UMaine CHB Distinguished Lecture Series

Microscopic Characterization of Disease Progression in the Living Brain

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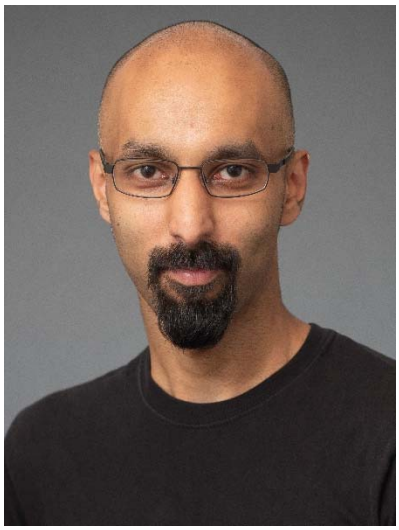
Friday, April 22nd, Noon

Soderberg Lecture Hall

To advance our knowledge of brain function and its disease-related alterations, it is vitally important to gain a more detailed understanding of cerebral blood flow and energy metabolism at the cellular and microvascular level. Impairments to mitochondrial function, cerebral oxygenation, and microvascular hemodynamics are early hallmarks for several debilitating neuropathologies. Investigating brain metabolism at a microscopic level is therefore essential for developing effective diagnostic and therapeutic techniques for brain disorders such as Alzheimer's disease, Parkinson's disease, and stroke.

I will discuss development and application of optical microscopy technologies to monitor cerebral energy metabolism and blood flow in preclinical rodent models. Optical measurements of phosphorescence lifetime from novel exogenous oxygen-sensing dyes, fluorescence lifetime of endogenous tissue constituents, and intrinsic tissue scattering enable minimally-invasive, high-resolution observations of cerebral oxygen partial pressure (pO2) and reduced nicotinamide adenine dinucleotide (NADH), and absolute blood flow, respectively. Measurements of these parameters will be presented from the rodent cortex under normal physiological conditions and during metabolic perturbations. These observations will ultimately lead to a deeper understanding of healthy brain function and its pathological changes.

Abbas Yaseen



Dr. Yaseen joined the Northeastern University Bioengineering Department in January, 2020. Prior to that, he obtained his doctorate in Bioengineering from Rice University and performed postdoctoral and junior faculty research at the Martinos Center for Biomedical Imaging at Massachusetts General Hospital. His research interests are in the areas of optical microscopy, brain energy metabolism, and neurodegenerative diseases. His recent work explores the effects of amyloid β on mitochondrial activity in a mouse model of Alzheimer's disease.