ALUMNI WEBINAR SERIES OF THE FACULTY OF ENGINEERING

MODELING DYNAMIC CEREBROVASCULAR REACTIVITY AND THE HEMODYNAMIC RESPONSE FUNCTION USING MULTIMODAL NEUROIMAGING MEASUREMENTS

Dr. Prokopis C. Prokopiou

Abstract: Over the last 30 years, blood oxygenation level-depend functional magnetic resonance imaging (BOLD-FMRI) has been the leading imaging technique for understanding brain function in health and disease. However, in addition to neuronal activation, the BOLD-fMRI signal is sensitive to changes in the partial pressure of carbon dioxide (CO2). Therefore, being able to dissociate the neuronal from the physiology effect on the BOLD-fMRI signal is important to improve the accuracy of brain functional activation analyses. In the first part of this talk I will present a methodological framework to investigate the regional characteristics of dynamic CO2 reactivity and the hemodynamic response to neuronal activation. In the second part, I will discuss how this framework can be used for imaging the brainstem neuromodulator nucleus locus coeruleus (LC). I will present results showing that lower LC function is associated with greater Alzheimer's disease (AD) pathology, as well as steeper cognitive decline, suggesting the promise of LC's functional properties as a gauge to identify individuals at risk for AD.

Mar 16, 6.00 PM

Live Webinar

University of Cyprus
Faculty of Engineering

Speaker

Prokopis C. Prokopiou

Prokopis was born in Nicosia, Cyprus. He received a B.Sc. degree in electrical engineering from the University of Cyprus in 2012. He then moved to Canada and received a M.Sc. degree in electrical engineering in 2014, and a Ph.D. degree in neuroscience in 2020, both from McGill University. Since February 2020, Prokopis is a post-doctoral fellow affiliated with the Department of Radiology and the Harvard Aging Brain Study at the Massachusetts General Hospital and Harvard Medical School. His research focuses on using multimodal neuroimaging measurements and developing advanced analysis tools to better understand (i) the underlying mechanisms between neuronal activity and cerebral blood flow (CBF) in cortical and subcortical structures in the brainstem and thalamus (neurovascular coupling), (ii) the influence of physiology (arterial CO2, respiration, cardiac activity) on CBF, and (iii) how these mechanisms change during aging and disease. Prokopis is also particularly interested in investigating these mechanisms in the brainstem nucleus locus coeruleus, the first brain region to be affected by Alzheimer disease pathology aiming to improve detecting early stages of the disease and promoting the development of more effective treatments.

To attend the Zoom meeting click here

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