

Johns Hopkins University

Department of  
Chemical & Biomolecular Engineering

Fall 2022 Seminar Series

**Professor Roger Kamm**

**MIT**

Date: Thursday, November 10, 2022

Time: 10:30 a.m.

Mudd Hall 26

Zoom Meeting ID: 919 5918 2879

Passcode: 270887



**Title:** A Neurovascular Model for Alzheimer's Disease

**Abstract:** Alzheimer's Disease constitutes a current and growing problem for our aging population, and while recent drugs, both FDA-approved and ones at various stages of clinical trial, show promise, nothing is yet available with demonstrated efficacy in treating the underlying disease. Most current drugs in the pipeline have been developed by traditional methods using high-throughput screens and animal studies, without the benefit of relevant in vitro models. Several approaches are now being developed, however, with both organ-on-chip and organoid-based models that show considerable potential in recapitulating human neurological disease. Here we present a model consisting of a microvascular blood-brain barrier with barrier properties comparable to those measured in vivo, consisting of a co-culture of endothelial cells, pericytes and astrocytes. Extensions to the current model including a neural compartment with healthy neurons and ones modified to express elevated levels of amyloid beta and a meningeal lymphatic system will be presented. The model is evaluated based on transcriptomic and functional data and demonstrated to be useful for assessing therapeutic delivery across the blood-brain barrier, disease modeling and drug screening.

**Bio:** Roger Kamm is currently the Cecil and Ida Green Distinguished Professor of Biological and Mechanical Engineering at MIT, where he has served on the faculty since 1978. Kamm has long been instrumental in developing research activities at the interface of biology and mechanics, formerly in cell and molecular mechanics, and now in engineered living systems. Current interests focus on the development of models for healthy and diseased organ function using microfluidic technologies, with an emphasis on vascularization. Kamm has fostered biomechanics during his career as Chair of the US National Committee on Biomechanics (2006-2009) and of the World Council on Biomechanics (2006-2010). In 2014, Kamm co-chaired the World Congress of Biomechanics and currently directs the NSF Science and Technology Center on Emergent Behaviors of Integrated Cellular Systems. He is the 2010 recipient of the ASME Lissner Medal and the 2015 recipient of the ESB Hiskes Medal, both for lifetime achievements, and in 2018 was the inaugural recipient of the Nerem Medal for mentoring and education. He is a member of the National Academy of Medicine since 2010. Kamm is co-founder of two companies, Cardiovascular Technologies and AIM Biotech.