

Jacob Graves McPherson

Email: jacob-mcpherson@northwestern.edu
Office phone: 312.503.1585
Mobile phone: 919.606.8604

*Depts of Biomedical Engineering, Physical
Therapy and Human Movement Sciences*
Northwestern University
645 N Michigan Ave, Suite 1100
Chicago, IL 60611

EDUCATION

September 2005 – present **Northwestern University**, Evanston, IL.
Ph.D. in Biomedical Engineering, in progress
M.S. in Biomedical Engineering, December 2008
Thesis: Evidence for increased expression of persistent inward currents in individuals with chronic hemiparetic stroke.
Thesis Committee: Julius PA Dewald, PT, PhD (chair); Charles J Heckman, PhD; Eric J Perreault, PhD; Matthew Tresch, PhD

August 2001 – May 2005 **The University of North Carolina**, Chapel Hill, NC.
B.S. in Applied and Materials Sciences, Biomedical Engineering,
May 2005

DISSERTATION RESEARCH

“The neurophysiological basis of reflex exaggeration and the loss of independent joint control in individuals with chronic hemiparetic stroke.”

Dissertation Committee: Julius PA Dewald, PT, PhD (chair); Charles J Heckman, PhD; Eric Perreault, PhD; Matthew Tresch, PhD

RESEARCH AND TEACHING EXPERIENCE

September 2005 – present **Graduate Research Assistant**
Northwestern University, *Departments of Biomedical Engineering,
Physical Therapy and Human Movement Sciences*
Advisor: Dr. Julius PA Dewald, PT, PhD
Researching the neurophysiological mechanisms underlying the expression of reflex alteration and the loss of independent joint control in individuals with chronic hemiparetic stroke; current investigations combine robotics and quantitative engineering approaches with neuropharmacological interventions in human participants.

August 2008 – present

Synthesis Project Advisor

Northwestern University, *Department of Physical Therapy and Human Movement Sciences*

Advising a group of Doctor of Physical Therapy students on a two year research project investigating the neurophysiological basis of reflex abnormalities in individuals with spastic-hemiparetic cerebral palsy

Winter 2009

Teaching Assistant, PHYS_TH 513-1: Neuroscience I

Northwestern University, *Department of Physical Therapy and Human Movement Sciences*

Responsible for lab portion of the course, instructing Doctor of Physical Therapy students on the proper dissection of the human brain and identification of human neuroanatomical structures

Winter 2009

Teaching Assistant, NUIN 441: Biophysical Signal Processing for Movement and Rehabilitation Sciences

Northwestern University, *Northwestern University Interdepartmental Neuroscience Program*

Responsible for teaching fundamental aspects of human biomechanics including kinematics and kinetics and responsible for teaching temporal and frequency domain signal processing techniques. Also teach students how to use Matlab to implement theoretical concepts and apply them to analysis of real and simulated data.

Fall 2006

Teaching Assistant, BME 271: Introduction to Biomechanics

Northwestern University, *Department of Biomedical Engineering*

Responsible for teaching human biomechanics to senior-level undergraduate students. Led discussion section for course, graded homework and exams.

August 2006 – June 2008

Synthesis Project Advisor

Northwestern University, *Department of Physical Therapy and Human Movement Sciences*

Advising a group of Doctor of Physical Therapy students on a two year research project investigating the neurophysiological basis of reflex abnormalities in individuals with spastic-hemiparetic cerebral palsy

May 2004 – August 2004

Undergraduate Rehabilitation Research Intern

The University of North Carolina at Chapel Hill, *Department of Biomedical Engineering*

Advisor: Dr. Richard Goldberg, PhD

Responsible for collaborating with physical and occupational therapists and special education teachers in an elementary school setting to identify the classroom needs of children with cerebral palsy. Subsequently responsible for designing, fabricating and implementing novel rehabilitation devices to facilitate the ability of children with cerebral palsy to interact with peers in the classroom.

