

## ELIZABETH T. HSIAO-WECKSLER

Department of Mechanical Science and Engineering (MechSE)  
University of Illinois at Urbana-Champaign  
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### EDUCATION

#### Ph.D., **University of California - Berkeley**

Mechanical Engineering, 2000

Fields of specialty: musculoskeletal biomechanics, dynamics, biocontrols, biostatistics

“Biomechanical Analysis of Movement Strategies During Falls from Standing Height”

Advisor: Stephen N. Robinovitch, Division of Orthopedic Surgery, University of California - San Francisco

#### M.S., **Rochester Institute of Technology**

Mechanical Engineering, 1994 (obtained while working full-time).

“A Dynamic Model to Study the Influence of Alpine Ski Boot Characteristics on Heel Retention Force”

Advisors: Joseph S. Török, Mechanical Engineering, and Jasper E. Shealy, Industrial and Systems Engineering

#### B.S., **Cornell University**

Mechanical Engineering, 1987

### ACADEMIC POSITIONS

#### **University of Illinois at Urbana-Champaign**

*Grayce Wicall Gauthier Professor*, MechSE, 02/23 - present

*Interim Director*, Health Care Engineering Systems Center, 01/22 - present

*Affiliate Professor (Courtesy Appointment)*, Coordinated Science Laboratory, 01/22 - present

*Adjunct Professor*, Zhejiang University – UIUC College of Engineering Joint Institute, Haining, China, 09/18-01/19

*Affiliate Professor (Courtesy Appointment)*, Carle Illinois College of Medicine, 03/17 – present

*Associate Head for Undergraduate Programs*, MechSE, 09/15 – 09/19

*Professor*, MechSE, 08/15 – present

*Affiliate Professor (Courtesy Appointment)*, Beckman Institute, 2/14 – present

*Willett Faculty Scholar*, MechSE, 04/13

*Affiliate Professor (Courtesy Appointment)*, Neuroscience Program, 3/11 – present

*Associate Professor*, MechSE, 08/09 – 08/15

*Affiliate Professor (Courtesy Appointment)*, Department of Industrial and Enterprise Systems Engineering (formerly Department of General Engineering), 10/05 – present

*Affiliate Professor (Courtesy Appointment)*, Department of Bioengineering, 10/02 – present

*Assistant Professor*, Department of Mechanical Science and Engineering (MechSE) (formerly Department of Mechanical and Industrial Engineering), 07/02– 08/09

#### **Georgia Institute of Technology**

*Visiting Affiliate Faculty*, Prosthetics & Orthotics Program, School of Biological Sciences, 01/17-05/17

#### **Boston University and Harvard Medical School**

*Post-doctoral Fellow*, Integrated Rehabilitation Engineering Program, 04/00 – 6/02

Advisors: James J. Collins, PhD, Department of Biomedical Engineering, Boston University

Lewis A. Lipsitz, MD, Hebrew Rehabilitation Center for Aged, Harvard Medical School

D. Casey Kerrigan, MD MS, Spaulding Rehabilitation Hospital, Harvard Medical School

Supported by a post-doctoral training grant from the National Institute on Disability and Rehabilitation Research (NIDRR) to JJC (PI), LAL, and DCK

#### **University of California - San Francisco and San Francisco General Hospital**

*Graduate Research Assistant*, 01/95 - 03/00

Advisor: Stephen N. Robinovitch, PhD, Biomechanics Laboratory, Division of Orthopedic Surgery

## ENTREPRENEUSHIP

IntelliWheels, Inc., Champaign, Illinois  
*Co-Founder*  
*Scientific Advisor, 05/10 – 07/18*

## INDUSTRIAL EMPLOYMENT

**Xerox Corporation**, Desktop Printer and Copier Division, Rochester, New York  
*Senior Project Engineer, 08/90 - 08/94*  
*Engineer, 04/88 - 08/90*  
*Associate Engineer, Engineering Development Program, 07/87 - 04/88*

## HONORS

- President-Elect, President, Past-President, American Society of Biomechanics, 2020-2023
- Distinguished Engineering Educator Awardee, Society of Women Engineers, 2018
- Fellow, American Society of Biomechanics, 2018
- Listed in “150 for 150”, Top 150 accomplished women at the University of Illinois in celebration of its sequential 1867-2017, 2017 <https://gec150.web.illinois.edu/>
- Associate Editor, ASME Journal of Medical Devices –7/2016 – 12/2022
- Fellow, American Society of Mechanical Engineers, 2015
- Willett Faculty Scholar Award – College of Engineering, University of Illinois at Urbana-Champaign, 2013
- Dean’s Award for Excellence in Research – College of Engineering, University of Illinois at Urbana-Champaign, 2013
- Program Chair (elected position) – American Society of Biomechanics, 2011-2012
- List of Teachers Ranked as Excellent – University of Illinois at Urbana-Champaign, Fall 2005, Fall 2006, Spring 2013, Fall 2013, Fall 2018, Spring 2020
- Engineering Council Award for Excellence in Advising – University of Illinois at Urbana-Champaign, 2008, 2009, 2015, 2016
- Campus Award for Excellence in Guiding Undergraduate Research – Honorable Mention, University of Illinois at Urbana-Champaign, 2005
- Fellow – Center for Advanced Study, University of Illinois at Urbana-Champaign, 2004-2005
- Biology of Aging Research Scholarship – American Federation of Aging Research and Glenn Foundation, 1998

## PATENTS / INVENTION DISCLOSURES

Graduate student under my (co-) supervision (underline). Undergraduate student (underline, italic)

Awarded patents:

1. Hsiao-Wecksler, E. T., K. A. Shorter, V. Gervasi, D.L. Cook, R. Remmers, G.F. Kogler, W.K. Durfee, “Portable active pneumatically powered ankle-foot orthosis” U.S. Patent (Pub. No.: US9480618 B2). Filing date: Mar 14, 2012. Publication date: Nov 1, 2016
2. Hsiao-Wecksler, E.T., Farooq, D., Xiao, C., Krishnan, G., Singh, G., and Oo, Y.L. Forearm and Wrist Support for Crutch Users. U.S. Patent (Pub. No.: US9662263 B2). Filing date: Oct 13, 2015. Publication date: May 30, 2017
3. Hsiao-Wecksler, E.T., and Daigle, S.C., “Gear-Shifting System for Manually Propelled Wheelchairs”, U.S. Patent (Pub. No.: US9707138 B2). Filing date: July 27, 2012. Publication date: July 18, 2017

Patent applications:

1. Hsiao-Wecksler, E. T., Pei, Y., Gim, K., Garag, P., Ripperger, E., and Zallek, C.M. “Training Simulator for Healthcare Training”, invention disclosures submitted February 25, 2021 and March 8, 2021. U.S. Provisional Patent Application #63/229,723, submitted August 5, 2021.
2. Bleakney, A.W., Elliott, J.R., Hsiao-Wecksler, E.T., Malik, P.B., McDonagh, D.C., Rausin, A.K., Norris, W.R., Almeida de Souza Ramos, J.L, Xiao, C., Chen, Y., Pei, Y., Song, SY, “A Low-Profile and High-load Ball-Balancing Rolling System”, Invention disclosure submitted, July 25, 2020. U.S. Patent Application No.: 63/074,126, submitted September 3, 2020.

3. Song, S.Y., Hsiao-Wecksler, E. T., and Zallek, C.M. “Method and apparatus for muscle tone and limb movement measurement and assessment”, invention disclosure submitted, June 27, 2019. U.S. Provisional Patent Application # 62/962,571 submitted January 17, 2020. U.S. Non-provisional Application No.: 17/147,654 filed on January 13, 2021
4. Liang, J., Hsiao-Wecksler, E.T., Ewoldt, R.H., Tippett, S.R. “Passive Hydraulic Medical Training Simulator”, Invention disclosure submitted November 24, 2015. U.S. Provisional Patent Application #62/321,360 submitted April 12, 2016. Abandoned.
5. Hsiao-Wecksler, E.T., Petrucci, M.N., Boes, M.K., Islam, M., Wang, Z., "Higher torque pneumatic ankle-foot-orthosis", US Provisional Patent Application submitted October 10, 2014. Further action was not pursued.
6. Hsiao-Wecksler, E.T., Petrucci, M.N., Boes, M.K., Islam, M., Wang, Z., "Geared pneumatic actuator", US Provisional Patent Application submitted October 10, 2014. Further action was not pursued.
7. Hsiao-Wecksler, E. T., E. Loth, G. Kogler, K. A. Shorter, J. A. Thomas, and J.N. Gilmer, “Portable Active Fluid Powered Ankle-Foot Orthosis”, United States Patent Application (Pub. No.: US20110112447 A1). Publication date: May 12, 2011. Abandoned

Invention disclosures:

1. Hsiao-Wecksler, E. T., Pei, Y., Gim, K., Garag, P., Ripperger, E., and Zallek, C.M. “Elbow and Ankle Medical Training Simulators”, invention disclosure submitted, February 1, 2021.
2. Chen, A.R., Garag, P., McDonagh, D.C., and Hsiao-Wecksler, E. T., “Portable cushion for sensing seated posture”, invention disclosure submitted, September 13, 2017.
3. Song, S.Y., Pei, Y., Liang, J., and Hsiao-Wecksler, E. T., “Position, Velocity, Resistance Meter (PVRM) for clinical evaluation of abnormal muscle behaviors”, invention disclosure submitted, March 28, 2017.
4. Rajamannar-Underhill, S., E.T. Hsiao-Wecksler, DuPree, I., Guggenheim, J., Kumar, M., and Moshage, S. “Real-time knee angle and weight-shift monitoring device”, invention disclosure submitted
5. Hsiao-Wecksler, E. T., E. Loth, A. Alleyne, G. Kogler, R. Chin, S. Manwaring, K. A. Shorter, and, S. N. Tyson, “Pneumatic power-harvesting ankle-foot-orthosis”, invention disclosure submitted, June 12, 2008.
6. Kerrigan, D.C. and E.T. Hsiao-Wecksler, “Ankle-foot orthosis with plantarflexor torque assistance,” invention disclosure submitted to Harvard Medical School

