Society of Biological Psychiatry 2009 Annual Meeting

THURSDAY, MAY 14

PLENARY SESSION
Novel Optical Approaches to Study Neuronal Circuits and Plasticity
Thursday, May 14, 2009 8:00 AM - 10:00 AM
Location: Regency Ballroom - 3rd Floor
Chair: Husseini Manji

1. Optical Control of Neurons and Behaviors

Karl Deisseroth

Bioengineering, Stanford, Stanford, CA

Professor Deisseroth received his bachelor's degree from Harvard in 1992, his PhD from Stanford in 1998, and his MD from Stanford in 2000. He completed medical internship and adult psychiatry residency at Stanford, and he was board-certified by the American Board of Psychiatry and Neurology in 2006. He joined the faculty at Stanford in Bioengineering and Psychiatry on January 1, 2005. As a bioengineer focused on neuroengineering, he has launched an effort to map neural circuit dynamics in psychiatric disease on the millisecond timescale, and his group at Stanford has developed optical neuroengineering technologies for noninvasive imaging and control of brain circuits, as they operate within living intact tissue. His work on optical control of neural circuits has launched a new field called "optogenetics". Professor Deisseroth has received many major awards including the NIH Director's Pioneer Award, the Presidential Early Career Award for Science and Engineering (PECASE), the McKnight Foundation Technological Innovations in Neuroscience Award, the Larry Katz Prize in Neurobiology, the Schuetze Award in Neuroscience, the Whitehall Foundation Award, the Charles E. Culpeper Scholarship in Medical Science Award, the Klingenstein Fellowship Award and the Robert H. Ebert Clinical Scholar Award.

2. Imaging the Development and Plasticity of Prefrontal Neuronal Circuits

Kuan Hong Wang

NIMH, Bethesda, MD

Dr. Wang is chief of the Unit on Neural Circuits and Adaptive Behaviors in the Genes, Cognition and Psychosis program at the National Institute of Mental Health. Dr. Wang received his B.A. in Biochemical Sciences from Harvard College and his Ph.D. from the University of California at San Francisco, where he studied the molecular regulators of sensory axon growth and branching during development with Marc Tessier-Lavigne. Dr. Wang obtained postdoctoral training with Susumu Tonegawa at the Massachusetts Institute of Technology, where he examined the ways in which cortical neurons respond to an animal's experience by directly visualizing the molecular activity of a given set of neurons over several days in the live animal. Dr. Wang joined NIMH as an investigator in 2006. His laboratory employs mouse genetics, in vivo imaging, electrophysiological and behavioral techniques to investigate experience-dependent changes in brain neural circuits underlying normal adaptive behaviors as well as psychiatric disorders.

3. Imaging Brain Function at the Cellular Scale in Behaving Subjects

Mark Schnitzer

Stanford University, Stanford, CA

4. New Optogenetic Tools for Cell-Type Specific Study of Neural Circuitry

Guoping Feng

Duke University, Durham, NC

The ability to control and manipulate neuronal activity within an intact mammalian brain is of key importance for mapping functional connectivity and for dissecting the circuitry bases of behaviors. Optogenetic approaches have recently been developed for high-speed, light-induced activation or silencing of neurons through the use of light-sensitive, cation permeable channelrhodopsin-2 (ChR2) and a light-driven chloride pump (NpHR). We have generated transgenic mice that express improved ChR2 and NpHR in various subtypes of neurons in the brain for in vivo light-induced manipulation of neuronal activity and mapping of neural circuits. We demonstrate that the illumination of ChR2-positive neurons in brain slices and in live animals produces photocurrents that generate action potentials within milliseconds. Moreover, the frequency of light-evoked action potentials can be precisely controlled. We further illustrate the feasibility of mapping neural circuits *in vivo* by probing the connections formed between the olfactory bulb and the piriform cortex, and find that olfactory information processing shows a high degree of mitral cell convergence and integration onto the piriform cortex. For neuronal silencing, we show that illumination of cortical pyramidal neurons expressing NpHR led to rapid, reversible photoinhibition of action potential firing in these cells. Together these studies demonstrate a system for precise manipulation of neural activity in the intact mammalian brain with light, and illustrate the potential broad use of ChR2 and NpHR transgenic mice in exploring circuitry function *in vivo*.

