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Lecture

001. DIALOGUES BETWEEN NEUROSCIENCE AND SOCIETY - Global Mental Health and Neuroscience: Challenges and Opportunities

Location: SDCC Ballroom 20

Time: Sat, Nov. 12, 2016, 11:00 AM - 1:00 PM

Support: Elsevier

Speakers: S. SAXENA;
The Dept. of Mental Hlth. and Substance Abuse, World Hlth. Organization, Geneva, Switzerland

Abstract: Global mental health is slowly but steadily coming out of the shadows. It is benefiting from advances in neuroscience, but not adequately. The potential is much greater. The lecture will present a background of the current state of mental health in the world and then focus on how a closer collaboration between mental health and neuroscience could enhance knowledge and improve population health. Examples from the areas of autism, substance dependence, psychoses, and dementia will help illustrate this potential.

Disclosures: S. Saxena: None.

Lecture

008. Lineage Analyses of Developing CNS Tissues

Location: SDCC Ballroom 20

Time: Sat, Nov. 12, 2016, 2:00 PM - 3:10 PM

Support: To be provided via email

Speakers: *C. CEPKO;
Howard Hughes Med. Institute, Harvard Med. Sch., BOSTON, MA

Abstract: Lineage analyses describe the progenitor: progeny relationships in developing tissue. Lineage data can rule in, or out, particular models of how a cell achieves its fate, as well as when some of the fate-determining events occur. Lineages can be most definitively tracked using clonal methods, as afforded by retroviral infection. The interpretability of lineage data is further strengthened when mapping is done from identified types of progenitor cells. Recent studies using such methods in the retina and telencephalon will be presented.

Disclosures: C. Cepko: None.

Lecture

009. PRESIDENTIAL SPECIAL LECTURE - Tuning Auditory Circuits for Vocal Communication

Location: SDCC Ballroom 20

Time: Sat, Nov. 12, 2016, 5:15 PM - 6:25 PM

Support: Biogen

Grant Support: NIH R01 DC009810

NSF IOS-0920081

Speakers: *S. WOOLLEY;
Psychology, Columbia Univ., New York, NY

Abstract: Social communication reflects the coordinated development of sensory and motor circuits around signals that convey information. The young brain, learning to communicate with hearing and voice, builds auditory and vocal motor circuits that are functionally coupled to perceive and produce similar signals. This lecture will describe progress made using songbirds to understand how species' identity dictates the capacities and limits of vocal learning, how early experience shapes auditory and vocal circuits, and how species and learning combine to map auditory tuning onto vocal acoustics.

Disclosures: S. Woolley: None.

Lecture

098. Bitten: Understanding and Modulating Mosquito Attraction to Humans

Location: SDCC Ballroom 20

Time: Sun, Nov. 13, 2016, 8:30 AM - 9:40 AM

Support: NIH Grant R01 DC014247

Howard Hughes Medical Institute Investigator Award

Speakers: *L. B. VOSSHALL;
Dept Neurogenetics & Behavior, Rockefeller Univ., New York, NY

Abstract: By the act of feeding on our blood, female mosquitoes spread dangerous infectious diseases such as malaria, dengue, zika, and yellow fever to humans. We attract mosquitoes via multiple sensory cues, including emitted body odor, body heat, and carbon dioxide in the breath. The mosquito perceives differences in these cues, both between and within species, to determine

which animal or human to target for blood-feeding. This lecture will focus on the genes and circuits that drive this dangerous behavior and how it is modulated by the internal physiological state of the mosquito.

Disclosures: L.B. Vosshall: None.