## PUBLICATIONS

Graduate student under my (co-) supervision (underline). Undergraduate student (underline, italic)

Also available on Research Gate: [http://www.researchgate.net/profile/Elizabeth\\_Hsiao-Wecksler/publications](http://www.researchgate.net/profile/Elizabeth_Hsiao-Wecksler/publications)

ORCID iD: <https://orcid.org/0000-0002-9373-3611>

### Peer-reviewed Published or In-press Journal Papers

1. Hsiao, E. T. and S. N. Robinovitch, “Common Protective Movements Govern Unexpected Falls from Standing Height,” Journal of Biomechanics, 31(1), 1-9, 1998. [http://dx.doi.org/10.1016/S0021-9290\(97\)00114-0](http://dx.doi.org/10.1016/S0021-9290(97)00114-0)
2. Hsiao, E. T. and S. N. Robinovitch, “Biomechanical Influences on Balance Recovery by Stepping,” Journal of Biomechanics, 32(14), 1099-1106, 1999. [http://dx.doi.org/10.1016/S0021-9290\(99\)00104-9](http://dx.doi.org/10.1016/S0021-9290(99)00104-9)
3. Robinovitch, S. N., E. T. Hsiao, R. Sandler, J. Cortez, and Q. Liu, “Prevention of Falls and Fall-Related Fractures through Biomechanics,” Exercise and Sport Sciences Reviews, 28(2): 74-79, 2000. <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=ovftd&NEWS=N&AN=00003677-200028020-00006>
4. Hsiao, E. T. and S. N. Robinovitch, “Elderly Subjects’ Ability to Recover Balance with a Single Backward Step Associates with Body Configuration at Step Contact,” Journal of Gerontology: Medical Science, 56A(1): M42-M47, 2001. <http://dx.doi.org/10.1093/gerona/56.1.M42>
5. Hsiao-Wecksler, E. T., K. Katdare, J. Matson, W. Liu, L. A. Lipsitz, and J. J. Collins, “Predicting the Dynamic Postural Control Response from Quiet-Stance Behavior in Elderly Adults,” Journal of Biomechanics, 36(9): 1327-1333, 2003. [http://dx.doi.org/10.1016/S0021-9290\(03\)00153-2](http://dx.doi.org/10.1016/S0021-9290(03)00153-2)
6. Hillman, C. H., E. T. Hsiao-Wecksler, and K. S. Rosengren, “Postural and Eye-blink Indices of the Defensive Startle Reflex,” International Journal of Psychophysiology, 55(1): 45-49, 2005. <http://dx.doi.org/10.1016/j.ijpsycho.2004.06.002>

7. Hsiao-Weckslers, E.T. and S. N. Robinovitch, "The Effect of Step Length on Young and Elderly Women's Ability to Recover Balance," *Clinical Biomechanics*, 22(5): 574-580, 2007.  
<http://dx.doi.org/10.1016/j.clinbiomech.2007.01.013>
8. Ramachandran, A. K., Y. Yang, K. S. Rosengren, and E. T. Hsiao-Weckslers, "Effect of Tai Chi on Gait and Obstacle Crossing Behaviors in Middle-aged Adults," *Gait and Posture*, 26(6): 248-255, 2007.  
<http://dx.doi.org/10.1016/j.gaitpost.2006.09.005>
9. Yang, Y., J. V. Verkuilen, K. S. Rosengren, S. A. Grubisich, M. R. Reed, and E. T. Hsiao-Weckslers, "Effect of Combined Taiji and Qigong Training on Balance Mechanisms: A Randomized Controlled Trial of Older Adults," *Medical Science Monitor*, 13(8): 339-348, 2007.  
<http://www.medscimonit.com/download/index/idArt/491621>
10. Major, M. J., A. Beaudoin, P. Kurath, and E. T. Hsiao-Weckslers, "Biomechanics of Aggressive Inline Skating: Landing and Balancing on a Grind Rail," *Journal of Sports Sciences*, 25(12): 1411-1422, 2007.  
<http://dx.doi.org/10.1080/02640410601129615>
11. Doyle, R. D., E. T. Hsiao-Weckslers, B. G. Ragan, and K. S. Rosengren, "Generalizability of Center of Pressure Measures of Quiet Standing," *Gait and Posture*, 25(2): 166-171, 2007.  
<http://dx.doi.org/10.1016/j.gaitpost.2006.03.004>
12. Hsiao-Weckslers, E. T., "Assessing Quiet and Perturbed Balance: A Review," *Japanese Journal of Biomechanics in Sports and Exercise*, 11(4): 291-302, 2007. **Invited paper.**
13. Riemer, R., E. T. Hsiao-Weckslers, and X. Zhang, "Uncertainties in Inverse Dynamics Solutions: A Comprehensive Analysis and an Application to Gait," *Gait and Posture*, 27(4): 578-588, 2008.  
<http://dx.doi.org/10.1016/j.gaitpost.2007.07.012>
14. Jang, J., K. T. Hsiao, and E. T. Hsiao-Weckslers, "Balance (Perceived and Actual) and Preferred Stance width during Pregnancy," *Clinical Biomechanics*, 23(4): 468-476, 2008.  
<http://dx.doi.org/10.1016/j.clinbiomech.2007.11.011>
15. Hsiao-Weckslers, E. T., "Biomechanical and Age-related Differences in Balance Recovery using the Tether-release Method," *Journal of Electromyography and Kinesiology*, 18(2): 179-187, 2008. **Invited paper.**  
<http://dx.doi.org/10.1016/j.jelekin.2007.06.007>
16. Doyle, R. D., B. G. Ragan, K. Rajendran, K. S. Rosengren, and E. T. Hsiao-Weckslers, "Generalizability of Stabiliogram Diffusion Analysis of Center of Pressure Measures," *Gait and Posture*, 27(2): 223-230, 2008.  
<http://dx.doi.org/10.1016/j.gaitpost.2007.03.013>
17. Shorter, K. A., J. D. Polk, K. S. Rosengren, and E. T. Hsiao-Weckslers, "A New Approach for Detecting Asymmetries in Gait," *Clinical Biomechanics*, 23(4):459-467, 2008.  
<http://dx.doi.org/10.1016/j.clinbiomech.2007.11.009>
18. Ragetly, C. A., D. J. Griffon, J. E. Thomas, A. A. Mostafa, D. S. Schaeffer, G. J. Pijanowski, and E. T. Hsiao-Weckslers, "Noninvasive Determination of Body Segment Parameters of the Hind Limb in Labrador Retrievers With and Without Cranial Cruciate Ligament Disease," *American Journal of Veterinary Research*, 69(9): 1188-1196, 2008. <http://dx.doi.org/10.2460/ajvr.69.9.1188>
19. Riemer, R. and E. T. Hsiao-Weckslers, "Improving Joint Torque Calculations: Optimization-based Inverse Dynamics to Reduce the Effect of Motion Errors," *Journal of Biomechanics*, 41(7): 1503-1509, 2008.  
<http://dx.doi.org/10.1115/1.3005155>
20. Riemer, R. and E. T. Hsiao-Weckslers, "Improving Joint Torque Calculations through a Two-step Optimization Method for Estimating Body Segment Parameters," *ASME Journal of Biomechanical Engineering*, 131(1): 011007, 2009. <http://dx.doi.org/10.1115/1.3005155>
21. Chin, R., E. T. Hsiao-Weckslers, E. Loth, G. Kogler, S. Manwaring, K. A. Shorter, S. N. Tyson, and J. N. Gilmer, "A Pneumatic Power Harvesting Ankle-foot Orthosis to Prevent Foot-drop," *Journal of NeuroEngineering and Rehabilitation*, 6(19), June 16, 2009, 11 pages.  
<http://www.jneuroengrehab.com/content/6/1/19>
22. Ragetly, C. A., D. J. Griffon, A. A. Mostafa, J. E. Thomas, and E. T. Hsiao-Weckslers, "Inverse Dynamics Analysis of the Hind Limbs in Labrador Retrievers with and without Cranial Cruciate Ligament Disease," *Veterinary Surgery*, 39(4), 513-522, 2010. <http://dx.doi.org/10.1111/j.1532-950X.2010.00680.x>
23. DiBerardino III, L. A., J. D. Polk, K. S. Rosengren, J. B. Spencer-Smith, and E. T. Hsiao-Weckslers, "Quantifying Complexity and Variability in Phase Portraits of Gait," *Clinical Biomechanics*, 25(6): 552-556, 2010. <http://dx.doi.org/10.1016/j.clinbiomech.2010.03.007>

