University of Rochester

School of Medicine and Dentistry

Department of Neuroscience and the Del Monte Institute for Neuroscience

presents

Shinho Cho, PhD

Research Associate
University of Minnesota Medical School
Center for Magnetic Resonance Research and
Departments of Radiology

Linking macro-, meso-, and microscopic brain dynamics on cognition and behavior by multimodal imaging integration

Dr. Cho's research aims to delineate the dynamic interaction and casual relationship between macro-, meso-, and microscopic-scale functional brain activity that underlies cognition, behavior, and clinical symptoms. He will present the functional relationship between the activity of subcortical brain regions and large-scale brain networks. Simultaneous deep brain stimulation and functional MRI (fMRI) in human and animal brains reveal that neuromodulation on deep brain structure (e.g., nucleus accumbens) altered not only the whole-brain network connectivity but influenced patients' cognition (e.g., mood). The following topic will illuminate the mesoscopic cortical layer and columnar organization that subserves visual orientation encoding in cats' primary visual cortex. The 9.4 Tesla fMRI and multiphoton optical imaging reveal the cortical layer-dependent orientation tuning property of hemodynamics response, reflected by vessel dilation and constriction. Dr. Cho will discuss the multimodal imaging (e.g., PET-MR) that bridges the gap of the dynamics between neurotransmitters (e.g., dopamine) and macroscopic brain networks; how the deficiency of neurotransmitters would impact brain and behaviors systematically. Overall, these findings and the integrated approach of different imaging modalities, behavioral assessment, and neuromodulation can characterize causal and correlational relationships in the hierarchical brain, providing a unique opportunity to understand the biological basis of cognition/behavior and neurologic/psychiatric disorders.

Tuesday, February 28, 2023

Upper Auditorium 3-7619

4:00 – 5:00 PM