Lecture

105. Dendritic Spines Shaping Memory and Behaviors

Location: SDCC Ballroom 20

Time: Sun, Nov. 13, 2016, 10:00 AM - 11:10 AM

Grant Support: Grants-in-Aid for Scientific Research (S) from JSPS

Strategic Research Program for Brain Science from AMED

The brain/MIND and SICP project from AMED

Speakers: *H. KASAI;
Lab. of Structural Physiol., Grad. Sch. of Medicine, The Univ. of Tokyo, Tokyo, Japan

Abstract: Spiny protrusions of dendrite, called dendritic spines, are the major postsynaptic sites for excitatory synaptic transmission in the brain. New studies indicate that spines act as memory elements, and do so by their structural plasticity. Such cell motility regulates functional connectivity, and enables Hebbian and reinforcement learning in the cortex and basal ganglia. Motility can be spontaneous, and such fluctuations may determine memory persistence and stabilize recurrently connected networks. Spine motility connects cell biology to mental functions and disorders.

Disclosures: H. Kasai: None.

Lecture

106. Translational Neuroepigenetic Insights of Addiction Vulnerability

Location: SDCC Ballroom 20

Time: Sun, Nov. 13, 2016, 11:30 AM - 12:40 PM

Grant Support: DA030359

DA033660

DA015446

Speakers: *Y. L. HURD;
Dept Psych, Icahn Sch. of Med. at Mount Sinai, NEW YORK, NY

Abstract: Drug addiction involves complex interactions of dynamic processes that contribute to individual vulnerability from early stages of development and during different phases of life by linking genetic factors with environmental experiences. This lecture will focus on neurobiological insights recently gained about the molecular underpinnings of substance abuse (particularly cannabis and opiates) using multidisciplinary translational approaches in humans and animal models. The work presented will illuminate epigenetic mechanisms associated with addiction risk that extend even across generations.

Disclosures: Y.L. Hurd: None.

Lecture

189. Circuits for Movement

Location: SDCC Ballroom 20

Time: Sun, Nov. 13, 2016, 1:00 PM - 2:10 PM

Grant Support: ERC Advanced Grant 249399

Swiss National Science Foundation Grant

Kanton Basel-Stadt

Novartis Research Foundation

Speakers: S. ARBER;
Dept Cell Biol, Biozentrum, Univ. of Basel and Friedrich Miescher Inst., Basel, Switzerland

Abstract: Movement is the behavioral output of the nervous system. Animals carry out an enormous repertoire of distinct actions, spanning from seemingly simple repetitive tasks like walking, to more complex movements such as forelimb manipulation tasks. This lecture will focus on recent work elucidating the organization and function of neuronal circuits at the core of regulating distinct motor behaviors. It will show that dedicated circuit modules within different brainstem nuclei and their interactions in the motor system play key roles in action diversification.

Disclosures: S. Arber: None.

Lecture

196. PETER AND PATRICIA GRUBER LECTURE - Random Walk in Neurobiology

Location: SDCC Ballroom 20

Time: Sun, Nov. 13, 2016, 2:30 PM - 3:40 PM

Support: The Gruber Foundation

Speakers: M.-M. POO;
Dept. of Mol. & Cell Biol., Univ. of California-Berkeley and Inst. of Neuroscience, Chinese Acad. of Sci., Berkeley, CA

Abstract: Beginning as a biophysicist studying diffusion of membrane proteins, I stumbled upon many interesting problems in cellular neurobiology, including neuronal polarization, axon guidance, synaptogenesis, and synaptic plasticity. An underlying theme in all these processes is random diffusion of proteins confined or even directed by localization mechanisms, leading to cellular topography critical for neuronal functions. As it turned out, my own career path resembled random walk, influenced and sometimes directed by interactions with my students, postdocs, and colleagues.

Lecture

197. PRESIDENTIAL SPECIAL LECTURE - Limitations on Visual Development: Neurons and Behavior

Location: SDCC Ballroom 20

Time: Sun, Nov. 13, 2016, 5:15 PM - 6:25 PM

Grant Support: NIH EY05864

NIH EY 021894

NIH EY 02017

NIH EY22428

James S. McDonnell Foundation

NCRR RR00166

Speakers: *L. KIORPES;
New York Univ., NEW YORK, NY

Abstract: Vision develops over many months in primate infants. The neural mechanisms that limit visual function are not fully understood. During development, neurons in visual cortex are more sensitive than would be expected based on visual behavior. Abnormal early experience creates a specific disorder-amblyopia-which permanently disrupts vision. Here also, the sensitivity of neurons in visual cortex exceeds behavior. This talk will describe neural limits on normal and abnormal postnatal visual development based on studies of brain and behavior in human and nonhuman primates.