24. Hur, P., B. A. Duiser, S. Salapaka, and E. T. Hsiao-Wecksler, "Measuring Robustness of the Postural Control System to an Impulse Perturbation," *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 18(4):461-467, 2010. <http://dx.doi.org/10.1109/TNSRE.2010.2052133>
25. Park, K., P. Hur, K. S. Rosengren, G. P. Horn, and E. T. Hsiao-Wecksler, "Effect of Load Carriage on Gait due to Firefighting Air Bottle Configuration," *Ergonomics*, 53(7): 882 – 891, 2010. <http://dx.doi.org/10.1080/00140139.2010.489962>
26. Hsiao-Wecksler, E.T., J. D. Polk, K. S. Rosengren, J. J. Sosnoff, and S. Hong, "A Review of New Analytic Techniques for Quantifying Symmetry in Locomotion," *Symmetry*, 2(2): 1135-1155, 2010. **Invited paper** <http://dx.doi.org/10.3390/sym2021135>
27. Helwig, N.E., S. Hong, E. T. Hsiao-Wecksler, and J. D. Polk, "Methods to Temporally Align Gait Cycle Data," *Journal of Biomechanics*, 44(3):561-566, 2011. <http://dx.doi.org/10.1016/j.jbiomech.2010.09.015>
28. Park, K., K. S. Rosengren, G. P. Horn, D. L. Smith, and E. T. Hsiao-Wecksler, "Assessing Gait Changes due to Fatigue and Protective Clothing," *Safety Science*, 49(5): 719-726, 2011. <http://dx.doi.org/10.1016/j.ssci.2011.01.012>
29. Shorter, K.A., G. F. Kogler, E. Loth, W. K. Durfee, and E. T. Hsiao-Wecksler, "A Portable Powered Ankle-Foot-Orthosis for Rehabilitation," *Journal of Rehabilitation Research & Development*, 48(4): 459-472, 2011. doi:10.1682/JRRD.2010.04.0054. <http://www.rehab.research.va.gov/jour/11/484/pdf/shorter484.pdf>
30. Li, Y., A. Becker, K. A. Shorter, T. Bretl, and E. T. Hsiao-Wecksler, "Estimating System State During Human Walking with a Powered Ankle-Foot Orthosis," *IEEE/ASME Transactions on Mechatronics*, 16(5):835-844, 2011. <http://dx.doi.org/10.1109/TMECH.2011.2161769>
31. DiBerardino, L., C. A. Ragetly, D. J. Griffon, S. Hong, and E. T. Hsiao-Wecksler, "Improving Regions of Deviation Gait Symmetry Analysis with Point-wise T-tests," *Journal of Applied Biomechanics*, 28(2): 210-214, 2012. <http://dx.doi.org/10.1123/jab.28.2.210>
32. Park, K., H. Dankowicz, and E. T. Hsiao-Wecksler, "Characterization of Spatiotemporally Complex Gait Patterns using Cross-correlation Signatures," *Gait & Posture*, 36(1): 120-126, 2012. <http://dx.doi.org/10.1016/j.gaitpost.2012.01.016>
33. Hur, P., K. A. Shorter, P. Mehta, and E. T. Hsiao-Wecksler, "Invariant Density Analysis: Modeling and Analysis of the Postural Control System using Markov Chains," *IEEE Transactions on Biomedical Engineering*, 59(4): 1094-1100, 2012. <http://dx.doi.org/10.1109/TBME.2012.2184105>
34. Shorter, K.A., Y. Li, T. Bretl, and E.T. Hsiao-Wecksler, "Modeling, Control, and Analysis of a Robotic Assist Device", *Mechatronics*, 22(8): 1067-1077, 2012. <http://dx.doi.org/10.1016/j.mechatronics.2012.09.002>
35. Ragetly, C. A., D. J. Griffon, M. K. I. Hsu, L. M. Klump, and E. T. Hsiao-Wecksler, "Kinetic and Kinematic Analysis of the Hind Limbs during Treadmill Trotting Gait in Healthy Dogs: Comparison Between Labrador Retrievers Predisposed or Not for Cranial Cruciate Ligament Disease," *American Journal of Veterinary Research*, 73(8): 1171-1177, 2012. <http://dx.doi.org/10.2460/ajvr.73.8.1171>
36. Chin, R., E. T. Hsiao-Wecksler, and E. Loth, "Fluid-Power Harvesting by Under-Foot Bellows During Human Gait," *Journal of Fluids Engineering*, 134(8): 081101, 2012. **(Number 1 Most Downloaded Article in JFE for August 2012)** <http://dx.doi.org/10.1115/1.4005725>
37. Ragetly, C.A., D. J. Griffon, L. M. Klump, and E. T. Hsiao-Wecksler, "Kinetic and Kinematic Analysis of the Pelvic Limbs in Labrador Retrievers Predisposed or at a Low Risk for Cranial Cruciate Ligament Disease," *Veterinary Surgery*, Nov; 41(8):973-982, 2012. <http://dx.doi.org/10.1111/j.1532-950X.2012.01042.x>
38. Shorter, K.A., J. Xia, E. T. Hsiao-Wecksler, W. K. Durfee, and G. F. Kogler, "Technologies for Powered Ankle Foot Orthotic Systems: Possibilities and Challenges," *IEEE/ASME Transactions on Mechatronics*, 18(1): 377-347, 2013. <http://dx.doi.org/10.1109/TMECH.2011.2174799>
39. Socie, M.J., B.M. Sandroff, J.H. Pula, E.T. Hsiao-Wecksler, R.W. Motl, and J.J. Sosnoff, "Footfall placement variability and falls in multiple sclerosis," *Annals of Biomedical Engineering*, 41(8): 1740–1747, 2013. <http://dx.doi.org/10.1007/s10439-012-0685-2>
40. Moon, Y., C. Jayaraman, M.K. Hsu, I.M. Rice, E.T. Hsiao-Wecksler, and J.J. Sosnoff, "Variability of peak shoulder force during wheelchair propulsion in manual wheelchair users with and without shoulder pain," *Clinical Biomechanics*, 28(9-10): 967-972, 2013. <http://dx.doi.org/10.1016/j.clinbiomech.2013.10.004>
41. Hur, P., K.S. Rosengren, G.P. Horn, D. Smith, and E.T. Hsiao-Wecksler, "Effect of protective clothing and fatigue on functional balance of firefighters," *Journal of Ergonomics*, S2: 004 (7 pages), 2013. <http://dx.doi.org/10.4172/2165-7556.S2-004>

42. Rice, I.M., C. Jayaraman, E.T. Hsiao-Wecksler, and J.J. Sosnoff, "Relationship Between Shoulder Pain and Kinetic and Temporal-Spatial Variability in Wheelchair Users," *Archives of Physical Medicine and Rehabilitation*, 95(4): 699–704, 2014. <http://dx.doi.org/10.1016/j.apmr.2013.11.005>
43. Rosengren, K.S., E.T. Hsiao-Wecksler, and G.P. Horn, "Fighting fires without falling: Effects of equipment design and fatigue on firefighters balance and gait," *Ecological Psychology*, 26(1-2): 167-175, 2014. <http://dx.doi.org/10.1080/10407413.2014.875357>
44. Jayaraman, C., Y. Moon, I.M. Rice, E.T. Hsiao-Wecksler, C.L. Beck, and J.J. Sosnoff, "Shoulder pain and cycle to cycle kinematic spatial variability during recovery phase in manual wheelchair users: A pilot investigation," *PLOS one*, 9(3): e89794 (7 pages), 2014. <http://dx.doi.org/10.1371/journal.pone.0089794>
45. Kesler, R.M., E.T. Hsiao-Wecksler, R.M. Motl, R.E. Klaren, I. Ensari, and G.P. Horn, "A Modified SCBA Facepiece for Accurate Metabolic Data Collection from Firefighters," *Ergonomics*, 58(1): 148-159, 2015. <http://dx.doi.org/10.1080/00140139.2014.964783>
46. Hur, P., K. Park, K. S. Rosengren, G. P. Horn, and E. T. Hsiao-Wecksler, "Effects of Air Bottle Design on Postural Control of Firefighters," *Applied Ergonomics*, 48 (May): 49-55, 2015. <http://dx.doi.org/10.1016/j.apergo.2014.11.003>
47. Horn, G.P., R.M. Kesler, R.M. Motl, E.T. Hsiao-Wecksler, R.E. Klaren, I. Ensari, and K.S. Rosengren, "Physiological Responses to Firefighter Exercise Protocols in Varying Environments," *Ergonomics*, (10 pages), 19 Jan, 2015. <http://dx.doi.org/10.1080/00140139.2014.997806>
48. Sosnoff, J.J., I.M. Rice, E.T. Hsiao-Wecksler, I.M.K. Hsu, C. Jayaraman, and Y. Moon, "Variability in Wheelchair Propulsion: A New Window into an Old Problem," *Frontiers in Bioengineering and Biotechnology*, 3:105 (7 pages), 2015. <http://dx.doi.org/10.3389/fbioe.2015.00105>
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#### **Submitted or in-revision journal or conference papers**

1. Fox, M.C., Polk, J.D., and Hsiao-Wecksler, E.T. “Effects of Body Mass on Leg and Vertical Stiffness in Running Humans”, Journal of Biomechanics (submitted) ). bioRxiv pre-print <https://doi.org/10.1101/2022.05.04.490639>
2. Thompson, N.A., Shin, S., Kocheril, A.G., Hsiao-Wecksler, E.T., and Krishnan, G. “Design and Validation of a Soft Robotic Simulator for Transseptal Puncture Training”, IEEE Transactions on Biomedical Engineering (under second review)
3. Mansouri, M., Krishnan, G., McDonagh, D.C., Zallek, C.M., and Hsiao-Wecksler, E.T. “Review of Assistive Devices for the Prevention and Treatment of Pressure Ulcers Among Immobile Patients: Challenges and Opportunities”, Disability and Rehabilitation: Assistive Technology (under second review)

