

**JAMES S. SULZER**  
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## CURRICULUM VITAE

### EDUCATION

**Northwestern University** EVANSTON, IL  
PhD in Mechanical Engineering, Projected Completion: September 2009

**Northwestern University** EVANSTON, IL  
Master of Science in Mechanical Engineering, April 2006  
Thesis title: Moment Arm Manipulation of a Cable-Driven Joint

**The Ohio State University** COLUMBUS, OH  
Bachelor of Science in Mechanical Engineering, *summa cum laude* with distinction, December 2002  
Thesis title: Simulating Head Trauma using MADYMO

### RESEARCH EXPERIENCE

**Rehabilitation Institute of Chicago and Laboratory for Intelligent Mechanical Systems**  
NORTHWESTERN UNIVERSITY (2006 TO PRESENT)

- Exploring the effects of knee flexion torque assistance at the knee during gait in people with Stiff-Knee Gait
- Designed and constructed novel, lightweight knee actuator, and using it for experiments at RIC
- Advised by Jim Patton (RIC) and Michael Peshkin (LIMS)
- Funded by American Heart Association Predoctoral Fellowship (2006-08) and U.S. Department of Veterans Affairs Predoctoral Fellowship (2008-09)

**Rehabilitation Institute of Chicago and Laboratory for Intelligent Mechanical Systems**  
NORTHWESTERN UNIVERSITY (2004 TO 2006)

- Designed and built an exotendon-driven robot for exerting joint torque known as MARIONET (Moment arm Adjustment for Remote Induction Of Net Effective Torque)
- Applications of this Masters project include rehabilitation and assistive devices
- Funded by NIH T32 Predoctoral Training Grant (2004-2006)

**Rehabilitation Institute of Chicago** NORTHWESTERN UNIVERSITY (SUMMER 2003)

- Intern for Dr. Larry Zhang in the Biomechanics Laboratory
- Modified actuated arm stretcher and developed control algorithm

**Dennis Guenther Lab** THE OHIO STATE UNIVERSITY (2002)

- Used a dynamic modeling program, MADYMO, to model head trauma

**John Deere** THE OHIO STATE UNIVERSITY (AUTUMN 2001- SPRING 2002)

- Worked in a team to develop novel methods of measuring air entrainment in hydraulic fluid

## **Peter Reiser Lab** THE OHIO STATE UNIVERSITY (WINTER 2001 - SPRING 2001)

- Carried out experiments analyzing ADP hydrolysis in avian skeletal muscle fibers

## INDUSTRIAL EXPERIENCE

### **Nottingham-Spirk Design Associates** CLEVELAND, OH (SUMMER 2002)

- Intern at consumer product development firm
- Involved in both testing and design of products

### **Sargent & Lundy, LLC** CHICAGO, IL (SUMMER 2001)

- Intern for international power plant design firm
- Modified piping and instrumentation diagrams using Microstation

### **Alcoa** CLEVELAND, OH (SUMMER 1999, 2000, WINTER 2000)

- Intern at wheel forging facility
- Designed safety equipment, updated drawings, and supervised small construction projects

## JOURNAL PUBLICATIONS

Sulzer, J S, R A Roiz, M A Peshkin, J L Patton. "A highly backdrivable, lightweight knee actuator for investigating gait in stroke". *IEEE Transactions on Robotics*. vol. 25, no. 3. pp. 539-548. 2009.

Sulzer, J S, M A Peshkin, J L Patton. "Pulling Your Strings". *IEEE Robotics and Automation Magazine*. vol. 15, no. 3. pp. 70-78. 2008.

## PEER-REVIEWED CONFERENCE PROCEEDINGS

Sulzer, J S, K E Gordon, T G Hornby, M A Peshkin, J L Patton. Adaptation to Knee Flexion Torque during Gait. *Proc. IEEE Int. Conf. on Rehabilitation Robotics (ICORR)*, Kyoto, Japan, 2009.

Sulzer, J S, M A Peshkin, J L Patton. Design of a Mobile, Inexpensive Device for Upper Extremity Rehabilitation at Home. *Proc. IEEE Int. Conf. on Rehabilitation Robotics (ICORR)*, Noordwijk, Netherlands, 2007.

Sulzer J, A Salamat, V S Chib, and J E Colgate. A Behavioral Adaptation Approach to Identifying Visual Dependence of Haptic Perception. *Second Joint Eurohaptics Conference and Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems*. Tsukuba, Japan. March, 2007.

Sulzer J, M A Peshkin and J L Patton. Catastrophe and Stability Analysis of a Cable-driven Joint. *IEEE International Conference of Engineering in Medicine and Biology Society*. New York, NY. August, 2006.

Sulzer J, S-B Kamalakkannan, D R Morr, J Wiechel, B Tanner and D Guenther. Simplified MADYMO Model of the IHRA Head-form Impactor. *Proc. SAE Int. Conf. on Digital Human Modeling*. Lyon, France July 2006.

Sulzer JS, MA Peshkin, JL Patton. MARIONET: An exotendon-driven Series Elastic Actuator for exerting joint torque. *Proc. IEEE Int. Conf. on Rehabilitation Robotics (ICORR)*. Chicago, IL June 2005.

