

Laura Crego Miller

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EDUCATION

Sept 2006 – Present **Northwestern University**, Evanston, IL
Ph.D. in Biomedical Engineering, in progress
M.S. in Biomedical Engineering, in progress

Masters Thesis: *Finger/wrist flexion forces and EMG increase as a function of shoulder abduction loading and reach in chronic hemiparetic stroke: implications for an increased influence of bulbospinal pathways to the distal upper extremity*

Thesis Committee: Julius P.A. Dewald, P.T., Ph.D. (chair); Todd Kuiken, M.D., Ph.D.; Lee Miller, Ph.D.; Eric J. Perreault, Ph.D.; Michael Peshkin, Ph.D.

Aug 2002 – May 2006 **Vanderbilt University**, Nashville, TN
B.E. in Biomedical Engineering; Minor in Neuroscience

RESEARCH AND TEACHING EXPERIENCE

Sept 2006 – Present **Graduate Research Assistant**
Northwestern University, *Depts of Biomedical Engineering and Physical Therapy and Human Movement Sciences*
Advisor: Julius P.A. Dewald, P.T., Ph.D.

Spring 2009 **Teaching Assistant**, Neuroanatomy Lab
Northwestern University, *Dept of Medicine*
Instructed medical students on the identification of neuroanatomical structures and proper dissection techniques during dissection of the human brain

Winter 2009 **Teaching Assistant**, Neuroanatomy Lab
Northwestern University, *Dept of Physical Therapy and Human Movement Sciences*
Instructed Doctor of Physical Therapy students on the identification of neuroanatomical structures and proper dissection techniques during dissection of the human brain

Winter 2009 **Teaching Assistant**, NUIN 441: Biophysical Signal Processing for Movement and Rehabilitation Sciences
Northwestern University, *Interdepartmental Neuroscience Program*
Taught graduate students how to implement time and frequency domain signal processing and digital filtering techniques in Matlab.

Spring 2007 **Teaching Assistant**, BME 403: Advanced Systems Physiology

Northwestern University, *Dept of Biomedical Engineering*
Led discussion section, graded homework and exams, held study sessions and office hours.

Aug 2003 – Oct 2005 **Data Analyst and Research Assistant**
Vanderbilt Medical Center, *Autonomic Dysfunction Center*
Advisors: David Robertson, M.D. and Nancy Keller, Ph.D.

Responsibilities: Analyzed collected blood pressure, heart rate, ECG, and nerve activity data using MATLAB, Excel, Windaq, PV-Wave, DataSciences, EMKA software and spectral analysis techniques. Helped conduct behavioral tests on mice.

Independent project—Spring 2005: “Blood Pressure and Heart Rate Variability in Norepinephrine Transporter Deficient Mice When Placed Into a Fear-Inducing Environment.” Developed poster, paper, and presentation.

May 2005 – Aug 2005 **Summer Internships in Neural Engineering (SINE) Research Intern**
Rehabilitation Institute of Chicago, *Sensory Motor Performance Program*
Northwestern University, *Dept of Physical Therapy and Human Movement Sciences*
Advisors: Julius P.A. Dewald, P.T., Ph.D. and Jun Yao, Ph.D.

Responsibilities: Performed signal coherence analysis and processing of human electroencephalogram (EEG) and electromyogram (EMG) data collected from stroke subjects and healthy controls. Helped to perform EEG/EMG collection during isometric torque generation experiments. Developed poster and paper: “Corticomuscular Coherence During Shoulder/Elbow Torque Generation in Chronic Hemiparetic Stroke.”

May 2003 – Aug 2003 **Program for Women in Science and Engineering (PWISE) Research Intern**
Iowa State University, *Dept. of Chemical Engineering*
Advisor: Balaji Narasimhan, Ph.D.

Responsibilities: Fabricated protein-loaded polyanhydride microspheres and performed in vitro release studies. Analyzed samples with an ELISA and investigated multiple fabrication variables. Developed poster, paper, and presentation. Research Topic: “A Study of Brain-Derived Neurotropic Factor Released In-Vitro from Biodegradable Polyanhydride Microspheres.”

HONORS/AWARDS

May 2006 Finalist for the Arnold Palmer Senior Design Project Prize, College of Engineering, Vanderbilt University

Mar 2005 The National Dean’s List

Feb 2003 Gamma Beta Phi Honor Society, Feb 2003
Phi Eta Sigma/Alpha Lambda Delta Freshman Honor Societies, Feb 2003

Fall 2002 Vanderbilt University Dean’s List, High Honors, Fall 2002

Spring 2002

Who's Who Among American High School Students, 2002

BME DESIGN EXPERIENCE

- Fall 2005-Spring 2006 *Senior Design Project: Non-invasive Continuous Blood Pressure Measurement Device for Mice (Fall 2005/Spring 2006, Vanderbilt University):* With Andrew McClellan, developed a system to non-invasively record continuous blood pressure measurements in the mouse using a tail cuff photo sensor. Developed poster, paper, and oral presentation. Finalist for the Arnold Palmer Senior Design Project Prize. Mentor: André Diedrich, M.D., Ph.D.
- Spring 2005 *Biomedical Instrumentation Course (Spring 2005, Vanderbilt University):* Designed and built a force plate using strain gauges and a Wheatstone Bridge circuit design.
- Spring 2002 *Introduction to Computing in Engineering (Spring 2002, Vanderbilt University):* Developed a MATLAB program to quantify the volume of affected brain regions in Multiple Sclerosis patients using MRI data.