4. Mansouri, M., Hsiao-Weckslar, E.T., and Krishnan, G. “Towards Design Guidelines for Multidirectional Patient Transfer on a Bed Surface Using Traveling Waves”, *ASME Journal of Mechanisms and Robotics* (under second review)
5. Xiao, C., Mansouri, M., Lam, D., Ramos, J. and Hsiao-Weckslar, E.T. “Design and Control of a Ballbot Drivetrain with High Agility, Minimal Footprint, and High Payload”, 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2023), Detroit, MI, October 1-5, 2023. (submitted)
6. Pei, Y., Mansouri, M., Zallek, C.M., and Hsiao-Weckslar, E.T. “Modeling, Control, and Clinical Validation of an Upper-limb Medical Education Task Trainer for Elbow Spasticity and Rigidity Assessment”, *IEEE Transactions on Neural Systems & Rehabilitation Engineering* (submitted)  
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8. Song, S.Y., Marin, N., Xiao, C., Okubo, R., Ramos, J. and Hsiao-Weckslar, E.T. “Hands-Free Physical Human-Robot Interaction and Testing for Navigating a Virtual Ballbot”, 32nd IEEE International Conference on Robot and Human Interactive Communication, IEEE RO-MAN 2023, Busan, South Korea, August 28-31, 2023. (submitted)

#### **In preparation journal or conference papers**

1. Song, S.Y., Pei, Y., Zallek, C.M., Tippet, S.R., and Hsiao-Weckslar, E.T. “Design and Validation of a Measurement Device (The PVRM – Position, Velocity, and Force Meter) for Quantifying Spasticity and Rigidity” (in preparation) *IEEE Trans Biomed Eng.*
2. Song, S.Y., Pei, Y., Zallek, C.M., Hsiao-Weckslar, E.T. “Quantification of Spasticity and Rigidity in Biceps and Triceps” (in preparation) *Clinical Neurophysiology*
3. Jahanian, O., Silver-Thorn, B., Muqet, V., Hsiao-Weckslar, E. T., Strath, S., and Slavens, B. A. “The Effects of Using Geared Wheels on Energy Expenditure during Manual Wheelchair Propulsion in Adults with Spinal Cord Injury”. *In prep*
4. Arquines, K., Mansouri, M., Krishnan, G., Zallek, C.M., Hsiao-Weckslar, E.T., and McDonagh, D.C. “User Centered Approach to the Needs of People Living with Amyotrophic Lateral Sclerosis (ALS)”. *In prep*

#### **Trade journals**

1. Horn, G.P., Hsiao-Weckslar, E.T., Rosengren, K.S., Hur, P., Park, K., and Smith, D. “FIND BALANCE – IFSI study examines how PPE affects walking & balance”, *Fire Rescue*, 27(1): 56-58, 2009.
2. Li, Y., Hsiao-Weckslar, E.T., Xia, J., Durfee, W.K., Banco, G.G., and Kovach, J.A. “Medical Motion: Actuation System Selection Analysis for Human Assist Applications”, *Today's Medical Developments*, February, 2012. <http://www.onlinetmd.com/tmd0212-fluid-power-actuation-systems.aspx>

#### **In the news**

1. Kline, G. “Scientists study cause of canine knee ailments”, *The News-Gazette*, August 20, 2005.
2. Korane, K. “Fluid Power Assists Rehabilitation Efforts”, *Hydraulics & Pneumatics*, 67(9): 34-38, September, 2014. <http://hydraulicspneumatics.com/hydraulics-pneumatics/2014-08-15-0>
3. John Gever. “Unique Solutions for MS Gait Problems”, *MedPage Today*, May 31, 2014.  
<http://www.medpagetoday.com/meetingcoverage/cmssc-actrims/46080>
4. Wurth, Julie. “Student team works to design new walking device with real-life impact for woman, maybe others”, *The News-Gazette*, September 30, 2019.
5. Wurth, Julie. “UI students' project produces new 'Bentley' for woman with cerebral palsy”, *The News-Gazette*, December 11, 2019. [https://www.news-gazette.com/news/local/university-illinois/ui-students-project-produces-new-bentley-for-woman-with-cerebral/article\\_d0807358-c752-5045-9515-fbd3fb315ee1.html](https://www.news-gazette.com/news/local/university-illinois/ui-students-project-produces-new-bentley-for-woman-with-cerebral/article_d0807358-c752-5045-9515-fbd3fb315ee1.html)
6. Pressey, Debra. “UI researchers redesigning the wheelchair”, *The News-Gazette*, Champaign, IL, September 26, 2020. [https://www.news-gazette.com/news/local/university-illinois/ui-researchers-redesigning-the-wheelchair/article\\_94be6d67-b9cf-5b6b-836a-58c26f11548c.html](https://www.news-gazette.com/news/local/university-illinois/ui-researchers-redesigning-the-wheelchair/article_94be6d67-b9cf-5b6b-836a-58c26f11548c.html)

7. “Hands-free wheelchair designed at U of I”, *WAND 17 TV news*, Decatur, IL, September 24, 2020.  
[https://www.wandtv.com/news/videos/hands-free-wheelchair-designed-at-u-of-i/video\\_c7a44f9c-e0b2-55a4-9cad-1bdaca269325.html](https://www.wandtv.com/news/videos/hands-free-wheelchair-designed-at-u-of-i/video_c7a44f9c-e0b2-55a4-9cad-1bdaca269325.html)

**FUNDING – AWARDED (\$ 9.4M overall, \$3.8M to ETHW)**

*For Research*

1. US Army, STTR Phase I: Biologically Inspired Acoustic Direction Finding for Soldiers, 8/04-2/05, #W911NF-04-C-0095, Antek, Inc. (PI), E. Hsiao-Wecksler (subaward), \$99,783.
2. UIUC Campus Research Board, Prevention of falls in older adults: assessment and models of human balance, 1/1/05-12/31/05, E. Hsiao-Wecksler (PI), \$15,976.
3. Mary Jane Neer Research Fund, UIUC College of Applied Life Studies, Assessing gait disability and recovery from injury using directional and variance asymmetry, 1/1/05-12/31/05, E. Hsiao-Wecksler (PI), K. Rosengren, J. Polk, \$13,000.
4. Faculty Incentive Grants, UIUC Initiative on Aging, Tracking fall-related events in young, middle-aged, older adults: development of the STAF (slips, trips, and falls) Inventory, 7/05-6/06, E. Hsiao-Wecksler (PI), K. Rosengren, A Creech, \$10,000.
5. Mary Jane Neer Research Fund, UIUC College of Applied Life Studies, Aging, physiological complexity, functional limitations and disability, 1/1/06-12/31/06, J. Sosnoff (PI), E. Hsiao-Wecksler, \$11,000.
6. UIUC Campus Research Board, Optimization-Based Inverse Dynamics to Reduce Errors in Estimated Joint Torques, 1/1/06-12/31/06, E. Hsiao-Wecksler (PI), \$19,126.
7. Mary Jane Neer Research Fund, UIUC College of Applied Life Studies, Multivariate analysis of simulated gait asymmetry, 5/15/06-5/14/07, J. Polk (PI), E. Hsiao-Wecksler, Sungjin Hong, \$7,853.
8. NSF, Engineering Research Center for Compact and Efficient Fluid Power, 5/18/06-5/17/16, K. Stelson, University of Minnesota (PI, Director), E. Hsiao-Wecksler (subaward PI). Testbed 6 Human Assist Devices - Fluid Powered Ankle-Foot Orthosis, \$1.2M since inception, # 0540834.
9. Faculty Incentive Grants, UIUC Initiative on Aging, Aging, Physiological Complexity, Functional Limitations and Disability, 6/1/06-5/30/07, J. Sosnoff (PI), E. Hsiao-Wecksler, \$10,000.
10. Department of Mechanical Science & Engineering Program for Exploratory Studies, UIUC, Gait and balance assessment of trip and fall risk among firefighters, 7/01/06-6/30/07, E. Hsiao-Wecksler (PI), \$20,935.
11. Illinois Homeland Security Research Center, Effect of SCBA bottle configuration on gait & balance performance among firefighters, 9/1/06-8/31/07, E. Hsiao-Wecksler (PI), K. Rosengren, T. Schroeder, \$30,000.
12. US Dept of Homeland Security, Cardiovascular and Biomechanical Responses to Firefighting and PPE: Firefighting, PPE and the leading sources of Firefighter fatalities and injuries, 7/27/07-7/26/08, D. Smith (PI), G. Horn (PI), #EMW-2006-FP-02459, \$899,268.
13. NSF, Quantitative Characterization of Complex Motion Patterns Using Shape-based and Multivariate Techniques, 9/1/07-8/31/10, E. Hsiao-Wecksler (PI), J. Polk, S. Hong, H. Dankowicz, #0727083, \$303,109.
14. American Kennel Club, Knee kinematics, kinetics and neuromuscular patterns in Labrador Retrievers at low risk for cranial cruciate disease, 3/1/08-2/28/09, \$12,960, D.J. Griffon (PI), E.T. Hsiao-Wecksler (Co-I), J. Pijanowski, C. Imb
15. American Kennel Club, Knee kinematics, kinetics and neuromuscular patterns in Labrador Retrievers predisposed to cranial cruciate disease, 3/1/08-2/28/09, \$12,960, D.J. Griffon (PI), E.T. Hsiao-Wecksler (Co-I), J. Pijanowski, C. Imbs
16. Mary Jane Neer Research Fund, UIUC College of Applied Health Studies, Wheelchair Use and Shoulder Pain: The Role of Motor Variability, 1/09-1/10, \$14,989, J. Sosnoff (PI), M. Frogley, P. Bajcsy, E. Hsiao-Wecksler, L.G. Carlton
17. UIUC Campus Research Board, Quantifying postural robustness and fall risk using Invariant Density Analysis, 5/16/09-12/31/10, \$11,310, E. Hsiao-Wecksler (PI).
18. UIUC Campus Research Board, Quantitative characterization of pathological gait patterns, # 10122, 5/16/10-12/31/11, \$22,620, J. Polk(PI), E. Hsiao-Wecksler, H. Dankowicz
19. National Collegiate Inventors and Innovators Alliance (NCIIA), IntelliWheels: The Continuously Variable Transmission for Manually-propelled Wheelchairs, #7596-10, 9/1/10 -1/31/12, \$20,000, E. Hsiao-Wecksler (PI).

