

Research Interests

Design of prostheses and orthoses, wearable sensors, biofeedback, gait analysis and modeling, biomechanical instrumentation, skeletal muscle injury

HONORS AND AWARDS

Academic Awards

Postdoctoral

- BRI Postdoctoral Fellowship, Holland Bloorview Kids Rehabilitation Hospital January 2015

Graduate Studies

- NSF Graduate Research Fellowship Honorable Mention April 2011
- NSF Graduate Research Fellowship Honorable Mention April 2010

Undergraduate Studies

- Valedictorian of School of Engineering May 2009
- University Scholar April 2009
- School of Engineering Dean's List 2005-2009
- Martha and Karel Tietze Endowed Scholarship for Mechanical Engineers 2005-2009
- University of Portland President's Scholarship 2005-2009

Teaching Award

- MAE Excellence in Teaching Award, Cornell University May 2014

Personal Awards

- MAE Outstanding Service Award, Cornell University May 2014
 - Spotlight Awards, Holland Bloorview Kids Rehabilitation Hospital January 2015-Present
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TEACHING EXPERIENCE

Courses Taught at SJSU

- Numerical Methods in Biomedical Engineering (BME 130)
- Introduction to Engineering Biomechanics (BME 167)
- Biomaterials (BME 175)
- Medical Imaging for Engineers (BME 258)
- Mathematical Methods in Biomedical Engineering (BME 210)

Courses Taught Outside SJSU

- Biomechanics, Hanoi University of Science and Technology, Hanoi, Vietnam (January 2019)

Teaching Assistant

Analysis of Mechanical and Aerospace Structures
Mechanical and Aerospace Engineering Department
Cornell University

Fall 2010, 2013

- Prepared and weekly recitations and quizzes for all four course TAs.
 - Led recitation sections and held office hours.
 - Managed other Teaching Assistants and assisted professor as Head TA
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- Evaluated highly by students for clear communication and a dedication to helping them understand difficult concepts

Teaching Assistant	<i>Mechanical Properties and Selection of Engineering Materials</i> Mechanical and Aerospace Engineering Department Cornell University	Spring 2012- 2014
	<ul style="list-style-type: none"> ● Managed other Teaching Assistants and assisted professor as Head TA ● Worked with professor to implement new peer-instructed learning techniques ● Lectured when professor was out of town ● Organized and taught additional review sessions for midterm and final exams ● Designed semester-long Matlab-based student project (20% of course grade) 	
Course Assistant	<i>Geometric Dimensioning and Tolerancing</i> Mechanical and Aerospace Engineering Department Cornell University	Spring 2013- 2014
	<ul style="list-style-type: none"> ● Assisted professor in writing and grading homework assignments and semester-long design project 	