Disclosures: L. Kiorpes: None.

Lecture

273. Quantal Release and Its Requirements

Location: SDCC Ballroom 20

Time: Mon, Nov. 14, 2016, 8:30 AM - 9:40 AM

Grant Support: R01 MH50712

P01DA10154-16A1

R01 MH096863-01A1

R01 NS089713

Speakers: *R. EDWARDS;
Univ. of California, San Francisco, San Francisco, CA

Abstract: Quantal release by exocytosis requires the transport of classical neurotransmitters into secretory vesicles. Vesicular transport activity thus defines the membranes, as well as the cells capable of transmitter release. However, the three families of vesicular transporters differ in ionic coupling. This lecture will discuss the biophysical properties of the transporters, the properties of secretory vesicles that influence their function, and the implications for synaptic transmission, including quantal size, non-vesicular efflux, synaptic vesicle pools and transmitter co-release.

Disclosures: R. Edwards: None.

Lecture

280. DAVID KOPF LECTURE ON NEUROETHICS - Reforming Forensic Science: Some Insights From Research on Vision and Memory

Location: SDCC Ballroom 20

Time: Mon, Nov. 14, 2016, 10:00 AM - 11:10 AM

Support: David Kopf Instruments

Speakers: *T. D. ALBRIGHT;
Salk Inst. For Biol. Studies, La Jolla, CA

Abstract: In its 2009 report, *Strengthening Forensic Science in the United States: A Path Forward*, the National Academy of Sciences identified a number of significant weaknesses in forensic science, which have contributed to wrongful convictions and have threatened public confidence in our criminal justice system. These problems have prompted broad calls for reform of the processes by which forensic evidence is acquired, analyzed, and interpreted. Several types of forensic analyses involve evaluation of complex visual patterns or memories of visual experiences. Advances in understanding of brain systems for visual sensation, perception, and memory can help shape forensic reform by illuminating the relevant sensory and cognitive processes, their limitations, and factors that can improve human performance in a forensic context.

Disclosures: T.D. Albright: None.

Lecture

281. Understanding Mammalian Microcircuits: Let Inspiration Guide the Way

Location: SDCC Ballroom 20

Time: Mon, Nov. 14, 2016, 11:30 AM - 12:40 PM

Grant Support: NIH Grant RO1 NS72211

NIH Grant RO1 HL70029

NIH Grant RO1 HL40959

NIH Grant T32 NS58280

Speakers: *J. L. FELDMAN;
Neurobio., UCLA, LOS ANGELES, CA

Abstract: More than 25 years since our discovery of the pre-Bötzinger Complex, the core of the circuit for breathing, the underlying mechanisms governing its dynamics remain elusive and are much more complex than we first thought. This lecture will address how novel emergent mechanisms, but not pacemakers, inhibition, or bursting, are likely to be critical and describe the roles the pre-BötC plays in regulation of body function, other movements, and emotion. The

neural circuit controlling breathing is inimitably tractable and may inspire general strategies for elucidating other neural microcircuits.

Disclosures: J.L. Feldman: None.