20. National Multiple Sclerosis Society, Acute exercise, spasticity and functional outcomes in MS: differential effects of duration and intensity, J. Sosnoff (PI), E. Hsiao-Wecksler & R. Motl (Co-PIs), RG 4333A2/2, \$295,673. 4/1/11-3/31/13.
21. NIH, Propulsion Mechanics Variability and Shoulder Pain in Manual Wheelchair Users, J. Sosnoff (PI), E. Hsiao-Wecksler (Co-PI), R21-HD066129-01A1, \$205,439. 4/1/11-3/31/13.
22. Parker Hannifin Corp., Gift Funds, E. Hsiao-Wecksler (PI), \$6,762, 7/11
23. US Dept of Homeland Security, Effect of SCBA Design & Firefighting Induced Fatigue on Balance, Gait and Safety of Movement, G. Horn (PI), E. Hsiao-Wecksler, B. Fernhall, K. Rosengren, R. Motl EMW-2010-FP-01606, \$999,569, 8/11-9/14
24. NIH, SBIR Phase I, IntelliWheels: The Automatic Transmission for Manually Propelled Wheelchairs, # R43 HD071653-01, 08/01/2012 – 07/31/2013, IntelliWheels, Inc. (PI) \$164,567 total, E. Hsiao-Wecksler and J. Sosnoff (subaward) \$49,551.
25. NIH, SBIR Phase II, IntelliWheels: The Automatic Transmission for Manually Propelled Wheelchairs, # R44 HD071653-02, 08/01/14 – 07/31/16 (NCE to 7/31/17), IntelliWheels, Inc. (PI) \$757,333 total, E. Hsiao-Wecksler (subaward) \$50,535.
26. NSF, Engineering Research Center for Compact and Efficient Fluid Power, K. Stelson, University of Minnesota (PI, Director), NSF#0540834. E. Hsiao-Wecksler (subaward PI). Project 2.F1 Soft pneumatic actuator for arm orthosis, \$190,000, 6/1/14-5/31/16
27. Jump Trading Simulation & Education Center at OSF and the Health Care Engineering Systems Center in College of Engineering UIUC, Jump ARCHES (Applied Research for Community Health through Engineering and Simulation) program, Development of a Robotic Forearm to Simulate Abnormal Muscle Tone Due to Brain Lesions. E. Hsiao-Wecksler (PI) & S. Tippett, \$49,957, 1/1/2015-12/31/15 (NCE to 7/31/16).
28. Center for Compact and Efficient Fluid Power, Portable Pneumatically Powered Orthoses (Testbed 6), E. Hsiao-Wecksler (PI), G. Krishnan (co-I), \$80,000, 6/1/16-5/31/17
29. Jump Trading Simulation & Education Center at OSF and the Health Care Engineering Systems Center in College of Engineering UIUC, Jump ARCHES (Applied Research for Community Health through Engineering and Simulation) program, Development of a Robotic Forearm to Simulate Abnormal Muscle Tone Due to Brain Lesions (year 2 support), E. Hsiao-Wecksler (PI), C. Zallek, \$50,209, 8/16/16-8/15/17 (NCE to 8/15/18)
30. UIUC, CHART (Collaborations in Health, Aging, Research, and Technology) Program, Portable Position, Velocity, and Resistance Meter (PVRM): A Portable Clinical Tool for Spasticity & Rigidity Assessment, E. Hsiao-Wecksler (PI), D.C. McDonagh and C. Shin (co-I), \$5,000, 6/1/17-8/31/17
31. Jump Trading Simulation & Education Center at OSF and the Health Care Engineering Systems Center in College of Engineering UIUC, Jump ARCHES (Applied Research for Community Health through Engineering and Simulation) program, Robotic Arm Neurological exam Training Simulator for Abnormal Muscle Tone (Rigidity), E. Hsiao-Wecksler (PI), C. Zallek, \$61,533, 3/1/19-2/28/20.
32. UIUC Campus Research Board, Development and evaluation of PURE (Personalized Unique Rolling Experience), E. Hsiao-Wecksler (PI), D. McNonagh, \$22,689, 4/30/19-11/30/2020.
33. UIUC, The Grainger College of Engineering, ZJU-UIUC Institute Research Program, Robotic Simulators for Neurological Examination Training, E. Hsiao-Wecksler (PI), C. Zallek, \$75,000, 7/15/19 - 8/15/20.
34. UIUC, The Grainger College of Engineering, Grainger Small Equipment Grant Program, An Open-Source High Resolution Silicone 3D printer with Customized Multimaterial Head and Dissolvable Support Feature, Girish Krishnan (PI), \$16,823, 10/11/19-12/31/19.
35. Jump Trading Simulation & Education Center at OSF and the Health Care Engineering Systems Center in College of Engineering UIUC, Jump ARCHES (Applied Research for Community Health through Engineering and Simulation) program, Design and Validation of a Soft Robotic Cardiac Transseptal Puncture Simulator, Girish Krishnan (PI), A. Kocheril (Co-PI), E. Hsiao-Wecksler, H-J Kong, \$60,346, 1/21/2020-1/20/2021.
36. Jump Trading Simulation & Education Center at OSF and the Health Care Engineering Systems Center in College of Engineering UIUC, Jump ARCHES (Applied Research for Community Health through Engineering and Simulation) program, Autonomous Morphing Bed Mattress for ALS patients with Limited

- Movement Ability, P228, E. Hsiao-Wecksler (PI), Girish Krishnan (Co-PI), C. Zallek, D. McDonagh, \$75,000, 1/21/2020-1/20/2021.
37. Grainger College of Engineering UIUC, Strategic Research Initiative (SRI) Phase 1 Award, Center for Wearable Intelligent Technologies (WIT). E. Hsiao-Wecksler (PI), S. Nam, G. Krishnan, R.B Sowers, M.E. Hernandez, S.J. Petruzzello, D. McDonagh, \$75,000, 5/16/20 – 5/15/21.
  38. NSF National Robotics Initiative 2.0, NRI: INT: MiaPURE (Modular, Interactive and Adaptive Personalized Unique Rolling Experience), #2024905, E. Hsiao-Wecksler (PI), D. McDonagh (co-PI), W. Norris (co-PI), J. Ramos, A. Bleakney, J. Elliot, P. Malik. \$1,499,539, 10/01/2020-09/30/2024.
  39. Jump Trading Simulation & Education Center at OSF and the Health Care Engineering Systems Center in College of Engineering UIUC, Jump ARCHES (Applied Research for Community Health through Engineering and Simulation) program, Remote state anxiety detection and monitoring using multimodal wearable sensors. M.E. Hernandez (PI), E. Hsiao-Wecksler, R.B Sowers, B.W. Roberts, S. Caldecott-Johnson, J. Clore, Phase 1 funding: \$75,000, 1/25/21-1/24/22 (NCE: 1/24/23), Phase 2 funding: \$195,189, 1/1/23-12/31/24.
  40. UIUC - Center for Networked Intelligent Components and Environments (C-NICE), Foxconn Interconnect Technology/Belkin, Ultrasensitive Temperature-sensing Intelligent Surfaces for Smart Home, S. Nam (PI), E. Hsiao-Wecksler, \$163,993, 1/15/21-1/14/22 (NCE: 1/14/23).
  41. Grainger College of Engineering UIUC, Strategic Research Initiative (SRI) Phase 2 Award, Center for Wearable Intelligent Technologies (WIT). E. Hsiao-Wecksler (PI), S. Nam, G. Krishnan, R.B Sowers, M.E. Hernandez, S.J. Petruzzello, D. McDonagh, \$54,150, 11/16/21 – 11/15/22.
  42. Jump ARCHES program, UIUC, Koopman framework for detecting mental health changes in multimodal wearable data, M.E. Hernandez (PI), J. Clore, R.B Sowers, E. Hsiao-Wecksler, \$74,947, 5/16/22-5/15/23

#### *For Education and Outreach*

1. NSF, *REU-Engineering Research Center for Compact and Efficient Fluid Power*, 6/1/07-5/31/014, A. Alleyne (PI), E. Hsiao-Wecksler, E. Loth, \$68,650.
2. UIUC Office of Public Engagement, *Alpha Launch of an Affordable Prosthetic Arm for Upper-Extremity Amputees in Guatemala*, E. Hsiao-Wecksler (PI), J. Naber, R. Kesler, and D. Krupa, \$10,000, 12/11-12/12
3. UIUC Office of Public Engagement, *Inspiring K-12 Students and Local Community to Engage in STEM Activities through Organized Robotics Programs*, E. Hsiao-Wecksler (PI), S. Suryadevara, S.Y.Jung, M.S. Kasten, and R. Smith, \$11,500, 12/11-12/12
4. UIUC College of Engineering, *Strategic Instruction Initiatives Program (SIIP): ME 370 / 371 (Machine Design) Course Revision*, S. Downing (PI), E Hsiao-Wecksler, A. Beaudoin, and S. Tawfick. \$226,721, 6/13-5/15.
5. National Fluid Power Association, *Exploring fluid power through fluid-powered bicycle competition*, E. Hsiao-Wecksler (PI), \$3,010, 11/14-10/15.
6. UIUC Office of Public Engagement, *Equipping K-12 Students to Explore STEM through Teamwork-Oriented Robotics Competitions*, E. Hsiao-Wecksler (PI), A. Aslam, R. Nothof, M.S. Kasten, and R. Smith, \$10,000, 12/14-12/15
7. UIUC College of Engineering, *Strategic Instruction Initiatives Program: (i Design) Integrated MechSE Design Curriculum*, E. Hsiao-Wecksler (PI), S. Downing, A. Dunn, B. Flachsbar, E. Jassim, B. Johnson, R. Keane, S. Kim, M. Philpott, S. Tawfick, A. Wissa, \$59,900, 6/15-6/17.