## MASTERS THESIS

James S. Sulzer, "Moment Arm Manipulation of a Cable-Driven Joint". (MS thesis, Northwestern University, 2006)

## PATENTS

**Cable-driven Moment Arm Manipulation.** Patton, J. L., Peshkin, M. A. and Sulzer, J. S. *Patent Pending*

## LEADERSHIP EXPERIENCE

**Co-president, InNUvation, 2006-07** Led multi-disciplinary entrepreneurial interest group

- Helped organize and supervise Northwestern's first university-wide business idea competition
- Helped found NUvention, a medical technology innovation program involving the law, engineering, business and medical schools. Currently the flagship course for Northwestern University
- Influenced creation of Center for Entrepreneurship and Innovation at the McCormick School of Engineering and Applied Sciences at Northwestern
- Worked with representatives from almost every school in Northwestern to organize speakers, business plan workshops, mobilize entrepreneurial resources and become the student entrepreneurial hub

**Vice President, InNUvation, 2005-06** Served as Engineering representative to the interdisciplinary student-run entrepreneurial interest group at Northwestern

**Co-founder, The Automata, 2005** Organized a city-wide event to bring together engineers and artists

**Founder of Yoga and Meditation interest group, Columbus 2000-02** Created and led yoga and meditation for hundreds of students and residents in Columbus

**Philanthropy Chair, Tau Beta Pi, Ohio State University 2001-02** Organized numerous volunteer activities for engineering honorary

**Founder of Israel Action Committee, Columbus 2000** Created and led fund drive to bring Israeli citizens to America and share their experiences

**Student Board Member, Hillel, Ohio State University 2001-2002**

**Social Chair, Sigma Phi Epsilon, Ohio State University 1999-00** Organized social events for fraternity

## AWARDS, GRANTS AND HONORS

**Baskin Research Award 2009**

**Northwestern University Cabell Terminal Year Fellowship Award 2008-2009**

**U.S. Department of Veterans Affairs Predoctoral Award 2008-2009**

**American Heart Association Predoctoral Award 2006-2008**

**Baskin Research Award 2006**

**2006 da Vinci Award** for team project design of the *NUberwalker*, a body-weight support treadmill for home use

## TEACHING EXPERIENCE

**Substitute Teacher, Chicago Public Schools, March 2009** Substitute for high school science classes.

**Teaching Assistant, Northwestern University Spring 2006** Developed, graded and helped students with homework assignments and midterms

**Client for EDC, Northwestern University Spring 2006** Helped guide freshmen undergraduate engineers to create a car transfer mechanism for people with neuromuscular difficulty

**Grader, Northwestern University, Winter 2006** Grader for Dynamics

**Organizer, Northwestern University, Winter 2005** Led and created a new course (Optimal Controls) under supervision of Dr. Randy Freeman

**Tutor, Lakeview High School, Chicago 2004-05** Tutored students weekly in math and science

**Grader, Ohio State University, Autumn 2002** Grader for Fluid Mechanics

**Tutor, Indian Springs Elementary School, Columbus 2000-01** Tutored a student weekly in reading

## SKILLS

**Machining** Metals, plastics, and wood

**Programming** C/C++ and Matlab

**Experimental** Motion Analysis, Surface/Intramuscular EMG collection

**Computer Assisted Drafting** SolidWorks, SolidEdge, AutoCAD, Microstation

**Graphics** GIMP, Omnigraffle

**Dynamic Simulation** MADYMO, Matlab/SimMechanics

## RELEVANT PRESS RELEASES

**Brown, J.T. and A. C. Kant.** "Creating Bioentrepreneurs: How graduate student organisations foster science entrepreneurship". *Journal of Commercial Biotechnology*. vol 15. pp. 125 - 135 (2009).  
Journal article featuring InNUvation

**"From Students to Innovators"** McCormick Magazine, Spring 2008 Article about NUvention

**"Medical startups - for credit"** in Crain's Chicago Business, Sept. 3, 2007 Article about NUvention - Medical Innovation

**Spike O'Dell Radio Show, WGN 720 AM, May 22, 2007** Interview of winners of NU Venture Challenge

## CONFERENCES AND WORKSHOPS ATTENDED

**IEEE International Conference on Rehabilitation Robotics (ICORR)** , Kyoto, Japan, June 2009  
(Poster presentation by Sulzer).

**Dutch Biomedical Engineering Conference (BME2009)** , Egmond an Zee, Netherlands, January 2009  
(Oral presentation by Sulzer).

**Society for Neuroscience** , Washington, D.C., November, 2008.

**North American Congress on Biomechanics (NACOB)** , Ann Arbor, Michigan, August 2008.

**International Conference on Rehabilitation Robotics (ICORR)** , Noordwijk, Netherlands, June 2007.  
(Poster Presentation by Sulzer)

**World Haptics Conference 2009** , Tsukuba, Japan, March 2007. (Oral Presentation by Sulzer)

**IEEE International Conference of Engineering in Medicine and Biology Society (EMBS)** , New York, August 2006. (Oral Presentation by Sulzer)

**Society of Automotive Engineers Conference on Digital Human Modeling** , Lyon, France, July 2006 (Poster Presentation by Sulzer)

**State of the Science Workshop on Stroke** , La Jolla, CA, March 2006

**International School of Robotics Science (ISRS)** , Tokyo, Japan 2005

**IEEE International Conference on Rehabilitation Robotics (ICORR)** , Chicago, IL, June 2005  
(Poster Presentation by Sulzer)