



## Mechanical Engineering Seminar Series

# Biomechanical Analyses of Human Movement Aimed at Improving Rehabilitation Outcomes

## Rick Neptune

*Chair, Walker Department of Mechanical Engineering  
John T. MacGuire Professor in Mechanical Engineering*

The University of Texas at Austin



Tuesday, March 23, 2021

4:00 p.m.

[ME Seminar Zoom link](#) (QR Code below)

Password 121814



### Abstract

The human neuromusculoskeletal system is exceedingly complex due to highly nonlinear multi-body dynamics and musculotendon actuators, and redundant muscle control that isn't well understood. As a result, gaining insight into normal and pathological movement remains a challenge due to the extremely difficult task of identifying causal relationships between muscle force development and resulting movement dynamics. This talk will discuss how we are using experimental and modeling and simulation techniques to gain insight into the biomechanics and neuromotor control of human movement with the goal to improve rehabilitation outcomes for those with movement disabilities. Specifically, we will look at how biomechanical analyses of specific movement tasks can give insight into how individual muscles contribute to specific biomechanical functions such as providing body support, forward propulsion and balance control and how clinical interventions influence the performance of these functions.

### Bio

Dr. Richard R. Neptune earned his Ph.D. in Mechanical Engineering from the University of California, Davis and has served on the Department of Mechanical Engineering faculty at UT Austin since 2001. His research integrates musculoskeletal modeling, computer simulation and experimental analyses to identify the neuromotor and biomechanical mechanisms that contribute to locomotor impairments in those with movement disabilities. His research also seeks to improve the performance of orthotic and prosthetic devices using design optimization and advanced additive manufacturing techniques. He has received a number of awards for his teaching and research including the CAREER award from the National Science Foundation, the Lockheed Martin Aeronautics Company Award for Excellence in Engineering Teaching, the Van C. Mow Medal from the American Society of Mechanical Engineers, and the Founders Award from the American Society of Biomechanics. He is a fellow of the American Society of Biomechanics and the American Society of Mechanical Engineers. He is currently the Chair of the Walker Department of Mechanical Engineering and holds the John T. MacGuire Professorship in Mechanical Engineering.

Karen Brown [karenar@umich.edu](mailto:karenar@umich.edu)

[ME Seminar Series](#)

Arbor, MI 48109-2125

[Unsubscribe {recipient's email}](#)

[Update Profile](#) | [About our service provider](#)

Sent by karenar@umich.edu