Lecture

377. ALBERT AND ELLEN GRASS LECTURE - Natural Products as Probes of the Pain Pathway: From Physiology to Atomic Structure

Location: SDCC Ballroom 20

Time: Mon, Nov. 14, 2016, 3:15 PM - 4:25 PM

Support: The Grass Foundation

Grant Support: NIH R37 NS065071

NIH R01 NS055299

NIH R01 NS047723

NIH R01 NS081115

Speakers: D. J. JULIUS;
Dept Cell & Molec Pharmacol, Univ. of California, San Francisco, San Francisco, CA

Abstract: We are interested in determining the molecular basis of somatosensation - the process whereby we experience touch and temperature - with an emphasis on identifying molecules that detect noxious (pain-producing) stimuli. We are also interested in understanding how somatosensation is altered in response to tissue or nerve injury. Our approach has been to identify molecular targets for natural products that mimic the psychophysical effects of commonly encountered somatosensory stimuli, such as heat or cold, and to then ask how these molecules are activated or modulated by noxious stimuli or injury.
We have focused on three members of the TRP channel family (TRPV1, TRPM8, and TRPA1) that are expressed by subpopulations of primary afferent sensory neurons and which have been implicated in the detection of thermal stimuli and/or inflammatory agents. Genetic studies support the idea that the capsaicin receptor (TRPV1) and the menthol receptor (TRPM8) function as detectors of heat and cold, respectively, whereas the wasabi receptor (TRPA1) functions as a detector of environmental and endogenous chemical irritants.
From a signal transduction and therapeutics perspective, there is great interest in understanding how these channels are activated (gated) by physical and/or chemical stimuli. We have used a combination of molecular genetics, natural product biochemistry, and biophysics to address these issues and probe mechanisms of stimulus detection, channel activation, and coding logic of the somatosensory system.

Disclosures: **D.J. Julius:** E. Ownership Interest (stock, stock options, royalty, receipt of intellectual property rights/patent holder, excluding diversified mutual funds); Patent royalty from Univ. of California. F. Consulting Fees (e.g., advisory boards); Scientific Advisory Bd member for Genentech, Inc. and Hydra, Inc..

Lecture

378. PRESIDENTIAL SPECIAL LECTURE - Toward Whole-body Connectome in *Drosophila*

Location: SDCC Ballroom 20

Time: Mon, Nov. 14, 2016, 5:15 PM - 6:25 PM

Support: Janssen Research & Development LLC

Grant Support: MOST104-2745-B-007-002

Speakers: *A.-S. CHIANG;
Natl. Tsing Hua University, Taiwan, Hsinchu City, Taiwan

Abstract: Our brains receive information from sensory neurons about our external environment and internal organs. To understand how the brain processes information and initiates motor outputs, scientists are constructing complete wiring diagrams called “connectomes” that map all neural connections in the brain and body. Taking *Drosophila melanogaster* as an example, this lecture will address challenges in building whole-body connectomes and how that knowledge may help us better understand normal function and treat disease.

Disclosures: **A. Chiang:** None.

Lecture

471. Genetic Dissection of Sensorimotor Circuits in the Spinal Cord

Location: SDCC Ballroom 20

Time: Tue, Nov. 15, 2016, 8:30 AM - 9:40 AM

Grant Support: NIH Grant NS080586

NIH Grant NS086372

NIH Grant NS090919

Speakers: *M. D. GOULDING;
Molec Neurobiol Lab., The Salk Inst. for Biol. Studies, La Jolla, CA

Abstract: Sensorimotor circuits in the spinal cord play essential roles in somatosensation and motor control. Studies defining the genetic programs controlling spinal cord development have opened up new avenues for exploring the cellular and functional organization of these circuits. This lecture will outline our current understanding of the spinal CPG circuits that control locomotion and the dorsal horn pathways that process and transmit cutaneous somatosensory modalities, highlighting the cutting-edge genetic and behavioral approaches that are being employed to map these circuits.

Disclosures: M.D. Goulding: None.

Lecture

478. From Song to Synapse: Vocal Communication in Sparrows, Finches, and Mice

Location: SDCC Ballroom 20

Time: Tue, Nov. 15, 2016, 10:00 AM - 11:10 AM

Grant Support: NIH Grant DC013826 (Present)

NSF Grant 1354962 (Present)

NIH Grant DC002524 (Past)

Speakers: *R. D. MOONEY;
Dept Neurobiol, Duke Univ., Durham, NC

Abstract: The interplay between hearing and vocalization is critical to vocal communication and vocal learning. Recent research using both songbirds and mice has provided keen insights into the neural circuits and mechanisms that mediate this sensorimotor interplay. This lecture will cover recent progress in understanding how auditory experience engages and shapes motor systems to enable vocal learning, how motor systems modulate hearing during vocalization and other movements, and the neural circuitry that produces vocalizations used for social communication.

