This minisymposium will discuss recent advances in locomotion and posture research gained in the freely behaving cat. Focusing on parietal, pre-motor, and motor cortical mechanisms of full body movements, it will include a new analytical description of corticospinal processing that allows steering, and a description of powered limb prosthesis integrated with nerves and muscles.

MINISYMPOSIUM: The Basal Ganglia: Beyond Action Selection CME

Chair: Eric A. Yttri, PhD
Wednesday, Nov. 7, 1:30–4 p.m.
San Diego Convention Center: 6E

New approaches — both behavioral and physiological — have enabled a new depth of interrogation of the neural correlates of behavior. Perhaps nowhere has this process been more powerful than in the basal ganglia, where recent insight is shifting the operational paradigm of function from a binary gating of action to a nuanced shaping of behavior. This minisymposium will cover the implications of animal model work and connect findings with human studies of healthy and clinical subjects.

THEME F: INTEGRATIVE PHYSIOLOGY AND BEHAVIOR

MINISYMPOSIUM: Neuronal Mechanisms for Prepulse Inhibition: Comparative Approaches From Sensory to Cognition CME

Chair: Thomas Preuss, PhD
Co-Chair: Susanne Schmid, PhD
Saturday, Nov. 3, 1:30–4 p.m.
San Diego Convention Center: 6C

Prepulse inhibition (PPI) is a measure for sensorimotor gating that has been studied across species, and PPI deficits are found in several psychiatric and neurological disorders. This minisymposium will provide a rare comparative perspective on neural mechanisms underlying PPI. Covering work from invertebrates to humans using cutting-edge approaches, the minisymposium will emphasize how comparative studies have advanced our understanding of PPI mechanisms and regulatory pathways.

SYMPOSIUM: Multiscale Computer Modeling of Neural Circuits in Health and Disease CME

Chair: William W. Lytton, MD
Co-Chair: Christophe Bernard, PhD
Sunday, Nov. 4, 8:30–11 a.m.
San Diego Convention Center: 6A

Brain function depends on interactions across multiple temporal and spatial scales from molecules and synapses up to interconnected brain areas. Mechanistic multiscale modeling provides the means to organize and understand the cross-scale interactions to explain how brains and other neural systems work or fail. Computational modeling also allows us to bridge the gap between mechanism and phenomenology, from anatomy and dynamics to behavior and cognition.

SYMPOSIUM: Blood-Brain Barrier in Health and Disease: Role in Neurodegeneration, CNS Autoimmunity, and Gene Transfer CME

Chair: Berislav V. Zlokovic, MD, PhD
Sunday, Nov. 4, 1:30–4 p.m.
San Diego Convention Center: 6B

This symposium summarizes current advances on the role of the blood-brain barrier (BBB) in health and disease, including major human neurodegenerative disorders, such as Alzheimer’s disease, and neuroimmune disease. It highlights single-cell approaches to understanding the role of brain vasculature in health and CNS disorders; cellular and molecular mechanisms at the BBB causing neurodegeneration and CNS autoimmunity; and gene transfer across the BBB to treat neurodegenerative and CNS disorders.

MINISYMPOSIUM: Defining Dysbiosis in Disorders of Movement and Motivation CME

Chair: Christopher T. Fields
Co-Chair: Helen Vuong, PhD
Monday, Nov. 5, 8:30–11 a.m.
San Diego Convention Center: 6C

The gut microbiota can affect multiple aspects of brain function and behavior in health and disease. Interestingly, movement and motivation outputs driven by thalamo-cortico-basal ganglia circuits are modulated by changes in this gut-brain axis. In this minisymposium, speakers will discuss recent advances in understanding the effects of the gut microbiota on action selection, somatosensation, and motor behavior in health and disease models, including Parkinson’s, obesity, and opioid addiction.