PUBLICATIONS

Work in Progress

Peer-Reviewed Articles

- Shi, S. **Leineweber, MJ.** Andrysek, J. Evaluating the factor configurations of vibrotactile feedback systems for use in lower-limb prostheses. *Journal of Acoustics*. Revisions submitted November 2018.
- Andrysek, J. Tomasi, J. **Leineweber, MJ.** Esraghi, A. A new modeling method to characterize the stance control function of prosthetic knee joints. *IEEE Transactions on Biomedical Engineering*. Published ahead of print. September 2018
- **Leineweber, MJ.** Gomez-Orroyo, M. Andrysek, J. Correcting kinematic measurement errors associated with postural deviations using commercially available wearable motion capture systems. Submitted to *Medical Engineering Physics*. April 2018.
- Likitlersuang, J. **Leineweber, MJ.** Andrysek, J. Evaluating and improving the performance of thin film force sensors within body-device interfaces. *Medical Engineering Physics*. (Accepted June 2017).
- Sayed Ahmed, B. Lamy, M. Cameron, D. Artero, L. Ramdial, S. **Leineweber, MJ.** Andrysek, J. Factors impacting participation in sports for children with limb absence: A pilot study. *Disability and Rehabilitation*. 2017. 0(0):1-8.
- Andrysek, J. **Leineweber, MJ.** Lee, H. Development and evaluation of a mechanical stance controlled orthotic knee joint with stance flexion utilizing a timing based control strategy flexion. *Journal of Biomechanical Engineering*. Accepted: November 2016.
- **Leineweber, MJ.** Andrysek, J. A method for evaluating timeliness and accuracy of volitional motor responses to vibrotactile stimuli. Invited paper. *Journal of Visualized Experiments*. 2016. Aug 2(114).
- **Leineweber, MJ.** Wyss, D. Dufour, S. Gane, C. Zabjek, K. Maltais, DB. Voisin, JIA. Andrysek, J. The effects of acute intense physical exercise on postural stability in children with cerebral palsy. *Adapted Physical Activity Quarterly*. 2016. 33(3):271-82.
- Sharma, A. **Leineweber, MJ.** Andrysek, J. The effects of cognitive load and prosthetic liner on volitional response times to vibrotactile feedback. *Journal of Rehabilitation Research and Development*. 2016. 53(4):473-82.
- Rogers, E. **Leineweber, MJ.** Andrysek, J. Analysis of terrain effects on the interfacial force distribution at the hand and forearm during crutch gait. *Assistive Technology*. 2016 (Epub ahead of Print).
- **Leineweber, MJ.** Gao, Y. Examining the feasibility of applying principal component analysis to detecting localized changes in mechanical properties. *Journal of Biomechanics*. 2014. 48(2):262-8.
- **Leineweber, MJ.** Stouffer, J. Gao, Y. Quantifying skeletal muscle recovery in a rat injury model using ultrasound imaging. *Journal of Biomechanics*. 2014. 48(2):379-82.

- **Leineweber, MJ.** Westborn, J. Cochran, A. Choi, J. Gao, Y. Averaging Improves Strain Images of the Biceps-Brachii Using Quasi-Static Ultrasound Elastography. *British Journal of Radiology*. 2014. 87(1039):Online.
- Delos, D. **Leineweber, MJ.** Chaudhury, S. Alzoobaee, S. Gao, Y. Rodeo, S. The Effect of Platelet-Rich Plasma (PRP) on Muscle Contusion Healing in a Rat Model. *American Journal of Sports Medicine*. 2014. 42(9): 2067-74.

Book Chapter

- Gao, Y. **Leineweber, MJ.** Aging in skeletal muscle. Derby, Brian Akhtar, Riaz. *Mechanical Properties of Aging Soft Tissues*. 2015. 75-93.

Conference Presentations

- Aguilar, R. Antar, M. **Leineweber, MJ.** A 3D computational model for evaluating muscle recruitment in above-knee prosthesis users. *CSU Biotechnology Symposium*. Garden Grove, CA. January 3-5, 2019.
- Shi, S. **Leineweber, MJ.** Andrysek, J. Examination of tactor configurations for the design of vibrotactile feedback systems for use in lower-limb prostheses. *Proceedings of the ASME 2018 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*. Quebec City, Quebec, Canada. August 26-29, 2018.
- **Leineweber, MJ.** Andrysek, J. Evaluating a variable-friction swing-phase control mechanism in a transfemoral prosthesis using a 2-D computational gait model. *American Society of Biomechanics Annual Conference*. Raleigh, NC. 2016-08-03. Poster Presentation
- **Leineweber, MJ.** Andrysek, J. Examining swing-side hip control strategies related to prosthetic knee swing-phase control using a 2-d computational model. *Canadian Society for Biomechanics Conference*. Hamilton, ON, Canada. 2016-07-21.
- Tomasi, J. **Leineweber, MJ.** Andrysek, J. Development and evaluation of a sensor system to monitor the stance-phase control function of the ASPL mechanism. *Canadian Society for Biomechanical Conference*. Hamilton, ON, Canada. 2016-07-21.
- **Leineweber, MJ.** Sharma, A. Andrysek, J. Developing a wearable biofeedback system for lower-limb prostheses: Examining user responses to vibrotactile stimuli. *BRI Research Symposium*. Toronto, Canada, 2015-11-10.
- Lee, H. **Leineweber, MJ.** Andrysek, J. Development and evaluation of a mechanical stance controlled orthotic knee joint with stance flexion utilizing a timing based control strategy flexion. *IFMBE Proceedings. World Congress on Medical Physics and Biomedical Engineering*, Toronto, Canada, 2015-06-10.
- Lamy, M. Sayed Ahmed, B. Cameron, D. Artero, L. Ramdial, S. **Leineweber, MJ.** Andrysek, J. Barriers and facilitators to sport participation for children with amputations. *CATO Conference 2015. CAOT Conference*, Winnipeg, Canada, 2015-05-28. Canadian Association of Occupational Therapists.
- Delos, D; **Leineweber, MJ**; Gao, Y; Chaudhury, S; Alzoobaee S; Rodeo, S. The Effect of Immediate and Delayed Platelet-Rich Plasma (PRP) Treatment on Muscle Contusion Healing in the Rat. *Orthopedic Research Society Annual Meeting 2013*, Poster Presentation.
- **Leineweber, MJ,** Cochran, A; Gao, Y. Using Ultrasound Elastography to Characterize Aging Induced Muscle Degradation. *Biomedical Engineering Society Annual Meeting 2010*, Session Presentation, Austin, TX, 2010-10-07.
- Doughty, TA. **Leineweber, MJ.** Investigating Nonlinear Models for Health Monitoring in Vibrating Structures. *Proceedings of the ASME 2009 International Mechanical Engineering Congress & Exposition IM. ASME 2009 International Mechanical Engineering Congress & Exposition IMECE2009*, Lake Buena Vista, 2009-11-13.
- **Leineweber, MJ;** Doughty, TA; Applying Nonlinear System Identification to Determine Crack Initiation in a Cantilever Beam. *J. Murdock Undergraduate Research Conference*. May 2008.

