

## “A control systems perspective of human motor control”

**Dr. Daniel Ludvig**  
**Research Assistant Professor**  
**Department of Physical Medicine & Rehabilitation**  
**Northwestern University**  
**Sensory Motor Performance Program**  
**Rehabilitation Institute of Chicago**

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**LECTURE: 9:00 AM - 10:00 AM**  
**ENGINEERING CENTER**  
**ROOM EC 2300**



### **Abstract:**

Proper control of movement and posture is essential in every day human life. For most, this motor control is effortless and automatic and taken for granted; however, the complexity and importance of this control system is very apparent when dealing with people suffering from neuromuscular disabilities. Stroke survivors display poor postural control and difficulty generating coordinated movements; spinal cord injury survivors lack the ability to control their limbs; amputees have limited control of their prosthetic limbs. The broad objective of my research is to gain a fuller understanding of the control systems human use to generate natural movements and to maintain posture. I will present research from a number of studies that modeled the contributions of different mechanisms to both the control of posture and movement. More specifically, I will present results that demonstrate how reflexes can be independently controlled as mean of postural control as well as the surprising behavior of our joint mechanics during movement. These results are a small part of generating a detailed understanding of the human control system, which will be of great value in helping rehabilitate stroke survivors, designing control systems to allow spinal cord injury survivors and amputees regain control of their limbs and prostheses respectively as well as allowing for the design of more natural biomimetic robotic systems.

**Biography** Daniel Ludvig is an engineer/scientist studying how people control their movements. He began his academic career studying for a B.Sc. degree in Physiology and Physics at McGill University, Montreal, Qc, which he received in 2003. Following his undergraduate degree, he pursued M.Eng and Ph.D degrees in Biomedical Engineering at McGill University, which he received in in 2005 and 2010 respectively. Following receiving his Ph.D. he pursued a Postdoctoral Fellowship in the Sensory Motor Performance Program at the Rehabilitation Institute of Chicago, Chicago, IL. He is currently a Research Assistant Professor with Department of Physical Medicine & Rehabilitation and a Research Affiliate with the Department of Biomedical Engineering, both at Northwestern University, Chicago, IL. He also acts as a Research Consultant for the Institut de Recherche Robert-Sauve en Sante et Securite du Travail, Montreal, Quebec, Canada. His research interests include the use of system identification in investigating human motor control systems. In particular, his research involves modeling how humans maintain posture and control movements of their limbs. Dr. Ludvig is a member of the IEEE Engineering in Medicine and Biology Society and the Society for Neuroscience.

**Contact:** [bmeinfo@fiu.edu](mailto:bmeinfo@fiu.edu); 305-348-6717

**Map:** <http://campusmaps.fiu.edu/Engineering Center>