MINISYMPOSIUM: Sex Differences in Risk and Resilience: Stress Effects on the Neural Substrates of Emotion and Motivation CME

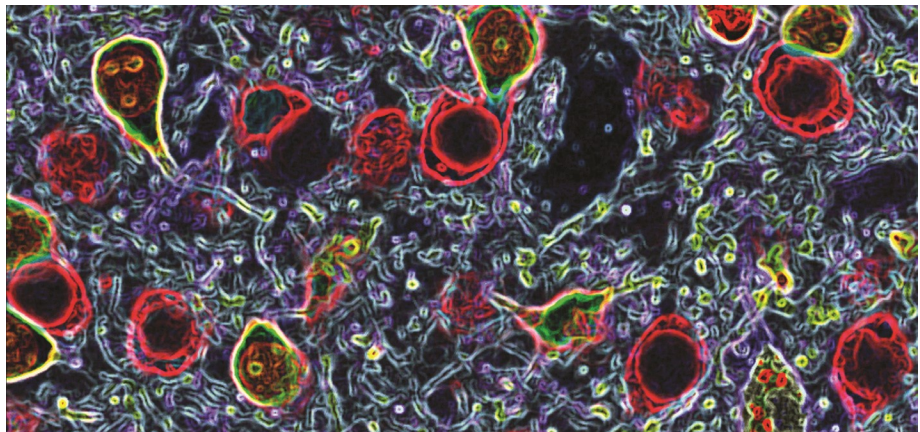
Chair: Cara L. Wellman, PhD
Monday, Nov. 5, 1:30–4 p.m.
San Diego Convention Center: 6C

Corticolimbic dysfunction is a hallmark of stress-linked psychological disorders, risk for which differs markedly in men and women. Understanding how the effects of stress differ in males and females is critical for determining the etiologies of stress-linked disorders. This minisymposium will describe sex-specific effects of stress on neural structure and function of brain regions involved in emotion, motivation, and cognition, highlighting possible neural mechanisms underlying sex-biased disorders.

MINISYMPOSIUM: Neuropeptide Signaling: From Physiology to Behavior CME

Chair: Jennifer Garrison, PhD
Tuesday, Nov. 6, 1:30–4 p.m.
San Diego Convention Center: 6E

Neuropeptides comprise the largest and most diverse class of neuromodulators, and they mediate integral processes ranging from energy homeostasis to behavior. This minisymposium will highlight recent experimental and technical advances in understanding mechanisms by which neuropeptide signaling can influence physiology and behavior at both the cellular and circuit level in a range of organisms.



SYMPOSIUM: Multiple Axes of Dopamine Systems for Behavioral Controls: From Fly Via Rodent to Monkey CME

Chair: Mitsuko Watabe-Uchida, PhD
Co-Chair: Okihide Hikosaka, MD, PhD
Wednesday, Nov. 7, 8:30–11 a.m.
San Diego Convention Center: 6A

Across the animal kingdom, dopamine plays a central role in regulating diverse flexible and habitual behaviors. This symposium brings together researchers using different models, from invertebrates to primates, to discuss how multiple dopamine systems work in concert to generate appropriate behavioral control. This comparative framework will highlight conserved and divergent organizational principles across dopamine systems and how they confer flexibility to neural circuits and behavior.

SYMPOSIUM: The Emerging Role of the Amygdala in Modulating the Somatosensory and Emotional Components of Pain and Itch CME

Chair: Benedict J. Kolber, PhD
Wednesday, Nov. 7, 1:30–4 p.m.
San Diego Convention Center: 6B

Pain involves a complex mix of sensory, cognitive, and emotional

processes. This symposium will address the emerging role of the amygdala in modulating all of these components in the mammalian limbic system. Speakers will provide important and novel mechanistic insight at the cellular, synaptic, and circuit levels achieved through cutting-edge microscopy, recording, and rodent behavioral techniques.

**THEME G: MOTIVATION AND EMOTION
MINISYMPOSIUM: Neurocognitive Development of Motivated Behavior CME**

Chair: Catherine A. Hartley, PhD
Co-Chair: Dylan G. Gee, PhD
Saturday, Nov. 3, 1:30–4 p.m.
San Diego Convention Center: 29D

Over the course of development, the neurocognitive processes that support the ability to anticipate and respond to rewards or threats in the environment change markedly. This minisymposium will bring together recent cross-species research characterizing the typical development of the neural circuits and cognitive processes involved in the control of threat- and reward-motivated behavior and the alteration of these trajectories by experiential factors such as early-life stress.

