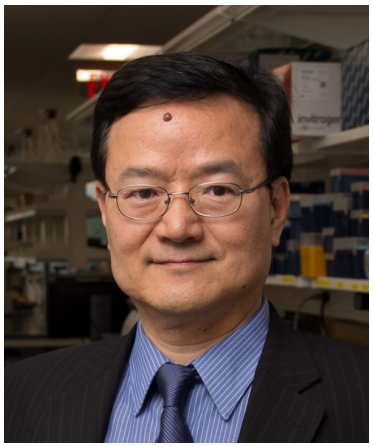
CARNEGIE MELLON UNIVERSITY
BME 2020 SUMMER SEMINAR SERIES

EEG-based Dynamic Brain Mapping and Brain-Computer Interface



PRESENTED BY

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SCHEDULE

Tuesday, June 16, 2020
(9:00 AM-10:00AM)

Brain activity is distributed over the 3-dimensional volume and evolves in time. Mapping dynamic brain activation with high spatial resolution and high temporal resolution is of great importance for understanding the brain functions and aiding in the clinical diagnosis and management of brain disorders. Electroencephalography (EEG) is a noninvasive technique to probe brain dynamics, and has been developed into a three-dimensional functional imaging modality for dynamic brain mapping. EEG has also played a significant role in our attempt to decode brain intention controlling a computer or device. This talk will consist of two parts: First, we will discuss the fundamental concepts of EEG and its relationship with the underlying brain activity, how EEG source imaging can offer a noninvasive window probing brain dynamics, and clinical applications to epilepsy source localization. Next, we will discuss the concepts and principles of EEG based brain-computer interface, and present our recent progresses in noninvasive brain-computer interface for controlling a virtual and physical object including flying a drone and controlling a robotic arm by “thought”. The presentation will feature the recent results from the group, and discuss challenges and opportunities of brain-computer interface, for aiding paralyzed patients as a medical technology, as well as the general population as a human-machine interface technology.

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