



Aerospace & Mechanical Engineering

University of Notre Dame

TUESDAY, AUGUST 27, 2013, 3:30 P.M.
LOWER LEVEL AUDITORIUM, GEDDES HALL

Reanimating the Paralyzed Arms of People with Spinal Cord Injuries with Functional Electrical Stimulation

Mr. Eric Schearer

*Department of Mechanical Engineering
Northwestern University*



Functional electrical stimulation (FES) is a method to restore lost function to persons with paralysis. Electrical stimulation of muscles causes muscle contraction which induces skeletal movements. Although FES has had success in some applications, there remain many challenges. Among these challenges is exploiting the full capability of the musculoskeletal system to perform a wide range of tasks. Complex movements such as reaching require the coordination of multiple muscles acting across multiple joints of the skeletal system.

Although controlling multiple muscles with FES potentially provides flexible motor control, that potential has not yet been fully realized. Control of joint movements with FES has largely focused either on single joint movements or on tuning stimulations for stereotyped motions of multiple joints.

I am developing techniques to identify subject-specific models of the FES-controlled arm to unlock the potential of the musculoskeletal system. Identifying the dynamics of the human arm has been elusive because the space to explore is large and many parameters that are used in computer models are not identifiable without removing the muscles from the body. The identification technique combines the flexibility of a black-box function approximator with prior knowledge of the arm dynamics encoded in a parameterized model. The subject-specific model of the arm allows for feedforward control of reaching motions.

Refreshments served at 3:00 p.m. in the Geddes Hall Coffee House

If you are interested in meeting individually with Mr. Schearer, please contact Linda at 631-5431.