PUBLICATIONS

- 2009 **Miller LC**, Ruiz Torres R, Stienen AHA, Dewald JPA. A wrist and finger force sensor module for use during movements of the upper limb in chronic hemiparetic stroke. *IEEE Trans Biomed Eng.* 2009; 56(9).
- 2006 Keller NR, Diedrich A, Appalsamy M, **Miller LC**, et al. Norepinephrine transporter-deficient mice respond to anxiety producing and fearful environments with bradycardia and hypotension. *Neuroscience.* 2006;139(3):931-46.

CONFERENCE PRESENTATIONS

- October 2009 **Society for Neuroscience Annual Meeting**, Chicago, IL, poster presentation. **Miller LC**, Dewald JPA. "Finger/wrist flexor and biceps activity increase as a function of limb loading and reach in chronic hemiparetic stroke."
- June 2009 **Robotics: Science and Systems Conference Workshop: Understanding the Human Hand for Advancing Robotic Manipulation**, Seattle, WA, poster presentation. **Miller LC**, Dewald JPA. "Wrist/finger flexion forces and EMG as a function of shoulder abduction loading in chronic hemiparetic stroke."
- April 2009 **Feinberg School of Medicine 5th Annual Lewis Landsberg Research Day**, Chicago, IL, poster presentation. **Miller LC**, Dewald JPA. "Quantification of finger/wrist flexion forces as a function of limb loading in chronic hemiparetic stroke and the effects of finger/wrist extensor stimulation."

- November 2008 **Society for Neuroscience Annual Meeting**, Washington, DC, poster presentation.
Miller LC, Dewald JPA. “Quantification of finger/wrist flexion forces as a function of limb loading in chronic hemiparetic stroke and the effects of finger/wrist extensor stimulation.”
- September 2008 **Annual Biomedical Engineering Research Day**, Evanston, IL, poster presentation.
Miller LC, Wieser M, Keller T, Dewald JPA. “Quantification of finger/wrist flexion forces as a function of limb loading in chronic hemiparetic stroke and the effects of finger/wrist extensor stimulation.”
- October 2004 **BIRCWH Scholars Meeting**, Bethesda, MD, poster presentation.
Keller NR, Diedrich A, Appalsamy M, Lonce S, Finney C, Tuntrakool S, **Miller LC**, Robertson D. “NET knockout mice exhibit bradycardia and reduced blood pressure in response to fear.”

MANUSCRIPTS REVIEWED

- Feb 2008 *Experimental Brain Research*
Journal of Child Neurology

LEADERSHIP/ACTIVITIES/SERVICE

- Feb 2008-Present *Communications Chair, Biomedical Engineering Graduate Society, Northwestern University.* Manage website and group communications.
- Nov 2006-Feb 2008 *Vice President: Treasury, Biomedical Engineering Graduate Society, Northwestern University.* Managed funds and fundraising opportunities.
- Jan 2005-Feb 2006 *Vice President for Finance, Delta Gamma Fraternity, Vanderbilt University.* Constructed fraternity budget (\$135,000), managed and allocated fraternity funds. Served on executive fraternity panel and house corporation committee.
- Jan 2003-Jan 2004 *Director of Alumnae Relations, Delta Gamma Fraternity, Vanderbilt University.* Organized events and relations with fraternity alumnae.
- 2003-2006 *Delta Gamma Fraternity, Eta Epsilon Chapter, Vanderbilt University.* Active membership including participation in service activities for the Tennessee School for the Blind and Service for Sight.
- Spring 2004 *Greeks Advocating the Mature Management of Alcohol (GAMMA), Vanderbilt University.* Appointed representative. Helped organize campus speakers and events to promote mature alcohol management.
- 2003-2006 *Gamma Beta Phi Honor Society.* Active membership, including service in the Nashville area Vanderbilt campus.

1999-2002 *Appalachia Service Project in Virginia, Tennessee, and Kentucky.* One week annual project to repaired homes for impoverished community residents. 1999-2002

RELEVANT SKILLS

Microsoft Office (Word, Excel, PowerPoint, Outlook, Windows Movie Maker), MATLAB, SPSS, GraphPad Prism, Stata, DataSciences, EMKA, PV-Wave, Windaq, NI LabView, Adobe Creative Suite

INTERNATIONAL EXPERIENCE

Traveled in Austria, England, France, Italy, The Netherlands, Switzerland, Wales, United Arab Emirates, Guatemala, Mexico. 1994, 1996, 1998-2002, 2007
Attended Stoke Hill Middle School, Exeter, England, Spring 1994.

OTHER EMPLOYMENT

2002 Clerical Assistant, John F. Kennedy Center for Human Development, Nashville, TN.
2001-2002 Cashier and Guest Services, Target, Ames, IA, 2001-2002
2000-2002 Web page designer, Drake University, Des Moines, IA, 2000-2002