#### **PEER-REVIEWED CONFERENCE PRESENTATIONS**

1. **Song, S.Y., Pei, Y.,** Hsiao-Wecksler, E.T. “Comparison of 3-D Torso Angles Using Low-Cost vs. High-Cost IMU,” North American Congress on Biomechanics, Ottawa, Quebec, Canada, August 21-25, 2022.
2. **Pei, Y.,** Feng, Y., **Song, S.Y.,** Liu, T., Zallek, C.M., and Hsiao-Wecksler, E.T., “Quantification of Elbow Spasticity (Preliminary Results)”, North American Congress on Biomechanics, Ottawa, Quebec, Canada, August 21-25, 2022.
3. **Song, S.Y., Xiao, C., Chen, Y.,** Ramos, J., Hsiao-Wecksler, E.T. “Hands-free Interface for a Self-balancing Omnidirectional Riding Ballbot,” 45th American Society of Biomechanics Annual Meeting (virtual), Atlanta, GA, August 10-13, 2021.

4. **Pei, Y., Garag, P., Gim, K.,** Zallek, C.M., Hsiao-Weckslers, E.T. “Biomechanical Design and Preliminary Evaluation of an Ankle-Foot Simulator for Ankle Clonus Assessment Training,” 44th American Society of Biomechanics Annual Meeting (virtual), Atlanta, GA, August 4-7, 2020.
5. **Song, S.Y., Pei, Y.,** Hsiao-Weckslers, E.T. “Simple and Low-Cost Methods of Computing Joint Angles Using Inertial Measurement Units Without Magnetometers,” 44th American Society of Biomechanics Annual Meeting (virtual), Atlanta, GA, August 4-7, 2020. **Finalist in MS student 3-minute presentation competition**
6. **Song, S.Y., Pei, Y.,** Zallek, C.M., Hsiao-Weckslers, E.T. “Preliminary Study of Spasticity Using the Portable Position, Velocity, and Resistance Meter (PVRM),” 44th American Society of Biomechanics Annual Meeting (virtual), Atlanta, GA, August 4-7, 2020.
7. Galvez, R., Amos, J., Hsiao-Weckslers, E.T., Huesmann, G., Llano, D., Miranpuri, A., Sutton, B., Vlasov, Y., and Rowen, J. “Evaluation of medical, basic science, and engineering knowledge following completion of the first engineering-integrated pre-clerkship clinical neuroscience medical course,” Society for Neuroscience annual meeting (virtual), Chicago, IL USA, October 19-23, 2019.
8. **Fox, M.,** Hsiao-Weckslers, E.T., Polk, J.D., “Body size differences in vertical and leg stiffness in running humans,” XXVII Congress of the International Society of Biomechanics and 43rd American Society of Biomechanics Annual Meeting, Calgary, Alberta, Canada, July 31-August 4, 2019.
9. **Xiao, C.,** Jahanian, O., Slavens, B.A., Hsiao-Weckslers, E.T. “Palmar pressure distribution using a pneumatic sleeve orthosis during Lofstrand crutch-assisted gait,” XXVII Congress of the International Society of Biomechanics and 43rd American Society of Biomechanics Annual Meeting, Calgary, Alberta, Canada, July 31-August 4, 2019.
10. **Xiao, C.,** Krishnan, G., Hsiao-Weckslers, E.T. “Crutch loading and spatiotemporal effects while using pneumatic ergonomic crutches,” XXVII Congress of the International Society of Biomechanics and 43rd American Society of Biomechanics Annual Meeting, Calgary, Alberta, Canada, July 31-August 4, 2019.
11. Jahanian, O., Schnorenberg, A., Hsiao-Weckslers, E.T., Slavens, B.A., “Biomechanics of geared manual wheelchair ramp ascent in individuals with spinal cord injury,” XXVII Congress of the International Society of Biomechanics and 43rd American Society of Biomechanics Annual Meeting, Calgary, Alberta, Canada, July 31-August 4, 2019.
12. **Song, S.Y.,** Zallek, C.M., Hsiao-Weckslers, E.T. “Quantification of Spasticity in Upper-Arm Muscles Using the PVRM (Position, Velocity, and Resistance Meter)”, Design of Medical Devices Conference, Minneapolis, MN, April 16-18, 2019.
13. Jahanian, O., **Gaglio, A.,** Schnorenberg, A. J., Muqet, V., Hsiao-Weckslers, E. T., and Slavens, B. A. “Evaluation of Hand-rim and Wrist Joint Kinetics During Geared Manual Wheelchair Propulsion in Veterans with Spinal Cord Injury”, Biomedical Sciences Instrumentation, 55(2): 324-329, 2019. Presented at 56th annual Rocky Mountain Bioengineering Symposium, Milwaukee, WI, April 12-14, 2019.
14. Galvez, R., Ahmad, B., Aldridge, B., Amos, J., Coiado, O., Hsiao-Weckslers, E.T., Huesmann, G., Llano, D., Pluta, W., Roberts-Lieb, S., Vlasov, Y., Yodh, J., and Rowen, J. “Development of an engineering-integrated clinical neuroscience medical curriculum: A novel case-centered problem-based medical education,” Society for Neuroscience annual meeting, San Diego, CA, November 3-7, 2018.
15. Jahanian, O., Muqet, V., Hsiao-Weckslers, E.T., Slavens, B.A., “Shoulder Muscle Activity during Geared Manual Wheelchair Start-Up on Carpeted Floor”, 12th International Shoulder Group (ISG) Meeting, Rochester, MN, August 12-13, 2018.
16. Jahanian, O., Silver-Thorn, B., Strath, S.J., Muqet, V., Hsiao-Weckslers, E.T., Slavens, B.A., “Energy Expenditure During Geared manual Wheelchair Propulsion in Individuals with Spinal Cord Injury,” 42nd American Society of Biomechanics Annual Meeting, Rochester, MN, August 8-11, 2018.
17. Jahanian, O., **Gaglio, A.,** Daigle, S., Muqet, V., Schorenberg, A.J., Hsiao-Weckslers, E.T., Slavens, B.A., “Hand-rim Biomechanics of Geared Manual Wheelchair Mobility” Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) 2018 Annual Conference, Arlington, VA, July 13 - 15, 2018. **Student Scientific Paper Winner.**  
<https://www.resna.org/sites/default/files/conference/2018/cac/Jahanian.html>
18. **Wang, Z.** and Hsiao-Weckslers, E.T. “Minimum Sensor Configuration for Gait Event Detection for a Portable Powered Ankle-Foot Orthosis,” 8th World Congress of Biomechanics, Dublin, Ireland, July 8-12, 2018.

