JOHNS HOPKINS
BIOMEDICAL ENGINEERING

BME Seminar Series

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Date: **Monday, September 16, 2019**

Time: 1:30 pm

Location: Traylor 709, Talbot Room, East Baltimore
Video-teleconferenced, Clark Hall 110, Homewood

Faculty Host: Sri Sarma

Computational Markers for the Diagnosis and Treatment of Epilepsy

Abstract: The diagnosis and treatment of epilepsy relies on visual interpretation of electrophysiological data in the form of scalp electroencephalography (EEG) or, in preparation for epilepsy surgery, intracranial EEG. While thereis extensive knowledge of the visual appearance of EEG waveforms associated with epilepsy and seizures, these standard techniques are sometimes insufficient to make a definitive clinical recommendation. For example, following epilepsy surgery, roughly half of patients will fail to achieve seizure freedom, and 70-90% will remain on antiepileptic medications. This suggests that additional information is needed to accurately identify the seizure onset zone and choose a target for surgical removal. In such instances, computational analysis of human electrophysiological data presents an opportunity to develop novel markers of epilepsy to supplement standard visual analysis. These tools facilitate improvements in the diagnosis and treatment of epilepsy by providing objective metrics to aid clinical decision making and elucidating basic mechanisms of the underlying disease. Specifically, my lab has developed computational techniques for (1) Predicting and measuring treatment response using EEG-based functional connectivity in a type of pediatric epilepsy called infantile spasms, and (2) Improved localization of the seizure onset zone for epilepsy surgery planning using high frequency oscillations (80-500 Hz) in intracranial EEG. I will give an overview of these techniques and describe their potential to impact the clinical treatment of epilepsy.

Bio: Beth Lopour has been an Assistant Professor of Biomedical Engineering and Mechanical and Aerospace Engineering at the University of California, Irvine since 2013. She received her B.S. in Mechanical Engineering from Northwestern University in 2004 and her PhD in Mechanical Engineering from UC Berkeley in 2009, where her research focused on representations of sleep and epilepsy in a mean-field model of the human cortex. Dr. Lopour was then a UC President's Postdoctoral Fellow in Neurobiology at UCLA, studying single neuron recordings in the epileptic human brain. Since joining UCI, she has focused on signal processing techniques for both invasive and noninvasive human electrophysiological data, developing novel methods and computational markers to aid in the diagnosis and treatment of epilepsy. Her efforts were recently recognized by the American Epilepsy Society when she won the Junior Investigator Research Award.