COLLEGE OF ENGINEERING, COMPUTER SCIENCE, & TECHNOLOGY

Seminar in Interdisciplinary STEM Research

November 21st – Thursday, 3:05-4:20 PM PST

Location: E&T C-256

HOSTED BY CREST-CATSUS AND SIKAND SITI CENTERS



Jonathan Realmuto, PhD

Assistant Professor at University of California, Riverside

Jonathan Realmuto is an assistant professor in the department of mechanical engineering at the University of California, Riverside and a visiting scientist at Children's Hospital Orange County. Together with his research group, the Bionic Systems Laboratory, he designs, builds, and experimentally test wearable and assistive robots, neuroprostheses, and collaborative robots. He completed his PhD at the University of Washington in 2017, and was a postdoc at the University of Southern, California, and briefly, at the University of California, Irvine.

Advancing wearable robots through soft actuation and neuromorphic control

Abstract: Wearable robots offer a tremendous opportunity to enhance the quality of life of individuals with mobility impairments. Examples include bionic prostheses for limb replacement after amputation or movement assisting exosuits for people with spinal cord injury. Such technologies restore or supplement motor function through mechanical interactions between human users and body-mounted robots. However, fundamental challenges that are not encountered in traditionally engineered systems limit the capabilities of current devices. For one, human-robot-environment interactions make control and perception challenging. Moreover, strict constraints on the physical embodiment of wearable robots complicate device design. In this talk, I will highlight my work tackling these challenges. Using my research on a fabric-based pneumatically actuated robots, I will highlight design and fabrication techniques, and outline a bio-inspired reflex controller. I will share results from human subjects experiments evaluating movement assistance, which show that a significant reduction in users' effort can be achieved with the proposed wearable robot and control methodology.

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