MINISYMPOSIUM: Computational Affective Neuroscience: Algorithms for Survival CME

Chair: Robb B. Rutledge, PhD
Co-Chair: Dominik R. Bach, MD, PhD
Sunday, Nov. 4, 8:30–11 a.m.
San Diego Convention Center: 6C

Emotions play a central role in adaptive behavior across the animal kingdom but are conceptualized in divergent and often imprecise ways. Researchers have recently adopted computational approaches to study a range of emotional phenomena from behavior to feelings, and to use computational models to interrogate the underlying neural circuits. This minisymposium will focus on how computational models can explain the role of emotions in adaptive behavior, both in humans and nonhuman animals.

MINISYMPOSIUM: Insular Cortex Neurocircuits: Relationships Among Function, Connectivity, and Drug and Alcohol Abuse CME

Chair: Brady K. Atwood, PhD
Monday, Nov. 5, 8:30–11 a.m.
San Diego Convention Center: 6E

The insular cortex plays a major role in processing the interoceptive effects of drugs of abuse, including alcohol. This minisymposium will highlight preclinical studies that dissect the local neurocircuitry of the insular cortex and its projections to specific brain regions in the context of alcohol, opioid, and psychostimulant abuse. Novel functional roles of these networks in drug-related behaviors and the impact of drugs of abuse on insular cortex-originating synapses will be discussed.

MINISYMPOSIUM: Social Motivation Across the Lifespan CME

Chair: Brian C. Trainor, PhD
Co-Chair: Alexa H. Veenema, PhD
Monday, Nov. 5, 1:30–4 p.m.
San Diego Convention Center: 6E

Social behavior and motivation have historically been considered different behavioral processes modulated by different neural circuits. Multiple lines of evidence, however, indicate significant overlap and communication among these circuits. This minisymposium will highlight recent discoveries in the neural mechanisms modulating normal and abnormal social behavior using a variety of genetic, cellular, neuroanatomical, electrophysiological, and pharmacological approaches.

MINISYMPOSIUM: Sex Differences and Hormone Action in the Limbic System CME

Chair: John Meitzen, PhD
Tuesday, Nov. 6, 1:30–4 p.m.
San Diego Convention Center: 29D

Limbic system function is critical for the control of emotion, motivation, and memory. Sex differences and hormone effects have been demonstrated in the limbic system, including in the nucleus accumbens, amygdala, and hippocampus. This minisymposium will highlight recent work on the electrophysiological and molecular mechanisms underlying these differences, how they interact with environmental stimuli such as stress, and their relevance to mental illness and other disorders.

THEME H: COGNITION

SYMPOSIUM: Specific Basal Forebrain-Cortical Cholinergic Circuits Coordinate Cognitive Operations CME

Chair: Laszlo Zaborszky, MD, PhD
Co-Chair: Gina R. Poe, PhD
Sunday, Nov. 4, 8:30–11 a.m.
San Diego Convention Center: 6B

The basal forebrain (BF) cholinergic projections, once viewed as a diffuse system, is emerging as highly specific in its connectivity based on molecular genetics as well as functional and quantitative anatomical studies. The BF can both rapidly and selectively modulate activity of specific circuits and coordinate ACh release in multiple areas related to particular aspects of cognitive processing. This symposium presents new approaches and findings from studies of the function and dysfunction of this system.

MINISYMPOSIUM: High-Level Cognition in Low-Level Brain Regions CME

Chair: Rosemary A. Cowell, PhD
Sunday, Nov. 4, 1:30–4 p.m.
San Diego Convention Center: 6C

Mounting evidence now contests the idea that high-level brain regions such as the medial temporal lobe engage only in high-level functions like declarative memory. This challenges the broader assumption that the brain comprises discrete anatomical units specialized for distinct cognitive functions. This minisymposium extends that challenge by asking the question: Can high-level cognitive functions such as recognition memory, recall, and spatial cognition be mediated by low-level cortical regions?