KEY NOTE SPEAKER
Thursday, May 14, 2009 10:15 AM - 10:45 AM
Location: Regency Ballroom - 3rd Floor

5. Reverse Translation: Moving from Bedside to Bench

Thomas Insel

NIMH, Bethesda, MD

Thomas R. Insel, M.D., is Director of the National Institute of Mental Health (NIMH), which leads the nation's research effort to understand, treat, and prevent mental disorders. Appointed as Director in 2002, Dr. Insel's association with NIMH actually spans over two decades, as he began his research career at the Institute in 1979, leaving it in 1994 to become Professor of Psychiatry at Emory University in Atlanta, Georgia. While at Emory he founded and led the Center for Behavioral Neuroscience, and continued his groundbreaking line of research, begun at NIMH, on the molecular basis of social behaviors. Among Dr. Insel's many scientific achievements, he is perhaps best known for his research on oxytocin and affiliative behaviors. Dr. Insel

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identified the important role of neuropeptides such as oxytocin or vasopressin for social attachment in comparative neurobiological studies of monogamous mammals. This discovery led to greater understanding of the molecular and cellular basis of parental behavior, pair bonding, and aggression. A prolific author, Dr. Insel has published over 200 scientific articles and four books. He is a member of the Institute of Medicine, a Fellow of the American College of Neuropsychopharmacology, and the recipient of several awards. Dr. Insel graduated from the combined B.A.-M.D. program at Boston University.

PRESIDENTIAL LECTURE
Thursday, May 14, 2009 10:45 AM - 11:45 PM
Location: Regency Ballroom - 3rd Floor
Chair: Husseini Manji

6. Synaptic Plasticity: The Brain's Response to Experience

Robert C. Malenka

Stanford University, Palo Alto, CA

Dr. Robert C. Malenka is the Pritzker Professor of Psychiatry and Behavioral Sciences, Director of the Pritzker Laboratory, and co-director of the Stanford Institute for Neuro-Innovation and Translational Neurosciences at the Stanford University School of Medicine. He has been a world leader in elucidating the mechanisms underlying the action of neurotransmitters in the mammalian brain and the molecular mechanisms by which neural circuits are reorganized by experience. His many contributions over the last 25 years have laid the groundwork for a much more sophisticated understanding of the mechanisms by which neurons communicate and the adaptations in synaptic communication which underlie all forms of normal and pathological behavior. He was trained as both a clinical psychiatrist and cellular neurobiologist and has been at the forefront of helping to apply the knowledge gained from basic neuroscience research to the treatment and prevention of major neuropsychiatric disorders. He is an elected member of the Institute of Medicine of the National Academy of Sciences (2004) and an elected fellow of the American Academy of Arts and Sciences (2005) and the American Association for the Advancement of Science 2009). His public service includes serving on the National Advisory Council on Drug Abuse and as a Councilor for the Society for Neuroscience. He is the co-author of the textbook Molecular Neuropharmacology: A Foundation for Clinical Neuroscience and has served on the editorial boards of many prominent journals including Neuron, Trends in Neuroscience, Biological Psychiatry and the American Journal of Psychiatry.

WORKSHOP
NIMH Grant Opportunities for Early Stage Investigators
Thursday, May 14, 2009 12:30 PM - 2:00 PM
Location: Regency A - 3rd Floor
Chair: Cheryl Anne Boyce*
Moderator: Cheryl Anne Boyce**

*Supported by NIMH employee
**Supported by NIMH/NIH/DHHS employee

7. Workshop on NIMH Grant Opportunities for Early Stage Investigators: Priorities in Translational and Neurodevelopmental Research

Cheryl Anne Boyce[1]

[1]NIMH/NIH/DHHS, Bethesda, MD

The National Institute of Mental Health (NIMH) supports and administers programs of research, research training, and resource development with the ultimate goal of preventing and curing mental illness. A goal for NIMH is to increase the number of research scientists who are prepared to transition to independent research careers. This workshop will focus on providing early stage investigators with resources necessary to initiate and continue on the path of research independence, particularly in the area of developmental translational science. Information on NIMH research priorities and tips for successful grant submissions will be presented. The workshop will be structured to allow for an interactive discussion based on attendees' research interests and skill needs. Workshop participants will have the opportunity to pose questions with program officials and current grantees to discuss research career paths and successful transitions to independent research funding.

WORKSHOP
Boundaries of Psychosis
Thursday, May 14, 2009 12:30 PM - 2:00 PM
Location: Regency B - 3rd Floor
Chair: Larry J. Siever
Moderator: Stephan Heckers

8. Boundaries of Psychosis

Stephan Heckers[1], **Godfrey Pearlson**[2], **Monte S. Buchsbaum**[3], **Larry J. Siever**[3], **Ayman H. Fanous**[4]

[1]Vanderbilt University, Nashville, TN, [2]Yale University School of Medicine, Hartford, CT, Institute of Living, Hartford, CT, [3]Mount Sinai School of Medicine, New York, [4]Washington VA Medical Center, Washington, DC, DC

Identifying the precise boundaries of psychosis poses a challenge to the field in defining nosology, for a rationally organized DSM-V, identifying specific genotypes, and characterizing pathophysiologic signatures given overlapping biomarkers and genetics between disorders. Schizophrenia and bipolar disorder (BD) may both be characterized by psychosis, while chronic schizophrenia shares deficit symptoms with schizotypal personality disorder (SPD) as part of the schizophrenia spectrum. In this workshop, new imaging and genetic data will highlight controversies, and promote discussion regarding overlap