Spring 2004

Teaching Assistant, PHYS 102/352: Digital Electronics, Electronics 2

The University of North Carolina at Chapel Hill, *Departments of Physics and Astronomy, Applied and Materials Sciences, and Biomedical Engineering*

Responsible for teaching the lab component of course to junior and senior level students, involved in teaching students how to construct digital electronic circuits including gates, flip flops and counters as well as data acquisition and filtering techniques. Also taught students to use the LabVIEW programming language.

Spring 2003

Undergraduate Research Assistant

The University of North Carolina at Chapel Hill, *Departments of Biomedical Engineering and Physics and Astronomy*; North Carolina State University College of Veterinary Medicine, *Department of Clinical Sciences*

Advisors: Dr. Hugon J Karwowski, PhD; Dr. Simon Roe, BVSc, PhD, Dip. ACVS

Developed a portable device capable of measuring the forces applied to tissue during suture tying, to be used as a training tool for surgical residents.

HONORS AND AWARDS

Summer 2004

Summer Undergraduate Research Fellowship, The Office of Undergraduate Research, The Smallwood Foundation and the Kauffman Foundation, The University of North Carolina at Chapel Hill, Chapel Hill, NC.

Fall 2002 – Spring 2005

Dean's List, The University of North Carolina at Chapel Hill, Chapel Hill, NC

PUBLICATIONS AND CONFERENCE PRESENTATIONS

Publications

2008

McPherson JG, Ellis MD, Heckman CJ, Dewald JPA (2008). Evidence of increased activation of persistent inward currents in

individuals with chronic hemiparetic stroke. *Journal of Neurophysiology*, 100: 3236-3243.

Conference Presentations

January 2009

American Academy of Cerebral Palsy and Developmental Medicine Annual Meeting, Scottsdale, AZ, platform presentation (submitted). **McPherson, JG**, Ellis MD, Arasniewicz M, Bronner R, Terpin S, Van Tiem C, Vessey L, Dewald JPA (2009). “Self-sustained firing in motoneurons of the paretic upper extremity: preliminary evidence for increased bulbospinal monoaminergic drive in children with Spastic-Hemiparetic Cerebral Palsy.”

September 2008

Annual Biomedical Engineering Research Day, Evanston, IL, poster presentation. **McPherson JG**, Ellis MD, Heckman CJ, Dewald, JPA (2008). “Evidence for increased activation of persistent inward currents in patients with chronic hemiparetic stroke.”

June 2008

Mechanisms of Plasticity and Disease in Motoneurons, Seattle, WA, platform presentation. **McPherson JG**, Ellis MD, Heckman CJ, Dewald JPA (2008). “Enhanced tonic vibration reflexes in individuals with chronic hemiparetic stroke.”

March 2008

4th Annual Lewis Landsberg Research Day, Chicago, IL, poster presentation. **McPherson JG**, Ellis MD, Heckman CJ, Dewald JPA (2008). “Plateau potentials and self-sustained motoneuron firing as evidence for increased bulbospinal monoaminergic drive in patients with chronic stroke.”

November 2007

Society for Neuroscience Annual Meeting, San Diego, CA, poster presentation. **McPherson JG**, Ellis MD, Heckman CJ, Dewald JPA (2007). “Bistable motoneuron behavior as indicator of increased bulbospinal monoaminergic drive following stroke.”

November 2004

Triangle Undergraduate Research Symposium, Raleigh, NC, poster presentation. **McPherson JG**, Whittaker J, Goldberg R (2004). “Switch-activated, microprocessor-regulated lazy susan device for children with severe and profound disabilities.”

ACADEMIC SERVICE AND LEADERSHIP

February 2008 – present

Biomedical Engineering Graduate Student Association, Northwestern University, Evanston, IL: co-president.

WORK EXPERIENCE

May 2005 – September 2005

Mechanical Engineer

Altec Industries, Creedmoor, NC.

Part of research and development team, responsible for designing control algorithms and instrumenting pre-production hydraulic aerial lift devices for cyclical failure analysis; also responsible for data analysis.

RELEVANT SKILLS

Microsoft Office suite (Word, Excel, PowerPoint), Matlab, LabVIEW, C/C++, Visual Basic for Applications (VBA), machine assembly language, DataDesk, SPSS, GraphPad Prism, Adobe Creative suite.