19. Hernandez, M E., Sowers, R., **Thompson, N.**, Krishnan, G., Hsiao-Wecksler, E.T., “Body-in-the-loop control of soft robotic exoskeletons during virtual manual labor tasks”, 2018 IEEE International Conference on Robotics and Automation (ICRA), Brisbane, Australia, May 21-25, 2018
20. Jahanian O., Schnorenberg A., Riebe J., **Gaglio A.**, Muqet V., Hsiao-Wecksler, E., and Slavens B. “Glenohumeral Joint Dynamics During Geared Manual Wheelchair Propulsion in Individuals with Spinal Cord Injury,” Gait and Clinical Movement Analysis Society (GCMAS) 2019 Conference, Frisco, TX, March 26-29, 2019.
21. **Xiao, C.**, Jahanian, O., Slavens, B., Hsiao-Wecksler, E.T. “Biomechanical Evaluation of a Pneumatic Sleeve Orthosis for Lofstrand Crutch-Assisted Gait,” 41<sup>st</sup> American Society of Biomechanics Annual Meeting, Boulder, CO, August 8-11, 2017.
22. **Xiao, C.**, Singh, G., Jahanian, O., Slavens, B., Krishnan, G., Hsiao-Wecksler, E.T. “Pneumatic ergonomic crutches: a self-contained, soft-robotic, energy-harvesting platform”, Dynamic Walking, Pensacola, FL, May 21-25, 2018.
23. *Gacek, E., Pakeltis, A.* **Gaglio, A.**, Daigle, S., Jahanian, O., Slavens, B., Rice, I., Hsiao-Wecksler, E.T. “An Investigation of the Effect of Gear Ratio on Manual Wheelchair Kinetics,” American Society of Biomechanics Midwest Regional Meeting, Grand Rapids, MI, February 23-24, 2017.
24. **Pei, Y., Liang, J.**, Ewoldt, R.H., Tippett, S.R., and Hsiao-Wecksler, E.T. “Validation of a Passive Hydraulic Simulator for Spasticity Replication,” American Society of Biomechanics Midwest Regional Meeting, Grand Rapids, MI, February 23-24, 2017.
25. **Thompson, N.**, Zhang, X., Krishnan, G. Hsiao-Wecksler, E.T. “Design of a Soft Robotic Upper-body Exoskeleton for Reducing Loads After Shoulder Injury in Manual Wheelchair Users, Preliminary Research,” American Society of Biomechanics Midwest Regional Meeting, Grand Rapids, MI, February 23-24, 2017.
26. **Petrucci, M.N., Boes, M.K., Kesler, R.M.**, Hsiao-Wecksler, E.T. Modification of Gait Kinetics Using a Powered Ankle Foot Orthosis for Gait Assistance in People with Multiple Sclerosis. 40th American Society of Biomechanics Conference, Raleigh, NC, August 2-5, 2016.
27. *Matijevich, E.S., Boes, M.K., Petrucci, M.N.*, Hsiao-Wecksler, E.T. Method for Assessing Hip Circumduction in Persons with Multiple Sclerosis While Wearing a Portable Powered Ankle Foot Orthosis. 40th American Society of Biomechanics Conference, Raleigh, NC, August 2-5, 2016.
28. Hsiao-Wecksler, E.T., “Portable Powered Ankle-Foot Orthosis (PPAFO) Testbed for Gait Initiation and Assistance”, Design of Medical Devices Conference, Minneapolis, MN, April 11-14, 2016. (Invited talk)
29. Tawfick, S., Beaudoin, A., Downing, S., Hsiao-Wecksler, E., Herman, G. L., Migotsky, C. & Hahn, L. “Transitioning from analysis-based to project-based machine design education”. In Proceedings of the 2015 ASME International Mechanical Engineering Congress and Exposition, Houston, TX, November 13-19, 2015.
30. **Islam, M.**, Hagan, M.T., and Hsiao-Wecksler, E.T. “State Estimation Technique for Detecting Gait Event during Human Walking with Powered Ankle-Foot Orthosis (AFO) using Modified Fractional Timing and Artificial Neural Network ”, 2015 Midwest Biomedical Engineering Society (BMES) Regional Conference, Akron, OH, November 6, 2015.
31. **Petrucci, M.N.**, MacKinnon, C.D., Hsiao-Wecksler, E.T. “Effectiveness of self-triggered versus externally-triggered cueing for improving gait initiation in persons with Parkinson’s disease and freezing of gait”, 45th Annual Society for Neuroscience, Chicago, IL, October 17-21, 2015.
32. **Islam, M., Wang, Z., Boes, M.K., Hsiao-Wecksler, E.T.**, “Pneumatically Powered Ankle-Foot Orthosis”, 2<sup>nd</sup> Fluid Power Innovation and Research Conference (FPIRC), Chicago, IL, October 14-16, 2015.
33. Singh, G., **Farooq, D., Xiao, C., Oo, Y.**, Tawfick, S.H, Ferreria, P., Slavens, B., Krishnan, G., Hsiao-Wecksler, E.T. “Project 2F.1: Soft Pneumatic Actuator for Arm Orthosis”, 2<sup>nd</sup> Fluid Power Innovation and Research Conference (FPIRC), Chicago, IL, October 14-16, 2015.
34. *Heinrich, M., Mattson, C., Ramuta, M., Stock, J., Liang, J.*, Morris, M.J., Tippett, S.R., Hsiao-Wecksler, E.T., and Henderson, J. “Pneumatic Elbow Simulator of Spasticity and Rigidity for Training of Healthcare Clinicians”, 2<sup>nd</sup> Fluid Power Innovation and Research Conference (FPIRC), Chicago, IL, October 14-16, 2015.
35. **Boes, M.K.**, Klaren, R.E., Kesler, R.M., **Islam, M.**, Learmonth, Y., **Petrucci, M.N.**, Motl, R.W. and Hsiao-Wecksler, E.T. “Spatiotemporal and Metabolic Impacts on Gait of a Powered Ankle Exoskeleton in Persons



- with Multiple Sclerosis”, 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, August 5-8, 2015.
36. Deetjen, G.S., Angelini, M.J., Kesler, R.M., Petrucci, M.N., Rosengren, K.S., Horn, G.P., and Hsiao-Wecksler, E.T. “Duration of Exertion and SCBA Design Affect Firefighter Balance”, 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, August 5-8, 2015.
  37. Angelini, M.J., Kesler, R.M., Petrucci, M.N., Rosengren, K.S., Horn, G.P., and Hsiao-Wecksler, E.T. “Effects of Fatigue and Asymmetric Load Carriage on Firefighter Obstacle Crossing Performance”, 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, August 5-8, 2015.
  38. Petrucci, M.N., DiBerardino, L.A., MacKinnon, C.D., Hsiao-Wecksler, E.T. “Simulation of Reduced Ankle Torque During the Anticipatory Postural Adjustments for Gait Initiation”, 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, August 5-8, 2015.
  39. DiBerardino, L.A., Dankowicz, H., Hsiao-Wecksler, E.T. “Studying the Progression of Compensation Changes During Simulated Recovery From Injury”, 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, August 5-8, 2015.
  40. Hsiao-Wecksler, E.T. “Portable Pneumatically-Powered Ankle-Foot Orthosis”, Dynamic Walking 2015, Columbus, OH, July 21-24, 2015.
  41. Petrucci, M.N., MacKinnon, C.D., Hsiao-Wecksler, E.T. “A orthosis improves the magnitude and consistency of gait initiation in Parkinson's disease with freezing of gait”, The MDS 19th International Congress of Parkinson's Disease and Movement Disorders, San Diego, CA, June 14-18, 2015.
  42. Wang, Z. and Hsiao-Wecksler, E.T., “Design and control of a compact high torque actuation system for a Portable Pneumatically Powered Ankle-Foot Orthosis”, 1st Fluid Power Innovation & Research Conference 2014, Nashville, TN, October 13-15, 2014.
  43. Islam, M., Boes, M.K., Hsiao-Wecksler, E.T., Neubeuer, B. Durfee, W.F. “Test Bed 6 - Human Assist Devices (Fluid-powered ankle-foot-orthoses)”, 1st Fluid Power Innovation & Research Conference 2014, Nashville, TN, October 13-15, 2014.
  44. Singh, G., D. Farooq, D., Hsiao-Wecksler, E.T., Krishnan, G. Tawfick, S.H. “Soft Pneumatic Actuator for Arm Orthosis”, 1st Fluid Power Innovation & Research Conference 2014, Nashville, TN, October 13-15, 2014.
  45. Hsiao-Wecksler, E.T., Boes, M.K., Islam, M., and Petrucci, M.N., “A Portable Powered Ankle-Foot Orthosis for Gait Initiation and Assistance”, 36<sup>th</sup> Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Chicago, IL, August 26-30, 2014
  46. Moon, Y., Jayaraman, C., Hsiao-Wecksler, E.T., Sosnoff, J.J. Variability structure in hand-rim peak force during manual wheelchair propulsion: A pilot study”, 7<sup>th</sup> World Congress of Biomechanics, Boston, MA, July 6-11, 2014. (**Third place – Best Poster for Masters Student**)
  47. Bradley, F.F., Angelini, M.J., Kesler, R.M., Petrucci, M.N., Rosengren, K.S., Horn, G.P., and Hsiao-Wecksler, E.T. “Effects of Fatigue and Load Carriage on Firefighter Gait”, 7<sup>th</sup> World Congress of Biomechanics, Boston, MA, July 6-11, 2014.
  48. Angelini, M.J., Kesler, R.M., Petrucci, M.N., Rosengren, K.S., Horn, G.P., and Hsiao-Wecksler, E.T. “Effects of fatigue, extended duration exercise, and variation of size and geometry of SCBA pack on firefighters’ ability to cross stationary obstacles”, 7<sup>th</sup> World Congress of Biomechanics, Boston, MA, July 6-11, 2014.
  49. Kesler, R.M., Hsiao-Wecksler, E.T., Motl, R.M, and Horn, G.P., “Accuracy of a modified facepiece for metabolic data collection from firefighters”, 7<sup>th</sup> World Congress of Biomechanics, Boston, MA, July 6-11, 2014.
  50. Boes, M.K., Islam, M., Neville, K., and Hsiao-Wecksler, E.T. “Differences in ankle angle during gait due to variations in assistive torque timing”, 7<sup>th</sup> World Congress of Biomechanics, Boston, MA, July 6-11, 2014.
  51. Petrucci, M.N., MacKinnon, C.D., and Hsiao-Wecksler, E.T., “A Step Towards Reducing Freezing of Gait in Parkinson’s Disease: Using a Portable Powered Orthosis”, 7<sup>th</sup> World Congress of Biomechanics, Boston, MA, July 6-11, 2014.
  52. Boes, M.K., Hsiao-Wecksler, E.T., and Motl, R.W. “Evaluation of a Portable Powered Ankle-Foot Orthosis on Gait Function in Persons with Multiple Sclerosis”, 2014 Consortium of Multiple Sclerosis Centers ACTRIMS Meeting, Dallas, TX, May 28-31, 2014.
  53. Hsiao-Wecksler, E.T. “Portable powered ankle-foot-orthosis (PPAFO) for gait and rehabilitation”, ASME Design of Medical Devices Conference, Minneapolis, MN, April 7-10, 2014.

