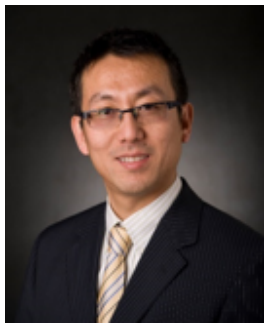
Stephenson School of Biomedical Engineering Seminar Series Presents

MANIPULATING AND MONITORING THE BRAIN NETWORK FUNCTION IN AWAKE RODENTS USING MULTI-MODAL APPROACHES



NANYIN ZHANG, PH.D

Professor
Department of Biomedical Engineering
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1:30 p.m.
Friday, August 30, 2019 | Carson Engineering Center, Rm. 438

BIO:

Dr. Nanyin Zhang is professor of Biomedical Engineering and Electrical Engineering at the Pennsylvania State University. His work has been focused on neuroimaging method and applications. His lab pioneered a novel resting -state fMRI method that allows the functional networks of the rat brain to be studied without any influences of anesthesia. Based on this method, Dr. Zhang's lab has established a platform that integrates fMRI, optogenetics, DREADDs, electrophysiology and behavioral methods in the same awake animal. This platform has made it possible to translate neuroimaging findings between animal models and human brain disorders. By utilizing this platform, his lab for the first time uncovered the organizational architecture of the brain network in awake rats, and revealed how this network organization was altered in different animal models of mental disorders including post-traumatic stress disorder and alcohol use disorder.

ABSTRACT:

A major challenge in research on the pathophysiology of brain disorders has been the difficulty to directly translate from human symptoms to animal models that have unique behavioral repertoire. The brain circuit function and connectivity, which has become accessible through the broad application of fMRI in humans, might provide a link between animal models and observations in humans with psychiatric disease. However, this task has been largely unsuccessful, primarily due to the confounding effects of anesthesia in most animal fMRI experiments. Our lab has established an approach that allows animal's brain circuit function to be examined at the awake state and investigation of the link between animal models and human pathophysiology for psychiatric disorders. This method can be combined with multiple cutting-edge neuroscience approaches including optogenetics, DREADDs and electrophysiology to manipulate and monitor brain-network function with multi-dimensional information.

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