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SEMINAR NOTICE

Putting the aging brain under the microscope

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Friday, October 13, 2017
1:00 p.m. Room 507-509
Duff Medical Building, 3775 University St.

With age and disease, the vascular system degrades with large arteries both becoming more rigid and less responsive to hemodynamic stress while smaller vessels see connections and functional changes modifying their tissue footprint and their ability to deliver oxygen to tissues. Impaired oxygen delivery affects mostly the brain due to constant metabolic demand that needs to be met at every point in time to avoid damage. Understanding how brain oxygen delivery is modified by age and vascular diseases is essential to better characterize the role of vascular factors in brain damage. In this talk, we will present new microscopy tools that can be used to investigate these changes with unprecedented precision. Using two-photon phosphorescent lifetime and optical coherence tomography imaging in awake animals, age-dependent change in oxygen delivery and blood flow will be detailed including the first observation of micro-pockets of hypoxia in the cortex of otherwise healthy aged mice. We will then describe a computational framework by which this microscopic depiction can be used to predict macroscopic MRI signals linking microscopic and macroscopic spatial scales. Finally, we will show how this can be extended to the whole brain using ex-vivo serial 3D microscopic imaging to correlate detailed vascular and myelin content to MRI.