Comprehensive Research Experience for Medical Students
Summer Research Program 2018

Supervisor/Project Information Form
Due February 14 2018 by email to crems.programs@utoronto.ca

PLEASE SUBMIT IN WORD FORMAT ONLY. PDF will not be accepted

Supervisor Name: Taufik A. Valiante

Hospital/Research Institution: Krembil Research Institute (Toronto Western Hospital)

Email: Taufik.Valiante@uhn.ca

Field of Research (2 keywords): Neuromodulation, Epilepsy

Department: Fundamental Neurobiology

School of Graduate Studies Appointment (IMS, LMP, IHPME etc)? Yes/No: YES

If YES, please name: IBBME, Neurosurgery

Project Title: Intracranial Brain Computer Interface for Epilepsy

Brief Project Description (<300 words):
Epilepsy, characterized by recurrent epileptic seizures, is one of the most common neurological conditions in the world. Although a lot of patients suffering from epilepsy benefit from anti-epileptic drugs (AED), a significant portion of them fail to respond to AEDs. For these individuals, the most common curative treatment strategy is surgical resection of the epileptic foci, which is unfortunately accompanied by significant adverse effects such as memory loss. Alternative treatment strategies for these individuals, such as deep brain stimulation, are currently under investigation. We wish to investigate the applicability of intracortical brain computer interfaces (BCIs) in helping individuals with medically refractory epilepsy better control their seizures. The goal of this project will be to develop a BCI using MATLAB that can extract neural data in real time from a clinically used neural amplifier. This interface will then visually represent this data (as a cursor or an image) and the individual operating the BCI will be able to modulate this visual representation by modulating their own neural activity. This BCI will be used on individuals with epilepsy that are implanted with intracranial electrodes for seizure foci localization. An ideal candidate for this position will have plenty of experience with MATLAB and will have the ability to quickly learn APIs to interface with external devices such as neural amplifiers.