RESEARCH GRANTS

07/01/2018-08/31/2019 (PI)

“Developing a 3D gait model for simulating motor control strategies in individuals using above-knee prostheses”
 Central RSCA Grant Program
 San Jose State University
 Award: \$5,000

06/01/2018-11/30/2019 (PI)

“Simulating motor control strategies in individuals using above-knee prostheses”
CSUPERB New Investigator Grant
California State University
Award: \$14,650

03/17/2017-02/28/2019 (PIs: Jan Andrysek & Kamran Behdinan)

“Harnessing additive manufacturing to produce intelligent prostheses with biosensing”
EMHSeed Program Award (Pilot funding for a new collaboration)
University of Toronto Faculty of Medicine & Faculty of Applied Science
Annual Award: \$60,000

05/01/2016 – 05/01/2018 (PI: Jan Andrysek)

“A wearable biofeedback system for prosthetic mobility”
Industry Partner: Össur Canada
Collaborative Research and Development Grant
Natural Sciences and Engineering Research Council of Canada
Annual Award: \$35,000

04/01/2017-03/31/2018 (PI: Jan Andrysek)

“Development of a lightweight high performance paediatric knee prosthesis for physically active children and youth with lower-limb amputations”
Centre for Leadership in Innovation
Holland Bloorview Kids Rehabilitation Hospital
Annual Award: \$13,000

01/01/2016-03/01/2017 (PI)

“Developing a variable friction-based swing phase controller to improve gait kinematics in physically active children and youth with lower-limb amputations”
Centre for Leadership in Innovation
Holland Bloorview Kids Rehabilitation Hospital
Annual Award: \$12,000

05/01/2015-03/01/2016 (PI: Jan Andrysek)

“A lifelike and functional passive prosthetic hand for infants”
Centre for Leadership in Innovation
Holland Bloorview Kids Rehabilitation Hospital
Annual Award: \$8,500

Teaching Grants

06/25/2018 – 06/01/2019

Lab Innovations with Technology (LIT) Program
California State University
Award: \$12,907

MENTORSHIP EXPERIENCE

Holland Bloorview Kids Rehabilitation Hospital

January 2015-
Present

As a postdoctoral fellow I supervised and worked closely with a number of individual students and student teams conducting biomechanics research at the Master’s and undergraduate levels. For each project, I worked with their advisor(s) to define the project goals and deliverables, evaluate student progress, and obtain project funding. I also

supervised the day-to-day activities of these students, and provided technical assistance to facilitate their research progress.