Disclosures: R.D. Mooney: None.

Lecture

479. CLINICAL NEUROSCIENCE LECTURE - Deciphering the Dynamics of the Unconscious Brain Under General Anesthesia

Location: SDCC Ballroom 20

Time: Tue, Nov. 15, 2016, 11:30 AM - 12:40 PM

Grant Support: R01-GM104948

Speakers: *E. N. BROWN;
MIT, CAMBRIDGE, MA

Abstract: General anesthesia is a drug-induced reversible coma. A primary mechanism by which anesthetics induce altered states of arousal is by producing large, structured oscillations that impair communication among brain regions. This lecture will discuss the neurophysiology of these oscillations and how they change with drug and patient age. It will show new ways to control the anesthetic state and induce rapid emergence from anesthesia. Studying mechanisms of anesthesia is a largely untapped way of studying the brain.

Disclosures: E.N. Brown: None.

Lecture

562. Cortical Circuits of Vision

Location: SDCC Ballroom 20

Time: Tue, Nov. 15, 2016, 1:00 PM - 2:10 PM

Grant Support: Howard Hughes Medical Institute

The Gatsby Charitable Foundation

NIH Grant EY025668

NIH Grant MH105959

Speakers: *M. SCANZIANI;
Univ. of California, San Francisco, San Fancisco, CA

Abstract: The diversity of neuron types and synaptic connectivity patterns in the cerebral cortex is astonishing. How this cellular and synaptic diversity contributes to cortical function is just beginning to emerge. Using the mouse visual system as an experimental model, this lecture will discuss the mechanisms by which excitatory and inhibitory interactions among distinct neuron types contribute to the most basic operations in visual cortex. This lecture will highlight how a functional and structural analysis of cortical circuits allows us to bridge the gap between system and cellular neuroscience.

Disclosures: M. Scanziani: None.

Lecture

569. FRED KAVLI HISTORY OF NEUROSCIENCE LECTURE - Sixty Years of Research on Neurotransmitter Release in the Light of Recent Results from the Calyx of Held Synapse

Location: SDCC Ballroom 20

Time: Tue, Nov. 15, 2016, 2:30 PM - 3:40 PM

Support: The Kavli Foundation

Speakers: *E. NEHER;
Max Planck Inst. for Biophysical Chem., Goettingen, Germany

Abstract: In the 1950s, Sir Bernhard Katz and co-workers laid the foundation for our present understanding of neurotransmitter release and its short-term plasticity. Their terms “units available” (for release) and “units responding to one impulse” have been replaced with terms like vesicle pools, release probability, and quantal content. Since then, the description of certain aspects of short-term plasticity has gained considerable complexity. Research on the Calyx of Held has described this complexity including heterogeneity of vesicle pools, refractoriness of release sites, and a phenomenon called “superpriming.” Nevertheless, this talk will argue that the original Katz view is still a useful framework on which to build.

Disclosures: E. Neher: None.

Lecture

570. PRESIDENTIAL SPECIAL LECTURE - Neurobiology of the Adolescent and Young Adult Brain Reveals Unique Strengths and Vulnerabilities: Debunking Myths

Location: SDCC Ballroom 20

Time: Tue, Nov. 15, 2016, 5:15 PM - 6:25 PM

Speakers: F. E. JENSEN;
Dept Neurol, Univ. of Pennsylvania, Philadelphia, PA

Abstract: Experimental and human evidence reveal that adolescence is a paradoxical state, with enhanced synaptic plasticity, yet incomplete myelination and regional connectivity. Full maturity is not reached until the third decade. Adolescent brain neuroscience impacts our understanding of patterns of onset of psychiatric illness, the long-term effects of exposure to substances of abuse and stress, and also explains their advantage in learning and memory and why they exhibit “signature” behaviors such as impulsivity, emotional liability, altered sleep cycle, and susceptibility to addiction.

