NJIT New Jersey Institute of Technology

BME

Department of Biomedical Engineering
Graduate Seminar

Date	Location	Time
Friday, November 15th	Central King Building (CKB 303)	11:45 AM

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Virtual Reality and Instrumented Interfaces for User-Device Integration in Rehabilitation

Abstract:
Virtual reality (VR) environments and flexible instrumentation allow for user-device interfaces to be highly customized to specific persons and conditions. Individuals with movement disabilities following neuromuscular traumas such as spinal cord injury, brain damage, or amputation often undergo physical therapy to restore functional abilities in performing activities of daily living. Physical therapy methods that are cognitively and physically engaging and facilitate personalized approaches have greater likelihood of success in terms of improved capabilities and clinical retention. Finding effective ways to integrate each user to an assistive device or rehabilitation protocol would be valuable. In this talk, I will describe approaches that our laboratory is currently developing to better integrate users and devices for rehabilitation after neuromuscular traumas. Our long-term objective is to develop cognitive-based interfaces that generate higher user agency over an assistive device and to accelerate rehabilitation gains. Currently, we are investigating two main pathways: (1) how varied operation of virtual devices affect sense of agency and related functional performance, and (2) how the nature of sensory feedback may promote movement consistency to be leveraged for better myoelectric device control. I will present our initial findings in three areas: (1) positively correlating agency and performance for force and motion tasks, (2) creating device interfaces that use sensory feedback to induce greater agency, (3) developing a rehabilitation platform using multi-sensory feedback to train muscle control abilities. Our future application of these methods is intended for neuroprostheses and powered exoskeletons after spinal cord injury, sensorimotor prostheses after amputation, and increasing independent function following neural trauma.

Light refreshments will be served.