

BIOENGINEERING SEMINAR

FALL 2023

Wearable Robotics for Pediatric Neurorehabilitation

Abstract

The Neurorobotics Research Group at the NIH Clinical Center integrates robotics and neural interfacing to create novel approaches for the study and treatment of movement disorders, with a particular emphasis on pediatric populations. A recent focus has been on exoskeletons for gait training, and this talk will highlight key advances in this effort to develop a wearable device to enhance mobility and improve walking function in children. This will include discussion of the design and implementation of control strategies which govern the human-robot interaction and their clinical evaluation in children with cerebral palsy and spina bifida, including results from our ongoing clinical trial of extended training outside the clinical environment. We will also discuss novel approaches to studying the effects of wearable devices on the control of movement, including the use of mobile neuroimaging, as part of a multi-modal approach to developing and optimizing innovative neurorehabilitation paradigms. This work will be explored in the context of other relevant advances to discuss future directions for improving functional recovery in individuals with neurological disorders.

Biography

Thomas C. Bulea is a tenure track investigator in the Rehabilitation Medicine Department at the NIH Clinical Center where he directs the Neurorobotics Research Group. Dr. Bulea received his B.S. in mechanical engineering from The Ohio State University and his M.S. and Ph.D. in biomedical engineering from Case Western Reserve University, where his research focused on development of neuroprostheses to restore mobility in individuals with paralysis. He completed a post-doctoral fellowship at the National Institutes of Health and a visiting post-doctoral fellowship at the University of Houston, both focused on the use of electroencephalography (EEG) to study cortical activation patterns relating to standing and walking function. His research focuses on developing novel neural interfacing and device-based approaches to the study and treatment of movement disorders. Dr. Bulea also serves as an Associate Editor of *Wearable Technologies* and *IEEE Transactions on Neural Systems and Rehabilitation Engineering*.



Thomas Bulea, PhD

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**Thursday, November 30
12:00-1:00 pm**

Fairfax Campus:
Horizon Hall, Rm 1010

Live streaming to SciTech
Campus: KJH 246