NJIT New Jersey Institute of Technology | BME

Department of Biomedical Engineering

Graduate Seminar

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Department of Biomedical Engineering

College of Medicine

University of Arizona

Feb 17 (Friday)

11:30am - 1:00pm

CKB 303

Addressing Frailty and Fall in Older Adults: Integrating Biomechanics, Wearables, and Machine Learning

Abstract:

The human body is a complex adaptive mechanism and deficits in each physiological system and dysregulations between them lead to loss of resilience in the face of stressors, such as falls, diseases (e.g., COVID-19), as well as invasive treatments. The geriatric syndrome of frailty is defined as the lack of physiological reserves, which means older adults are unable to fully recover from stress events. The current research program focuses on establishing a new model for characterizing the loss of resilience as defined by the concept of frailty. This approach is based on measuring behaviors of multiple physiological systems in response to provocative stress testing (i.e., lab-based physical assessments), with a goal of modeling the actual real-life stress events (e.g., invasive therapy), using wearable sensors and non-invasive imaging techniques. The dominant symptom of frailty progression is muscle loss and weakness (sarcopenia and dynapenia), which in combination with cognitive impairments and deficits in cardiac autonomic control can compromise the response to stress. The function of three physiological systems of motor, cardiac, and brain are, therefore, targeted here. Inspired by mathematical approaches established for modeling interactions between complex ecosystems, we will characterize dynamic interactions between physiological systems in response to provocative testing.

About the Speaker

Dr. Toosizadeh achieved his PhD in Industrial and System Engineering Department at Virginia Tech in 2013 with a Human Factor focus. He continued as a Research Associate at the Departments of Surgery and Medicine at the University of Arizona for four years. He is currently a tenure-track Assistant Professor in the Department of Biomedical Engineering in the College of Engineering and the Division of Geriatrics, General Internal Medicine and Palliative Medicine in the College of Medicine, University of Arizona. He is an Aging and Cognition Fellow within the CDC-funded UA Healthy Brain Research Center and the NIH-funded Arizona Alzheimer's Consortium. Dr. Toosizadeh's research focus is computational model, sensor-based engineering approach, and machine learning tools to diagnose and treat older adults with aging-related conditions, focusing on frailty, cognitive impairment assessment and fall rehabilitation.