MINISYMPOSIUM: The Neurobiology of Forgetting CME

Chair: Maria Wimber, PhD
Co-Chair: Paul W. Frankland, PhD
Tuesday, Nov. 6, 8:30–11 a.m.
San Diego Convention Center: 6C

We automatically encode virtually all experiences, yet the vast majority of our experiences are not remembered later. This minisymposium will address the questions of how and why the brain forgets. It brings together researchers that study forgetting in flies, rodents, and humans. The minisymposium will focus on molecular-, cellular-, and systems-level mechanisms underlying forgetting and consider the active and adaptive roles that forgetting plays in keeping our memory system flexible.

SYMPOSIUM: Language Networks Derived From Direct Intracranial Recordings in Humans CME

Chair: Nitin Tandon, MD
Co-Chair: Stanislas Dehaene, PhD
Tuesday, Nov. 6, 1:30–4 p.m.
San Diego Convention Center: 6C

Intracranial recordings in humans provide data unsurpassed in spatiotemporal resolution that yield novel insight into the rapid computations that underlie language. This symposium details results from a broad array of questions asked and experimental paradigms used across five labs to probe language architecture — from reading and sentence comprehension to lexical retrieval and articulation processes. This new knowledge about language networks carries implications for learning and disease.

SYMPOSIUM: Mental Structures and Sequences: Evolutionary Solutions From Birds to Primates CME

Chair: Christopher I. Petkov, PhD
Co-Chair: Angela Friederici, PhD
Wednesday, Nov. 7, 8:30–11 a.m.
San Diego Convention Center: 6B

The human brain appears to be specialized for certain operations. To what extent aspects of our neurobiology can find realistic animal models constitutes a pressing issue for neuroscience. This is most salient in the domain of language, a uniquely human neurocognitive capacity. This symposium will review the revolution taking place in understanding the neurobiology of language as it includes how the brain creates mental structures and which aspects engage evolutionarily conserved or convergent neural mechanisms.

MINISYMPOSIUM: From Recent to Remote Memory and Back CME

Chair: Yaniv Ziv, PhD
Co-Chair: Inbal Goshen, PhD
Wednesday, Nov. 7, 1:30–4 p.m.
San Diego Convention Center: 6C

What makes some memories fade rapidly and others persist for a lifetime? Studies have indicated that recent and remote memories of a similar experience have different qualities and may be supported by different brain circuits. Integrating knowledge from ongoing work, this minisymposium brings together experts studying the topic at different levels of organization, measuring how networks, neurons, and spines change over time, and manipulating neurons and glia to test their involvement in long-term memory.

THEME I: TECHNIQUES

MINISYMPOSIUM: New Observations in Neuroscience Using Superresolution Microscopy CME

Chair: Michihiro Igarashi, MD, PhD
Saturday, Nov. 3, 1:30–4 p.m.
San Diego Convention Center: 6B

Superresolution microscopy (SM) techniques overcome optical limitations, and several new observations using SM have had revolutionary impact on neuroscience. Several types of SM have been developed (e.g., STED, SIM, PALM, STORM), each with special features. This minisymposium will discuss the new structural and functional information about specific important molecules in neuroscience obtained with SM.

SYMPOSIUM: Local Field Potentials and Deep Brain Stimulation CME

Chair: Cameron C. McIntyre, PhD
Sunday, Nov. 4, 1:30–4 p.m.
San Diego Convention Center: 6A

This symposium will provide an integrated story of scientifically driven clinical translation in deep brain stimulation (DBS) using local field potentials (LFPs). The talks will span from the basic science and fundamentals of LFP signals, to techniques and strategies for performing the clinical research necessary to define the appropriate LFP biomarkers, to direct application of adaptive DBS algorithms in clinical practice.