Disclosures: **F.E. Jensen:** B. Contracted Research/Research Grant (principal investigator for a drug study, collaborator or consultant and pending and current grants). If you are a PI for a drug study, report that research relationship even if those funds come to an institution; Eisai Pharma-Investigator Initiated research funds.

Lecture

654. Regulation of Neural Stem Cell Fate During Development and in the Adult

Location: SDCC Ballroom 20

Time: Wed, Nov. 16, 2016, 8:30 AM - 9:40 AM

Support: To be provided via email

Speakers: Y. GOTOH;
Inst. of Mol. and Cell. Biosci., The Univ. of Tokyo, Tokyo, Japan

Abstract: Synapse assembly, maturation, and plasticity are controlled by synaptic organizing complexes, presynaptic neurexins, and LAR-PTPs and their diverse postsynaptic partners. Genetics places these complexes centrally in a synaptic risk pathway for autism and other neuropsychiatric disorders. This lecture will discuss how these complexes cooperate in synapse development, confer specificity, balance excitation and inhibition, mediate plasticity, and promote an adaptable response to genetic risk.

Disclosures: **Y. Gotoh:** None.

Lecture

661. Postdiction and Perceptual Awareness

Location: SDCC Ballroom 20

Time: Wed, Nov. 16, 2016, 10:00 AM - 11:10 AM

Speakers: *S. SHIMOJO;
Biol Computation Neural Syst., Caltech, Pasadena, CA

Abstract: There are a few postdictive perceptual phenomena known, where a stimulus presented later causally affects the percept of target presented earlier. While backward masking and apparent motion provide classical examples, the flash lag effect and its variations have stimulated theorists. The TMS-triggered scotoma and its “backward filling-in” offer a unique neurophysiological case. Findings suggest that various visual attributes are postdictively

reorganized; its neural correlates (such as reentry) and implications to understand visual awareness and sense of agency will be discussed.

Disclosures: S. Shimojo: None.

Lecture

662. The Social Brain in Human Adolescence

Location: SDCC Ballroom 20

Time: Wed, Nov. 16, 2016, 11:30 AM - 12:40 PM

Grant Support: Wellcome Trust Strategic Award

Royal Society University Research Fellowship

Jacobs Foundation Research Prize 2015

Nuffield Foundation Research Grant

Speakers: *S.-J. BLAKEMORE;
Inst. of Cognitive Neurosci., Univ. Col. London, London, United Kingdom

Abstract: Social cognitive processes involved in navigating an increasingly complex social world continue to develop throughout human adolescence. In the past 20 years, neuroscience research has shown that the human brain develops both structurally and functionally during adolescence. Areas of the social brain undergo significant reorganization during the second decade of life, which might reflect a sensitive period for adapting to the social environment.

Disclosures: S. Blakemore: None.

Lecture

757. Capturing Immune Responses to Understand and Treat Neurodegenerative Disease

Location: SDCC Ballroom 20

Time: Wed, Nov. 16, 2016, 1:00 PM - 2:10 PM

Speakers: *E. MASLIAH;
UCSD, La Jolla, CA

Abstract: Neurodegenerative disorders are characterized by progressive accumulation of proteins leading to cognitive impairment and movement disorders. A dysequilibrium in the rate

of aggregation, clearance, and synthesis appears to play a key role. Moreover, recent studies have shown that prion-like propagation of proteins may contribute to neurodegeneration. Therefore, developing strategies to increase clearance and diminish prion-like propagation might be key to treating these disorders. Harnessing the power of the immune system by utilizing cellular and humoral immunization has been under development for the past several years. This lecture will provide a perspective on the recent progress and challenges of utilizing immunotherapy for neurodegenerative disorders.

Disclosures: E. Masliah: None.