Joint Department of

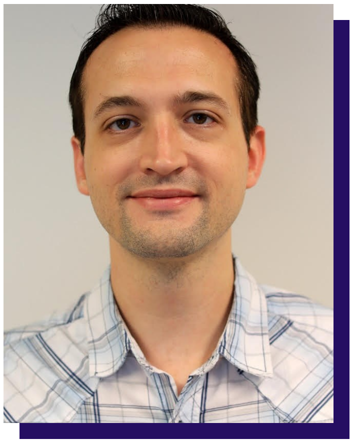
BIOMEDICAL ENGINEERING

UNC CHAPEL HILL | NC STATE UNIVERSITY

Coulter Seminar Series Presents

Rehabilitation Engineering

Data-Driven Control Strategies for Wearable Lower-Limb Robotic Systems



Aaron Young Ph.D.

Associate Professor

Woodruff School of Mechanical Engineering

Georgia Tech

Dr. Aaron Young is an Associate Professor and Woodruff Faculty Fellow in the Woodruff School of Mechanical Engineering at Georgia Tech and has directed the Exoskeleton and Prosthetic Intelligent Controls (EPIC) lab since 2016. Dr. Young received his MS and PhD degrees in Biomedical Engineering with a focus on neural and rehabilitation engineering from Northwestern University in 2011 and 2014 respectively. He received a BS degree in Biomedical Engineering from Purdue University in 2009. He also completed a post-doctoral fellowship at the University of Michigan in the Human Neuromechanics Lab working with lower limb exoskeletons and powered orthoses to augment human performance. His research area is in advanced control systems for robotic prosthetic and exoskeleton systems for humans with movement impairment. He combines machine learning, robotics, human biomechanics, and control systems to design wearable robots to improve the community mobility of individuals with walking disability. He has received an NIH New Innovator Award, NIH NCMRR New Investigator award and IEEE New Faces of Engineering award, and his EPIC lab group recently won the International VIP Consortium Innovation Competition.

ABSTRACT New advanced wearable exosuits are capable of restoring function to individuals in the older adult population by reducing the metabolic cost of walking and restoring normative biomechanics. An important function of these devices is to timely and accurately recognize user intent and optimize the control to provide biomechanically appropriate assistance across multimodal task paradigms, especially during balance-impaired situations. Key challenges in the wearable robotics control community include generalizing control systems across a rich variety of real-world tasks and diverse individuals while simultaneously personalizing control systems to each individual's specific set of biomechanical needs. Our research has focused on data-driven approaches using deep learning to tackle these challenges with applications in lower limb wearable robotics. This talk will examine approaches for AI-driven personalization of controllers to unique subjects and generalizing controllers across a rich variety of real-world tasks. New open-source datasets that we have generated to facilitate research in this area will also be briefly discussed.

CLEAR Core

Closed Loop Engineering for Advanced Rehabilitation

http://clear.bme.unc.edu

Friday, February 2nd @ 12:00 Noon

Presented from: 4142 Engineering Bldg 3—NCSU

Video conferenced to

3116 Mary Ellen Jones (UNC) & ECU