Master's Thesis: Exploring key design parameters of a vibrotactile biofeedback system for use with lower-limb prostheses

Master's Thesis: Assessment of postural deviation-associated errors in the analysis of kinematics using inertial and magnetic sensors, and a correction technique proposal

Master's Thesis: Development and evaluation of a wearable sensor system to monitor the stance-phase control function of the Simplified Automatic Stance-Phase Lock (SASPL) mechanism

Master's Thesis: Barriers and facilitators to sport participation for children with amputations

Undergraduate Summer Research: Preliminary evaluation and implementation of a sensor to monitor the function of the Automatic Stance Phase Lock (ASPL) mechanism of the AT-Knee

Undergraduate Summer Research: Development of a portable performance monitoring system for the Automatic Stance-Phase Lock (ASPL) mechanism

Undergraduate Summer Research: Towards a biofeedback system for lower-limb prostheses: Examining the propagation of vibrations through a prosthetic socket

Senior Capstone Project: Topic: Designing a lifelike and functional passive prosthetic hand for infants

- 1st Place: IEEE EMBS ISC 2016 Design Competition in Ottawa, May 29-31st, 2016

Cornell University

August 2010-
May 2013

While pursuing my doctorate, I helped supervise undergraduate and graduate students in the lab as they worked on projects related to my Ph.D.

Master's Thesis: Examining the effect of random-user-variability in ultrasound image collection on displacement images in skeletal muscle

Senior Design Project: Design and construction of a custom chair for automated elastography analysis

Senior Design Project: Development of an automated ultrasound scanning system

LEADERSHIP EXPERIENCE

President

Sibley Graduates in Mechanical and Aerospace Engineering (SiGMA)
Cornell University

May 2010-
August 2012

- Oversaw professional development events, social events, and community outreach for graduate students in the Mechanical and Aerospace Engineering Department
- Acted as official liaison between students and faculty
- Awarded the Outstanding Service Award in recognition of my contributions to building a stronger graduate community.

Science Resources Chair

Expand Your Horizons Conference
Cornell University

October 2010-
May 2014

- Recruited and managed 5+ live science demonstrations for middle school and high school girls to promote interest in science, technology, and math fields
- Helped expand the conference from nearly participants to over 500 during my four year tenure

OUTREACH EXPERIENCE

Volunteer

Cornell Center for Materials Research
Cornell University

January 2011-
December 2013

- Designed and conducted a demonstration and hands-on activity incorporating my ultrasound research for students at Enfield Elementary School, the Ithaca Youth Bureau, and the Tompkins County Library

Volunteer/Organizer

4H—Cornell Chapter
Cornell University

February 2012-
August 2012

- Worked with representatives for 4H to bring the program to the Mechanical and Aerospace Engineering Department
 - Helped develop three-day workshops for high school students to get hands-on experience as mechanical engineers
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INDUSTRY EXPERIENCE

Mechanical Engineering Intern

Acute Innovations, Hillsboro, OR

Dec. 2008-
August 2009

- Aided in the design and manufacturing of thoracic implants. Tasks included creating engineering drawings, inspecting parts and inventory, problem solving, and design of experiments and test protocol.

Senior Design Project

Mechanical Engineering

University of Portland

August 2008-
April 2009

Advisor: Timothy A. Doughty, Ph.D.

Topic: Design of a tremor reducing eating utensil

- Worked with a team of senior mechanical engineering students to design an eating utensil to decrease the effects of hand tremor present in people with Parkinson's disease.
 - Designed and conducted experiments to determine the primary parameters of the hand tremor (mass, stiffness, damping, natural frequency). Used the data to aid in the design of the tool.
 - Won entrepreneurship competition: "University of Portland 20K Challenge", resulting in a patent on the device. Continued development of the technology is continued through Prof. Timothy Doughty at the University of Portland
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Societies

Canadian Society for Biomechanics

March 2016

Biomedical Engineering Society

September 2010

Tau Beta Pi

October 2007

- Selected to be in the national Engineering Honors Society

American Society for Materials

September 2009

Alpha Lambda Delta

Spring 2006

- Selected to be a part of the Freshman Honors Society