

## **Susan Y. Bookheimer, Ph.D.**

MIND Institute Distinguished Lecturer Series – October 9, 2013

### ***Biographical Information***

Susan Y. Bookheimer, PhD, holds the Joaquin Fuster Chair in Cognitive Neuroscience and is a Professor in the Dept. of Psychiatry and Biobehavioral Sciences, David Geffen School of Medicine at UCLA and the Department of Psychology, where she is director of the Staglin IMHRO Center for Cognitive Neuroscience. She is a clinical neuropsychologist whose work has spanned both basic research and clinical practice. Her experimental expertise includes structural and functional Magnetic Resonance Imaging (sMRI, fMRI), positron emission tomography (PET), sodium Amytal examinations (Wada tests) and intraoperative electrocortical stimulation mapping (ESM), as well as classical neuropsychological approaches, applied across a range of neuropsychiatric disorders.

Dr. Bookheimer has been active in pediatric imaging since the inception of functional MRI in the early 1990s, and has focused on brain imaging in developmental and other disorders at UCLA for over 18 years, and in autism for the past 15 years. Dr. Bookheimer's autism research program uses functional magnetic resonance imaging (fMRI) to try to understand what differences in brain function give rise to the major symptoms of autism, especially in language, social communication, joint attention, and emotion, and integrates imaging with genetics to understand how autism risk genes alter the trajectory of abnormal brain development in autism.

Dr. Bookheimer is the Principal Investigator of the UCLA Autism Center of Excellence, and site PI for the Multimodal Development Neurogenetics of Females with ASD Autism Center of Excellence Multi-site Network. She is an active member of INSAR, serving as Chair of the Membership Committee, and is a member of the Scientific Program Committee; she is also past chair of the Scientific Program Committee for IMFAR (2007). Dr. Bookheimer also serves on the Council for the Organization for Human Brain Mapping and was elected Chair of the organization in 2013. She has also served on the NIMH Council Work Group on MRI Research Practices and on the NIH Working Group on Pediatric Imaging.

### ***Presentation Abstract (4:30 pm)***

#### *Linking Genes, Brain and Behavior in Autism Spectrum Disorder*

Autism Spectrum Disorder (ASD) is known to have a strong genetic component. However little is known about how autism risk genes relate to brain differences found in individuals with ASD and behavioral features of ASD. This talk will review some of the primary genetic pathways that have been identified in autism, and will present research on how these genes affect brain development, specifically brain connectivity. Using both activation and resting state fMRI, we have identified patterns of brain activation and connectivity associated with specific variations in common polymorphisms in autism risk genes. Three gene targets will be presented: the CNTAP gene, which confers risk for the language phenotype in ASD; the MET gene, which relates to processing socially relevant stimuli; and the Oxytocin gene, which relates to social motivation. The talk will show how these genes affect brain activation and connectivity across diagnostic groups, and how some of these genes interact with an autism diagnosis. New analytic techniques, such as graph theory applied to functional connectivity data, suggest abnormal development of specific connectivity patterns, including modularity and network efficiency, that help to explain the cognitive and behavioral differences associated with different autism phenotypes.