MINISYMPOSIUM: Exposing Neural Dynamics Using Real-Time Control: From Neurons to Human Behavior and Psychopathology CME

Chair: Hanna Keren, PhD
Co-Chair: Christoph Zrenner, MD
Monday, Nov. 5, 8:30–11 a.m.
San Diego Convention Center: 29D

The brain requires interaction with the environment to function. Current experimental and clinical paradigms, however, do not reflect this bidirectional coupling to a reactive environment. This minisymposium will present new experimental approaches to “close the loop” around neural systems, using a real-time system control approach. These methodological advancements will be addressed as they constitute a range of aspects, from computational modeling and engineering to clinical treatments.

MINISYMPOSIUM: Innovative Approaches for Monitoring Neuromodulation With Light CME

Chair: Yulong Li, PhD
Co-Chair: Matthew R. Banghart, PhD
Monday, Nov. 5, 1:30–4 p.m.
San Diego Convention Center: 28A

Neuromodulators are essential signaling molecules that regulate many neural processes through their influence on brain circuits. Monitoring neuromodulator dynamics and untangling their underlying circuits is critical for understanding the function of the brain. This minisymposium will present state-of-the-art optical techniques that enable rapid, sensitive, cell-specific monitoring of important neuromodulators and cutting-edge tools for labeling neural circuits involved in neuromodulation.

MINISYMPOSIUM: Whole-Brain Analysis of Cells and Circuits by Tissue Clearing and Light-Sheet Microscopy CME

Chair: Hiroki R. Ueda, MD, PhD
Co-Chair: Kwanghun Chung, PhD
Tuesday, Nov. 6, 8:30–11 a.m.
San Diego Convention Center: 29D

Recent advances in tissue clearing, biomolecular labeling, rapid imaging, and image informatics have allowed neuroscientists to observe the entire brain at a subcellular resolution. Whole brain clearing and imaging is particularly powerful for physiology and pathology of cellular components and their connections in the CNS. This minisymposium will discuss challenges and opportunities in whole-brain analysis of cells and circuits to elucidate brain functions by tissue clearing and light-sheet microscopy.

SYMPOSIUM: The Dynamic Brain: Signatures of Fast Functional Reconfiguration, Their Interpretability, and Clinical Value CME

Chair: Javier Gonzalez-Castillo, PhD
Co-Chair: Peter Bandettini, PhD
Tuesday, Nov. 6, 1:30–4 p.m.
San Diego Convention Center: 6B

Communication across brain regions fluctuates tirelessly as we interact with our environment. Established patterns of functional connectivity (e.g., DMN) often disintegrate in the span of a few minutes, making the concept of networks elusive under such volatile conditions. This symposium will review how to best capture, model, and interpret dynamic patterns of functional connectivity in the human brain. It will then discuss in what ways aberrant dynamic connectivity underlies clinical conditions.

MINISYMPOSIUM: Human Stem Cell Models to Validate Rare and Common Variants Contributing to Neurodevelopmental Disorders CME

Chair: Kristen Brennand, PhD
Wednesday, Nov. 7, 8:30–11 a.m.
San Diego Convention Center: 6C

As genetic studies identify a growing list of variants underlying neuropsychiatric disease and addiction, unraveling how these risk factors interact within and between the diverse cell types of the brain becomes critical. This minisymposium will discuss recent molecular and phenotypic insight uncovered using hiPSC-derived neurons and glia, with a focus on integrating these findings with datasets generated from consortia-led genomic and post-mortem studies of large patient cohorts.

THEME J: HISTORY AND EDUCATION

MINISYMPOSIUM: Telling Stories of Science

Chair: Wendy A. Suzuki, PhD
Sunday, Nov. 4, 1:30–4 p.m.
San Diego Convention Center: 6E

Now more than ever, it is essential that scientists actively engage with the public. Through storytelling, or the use of a personal narrative, we can bring science to life and improve communication not only with the public but also within the community. In this minisymposium, presentations about the science of storytelling and why and how to tell stories, as well as three powerful personal stories, will demonstrate how storytelling can transform science communication and promote scientific progress.