MathWorks® Weeks
at Northeastern University

Bio-related Applications

Friday, March 24, 2 - 3 pm

Register here: Bio-relatedApplications.eventbrite.com

Regulation of the cellular redox environment in the nematode C. elegans

Dr. Javier Apfeld: Biology Department, Northeastern

Bacteria, fungi, plants, and animals have long been known to excrete large quantities of hydrogen peroxide (H2O2) to attack their prey and pathogens. H2O2 is also a byproduct of aerobic respiration. The proteome wide shift in cysteine oxidation induced by changing H2O2 levels is now recognized a critical post-translational mechanism that rapidly and reversibly modulates a wide array of biological processes. While much is known about the intracellular pathways that oxidize cysteine, little is known about the intercellular pathways that determine the oxidation of cysteines in target tissues due to the technical difficulty of measuring oxidation non-destructively. In my talk, I will discuss how our innovations in live imaging of protein oxidation are enabling my lab to fill this critical gap in knowledge, which hinders understanding of how animals coordinate diverse cellular processes by regulating the oxidation of proteins via intercellular signaling.

Determining limb swelling during physical activity with wearable sensors

Dr. *Kris Dorsey: ECE Department, Northeastern*

The goal of this project is to investigate a wearable sensing system that will deliver information about fluid retention state. Information uncovered through this project will be critical to design systems that can detect and warn of fluid retention for disease treatment. We will describe progress towards a healthy subjects study using physical activity to safely induce swelling and in using datasets with MATLAB's Neural Network Fitting app to identify limb size and swelling state from wearable sensor measurements

Using AI to predict Toxicity in small molecules

Dr. Elvira Osuna-Highley: MathWorks

Machine Learning is rapidly becoming a standard tool in many fields, including in drug discovery and development. Every step in the drug discovery process accumulates costs. Early-stage toxicity determination is critical for minimizing cost and maximizing scientific efficiency. Using Machine Learning, we determined the toxicity of several small molecules with an accuracy of 81%. This method can increase efficiency and reduce costs in the drug discovery workflow.