54. **DiBerardino, L.A.**, Dankowicz, H., and Hsiao-Wecksler, E.T. “Modeling Control Adaptations During Recovery from Anterior Cruciate Ligament Reconstruction”, 2013 ASME International Mechanical Engineering Congress Exposition (IMECE), San Diego, CA, November 15-21, 2013.
55. **Boes, M.K.**, **Tangtragulcharoen, T.**, **Kesler, R.M.**, Nolan, L., and Hsiao-Wecksler, E.T., “Spatiotemporal Gait Analysis of Trans-tibial and Trans-femoral Amputees at Varying Gait Speeds”, 37th Annual Meeting of the American Society of Biomechanics, Omaha, NE, September 4-7, 2013.
56. **Petrucci, M.N.**, Horn, G.P., Rosengren, K.S., and Hsiao-Wecksler, E.T., “Perception vs. Action: Perceived Obstacle Crossing Ability of Firefighters In Protective Gear”, 37th Annual Meeting of the American Society of Biomechanics, Omaha, NE, September 4-7, 2013.
57. **Sy, J.**, Horn, G.P., **Kesler, R.M.**, **Petrucci, M.N.**, Park, K., and Hsiao-Wecksler, E.T., “Assessing Gait Changes In Firefighters Due To Fatigue And Asymmetric Load Carriage”, 37th Annual Meeting of the American Society of Biomechanics, Omaha, NE, September 4-7, 2013.
58. **Kesler, R.M.**, Horn, G.P., and Hsiao-Wecksler, E.T., “Analysis of Foot Clearances in Firefighters during Ascent and Descent of Stairs”, 37th Annual Meeting of the American Society of Biomechanics, Omaha, NE, September 4-7, 2013.
59. **Hsu, M-K. I.**, Moon, Y., Jayaraman, C., Rice, I.M., Sosnoff, J., and Hsiao-Wecksler, E.T., “Variability Of Upper Extremity Kinematics And Shoulder Pain During Wheelchair Propulsion: A Vector Coding Analysis”, 37th Annual Meeting of the American Society of Biomechanics, Omaha, NE, September 4-7, 2013. (Nominated for Clinical Biomechanics Award.)
60. Jayaraman, C., Rice, I.M., Moon, Y., **Hsu, M-K. I.**, Hsiao-Wecksler, E.T., Beck, C., and Sosnoff, J.J., “A Principal Component Analysis Of Kinematic Variability During Wheelchair Propulsion”, 37th Annual Meeting of the American Society of Biomechanics, Omaha, NE, September 4-7, 2013.
61. Moon, Y., Jayaraman, C., **Hsu, M-K. I.**, Rice, I.M., Hsiao-Wecksler, E.T., and Sosnoff, J.J., “Variability of Peak Shoulder Force during Wheelchair Propulsion as A Function of Shoulder Pain”, 37th Annual Meeting of the American Society of Biomechanics, Omaha, NE, September 4-7, 2013.
62. Hsiao-Wecksler, E.T., “Portable powered ankle-foot-orthosis (PPAFO) for gait and rehabilitation”, Dynamic Systems and Control Conference (DSCC), Fort Lauderdale, FL, October 17-19, 2012. (Invited session)
63. **Boes, M.K.**, Hsiao-Wecksler, E.T., Motl, R.W, and Sosnoff, J.J., “Postural Control Model of Spasticity in Persons with Multiple Sclerosis”, 36th Annual Meeting of the American Society of Biomechanics, Gainesville, FL, August 15-18, 2012.
64. Jayaraman, C., **Hsu, M-K. I.**, Moon, Y., Hsiao-Wecksler, E.T., Rice, I.M., Beck, C., and Sosnoff, J.J., “Correlation Analysis of Upper Extremity Kinematics for Manual Wheelchair Propulsion”, 36th Annual Meeting of the American Society of Biomechanics, Gainesville, FL, August 15-18, 2012.
65. **Li, Y.D.**, and Hsiao-Wecksler, E.T., “Gait Mode Recognition Using an Inertia Measurement Unit on a Powered Ankle-Foot-Orthosis”, 36th Annual Meeting of the American Society of Biomechanics, Gainesville, FL, August 15-18, 2012.
66. **Petrucci, M.N.**, **Hartton, B.**, Rosengren, K.S., Horn, G.P., and Hsiao-Wecksler, E.T., “What Causes Slips, Trips, and Falls on the Fireground? A Survey”, 36th Annual Meeting of the American Society of Biomechanics, Gainesville, FL, August 15-18, 2012.
67. **Petrucci, M.N.**, MacKinnon, C.D., and Hsiao-Wecksler, E.T., “Mechanical Cueing Using a Portable Powered Ankle-Foot Orthosis”, 36th Annual Meeting of the American Society of Biomechanics, Gainesville, FL, August 15-18, 2012.
68. **Socie, M.J.**, Hsiao-Wecksler, E.T., Sandroff, B.M., Pula, J.H., Motl, R.W., Sosnoff, J.J. “A Novel Metric of Footfall Placement Variability and Fall History in Multiple Sclerosis”, Gait and Clinical Movement Analysis Society (GCMAS), Grand Rapids, MI, May 9-12, 2012.
69. **Daigle, S.C.**, Sosnoff, J.J., and Hsiao-Wecksler, E.T., “An Evaluation of an Automatic Gear-shifting System for Manual Wheelchairs”, ASME Design of Medical Devices Conference, Minneapolis, MN, April 10-12, 2012
70. Hsiao-Wecksler, E.T., **Shorter, K.A.**, **Li, Y.**, Kogler, G.F., and Durfee, W.K., “Portable Pneumatically-Powered Ankle-Foot Orthosis”, ASME Design of Medical Devices Conference, Minneapolis, MN, April 10-12, 2012

71. **Park, K., Morris, E.A.,** and Hsiao-Wecksler, E.T. “Effect of time normalizing gait data on the condition signature of lower limb joint motions”, 35<sup>th</sup> Annual Meeting of the American Society of Biomechanics, Long Beach, CA, August 10-13, 2011.
72. **Park, K.,** Vallabhajosula, S., Roemmich, R., *Jungles, L.*, Hass, C.J. and Hsiao-Wecksler, E.T. “Effects of Subthalamic Nucleus Deep Brain Stimulation on Parkinsonian Gait Behavior, 35<sup>th</sup> Annual Meeting of the American Society of Biomechanics, Long Beach, CA, August 10-13, 2011.
73. **Li, Y., Morris, E.A., Shorter, K.A.,** and Hsiao-Wecksler, E.T. “Energy Efficiency Analysis of A Pneumatically-Powered Ankle-Foot Orthosis”, International Fluid Power Expo (IFPE), Las Vegas, NV, March 23-25, 2011.
74. **Daigle, S.C.,** Rampurawala, Z., Hsiao-Wecksler, E.T., and Sosnoff, J.J., Evaluation of an Inertial and Magnetic Measuring System as a Method of Collecting Kinematics of Wheelchair Propulsion. 34<sup>rd</sup> Annual Meeting of the American Society of Biomechanics, Providence, RI, August 18-21, 2010.
75. **DiBerardino, L.A.,** Dankowicz, H., and Hsiao-Wecksler, E.T. Neuromuscular control adaptation in gait due to injury: a motivating study using a simplified dynamic model. 34<sup>rd</sup> Annual Meeting of the American Society of Biomechanics, Providence, RI, August 18-21, 2010.
76. **DiBerardino, L.A.; Ragetly, C.A.;** Hong, S.; Griffon, D.J.; Hsiao-Wecksler, E.T. Improving Regions of Deviation gait symmetry analysis with pointwise t-tests, 34<sup>rd</sup> Annual Meeting of the American Society of Biomechanics, Providence, RI, August 18-21, 2010.
77. **Hur, P.,** Kang, H.G., Lipsitz, L. A. and Hsiao-Wecksler, E.T. Fall-risk Estimation of Community-Dwelling Elderly Using Invariant Density Analysis. 34<sup>rd</sup> Annual Meeting of the American Society of Biomechanics, Providence, RI, August 18-21, 2010.
78. **Morris, E.A.,** and Hsiao-Wecksler, E.T. Time normalizing gait data based on gait events. 34<sup>rd</sup> Annual Meeting of the American Society of Biomechanics, Providence, RI, August 18-21, 2010.
79. **Park, K.,** Dankowicz, H., and Hsiao-Wecksler, E.T. Assessing spatiotemporally complex and coupled gait patterns using temporal cross-correlation. 34<sup>rd</sup> Annual Meeting of the American Society of Biomechanics, Providence, RI, August 18-21, 2010.
80. **Shorter, K.A.,** Kogler, G.F., Loth, E., Durfee, W.K, and Hsiao-Wecksler, E.T., A pneumatically powered portable ankle-foot orthosis. 34<sup>rd</sup> Annual Meeting of the American Society of Biomechanics, Providence, RI, August 18-21, 2010.
81. **Hur, P.,** Kang, H.G., Lipsitz, L. A. and Hsiao-Wecksler, E.T. Invariant Density Analysis of Postural Sway and Fall-risk Estimation Model of Community-Dwelling Elderly Adults. 6<sup>th</sup> World Congress of Biomechanics, Singapore, August 1-6, 2010. *Invited Paper*
82. **Park, K.,** Dankowicz, H., and Hsiao-Wecksler, E.T. Characterization of spatiotemporally complex and coupled gait patterns using cross-correlation. 16<sup>th</sup> US National Congress on Theoretical and Applied Mechanics (USNCTAM), University Park, PA, June 27 - July 2, 2010.
83. Sosnoff, J.J., Rampurawala, Z., **Daigle, S. DiBerardino, L.A.,** Park, K., and Hsiao-Wecksler, E.T. Complexity and Variability in Manual Wheelchair Propulsion. 16<sup>th</sup> US National Congress on Theoretical and Applied Mechanics (USNCTAM), University Park, PA, June 27 - July 2, 2010.
84. **Li, Y., Shorter, K.A.,** Bretl, T. and Hsiao-Wecksler, E.T. Modeling and Control of a Portable Powered Ankle Foot Orthosis. 6<sup>th</sup> Annual FPNI – PhD Symposium, West Lafayette, Indiana, June 15-19, 2010.
85. Helwig, N.E., Hong, S., and Hsiao-Wecksler, E.T. Time-Normalization Techniques for Gait Data Curves. 33<sup>rd</sup> Annual Meeting of the American Society of Biomechanics, State College, PA, August 26-29, 2009.
86. Helwig, N.E., Hong, S., and Hsiao-Wecksler, E.T. Partitioning Gait Cycle Curves into Temporal and Intensity Differences. 33<sup>rd</sup> Annual Meeting of the American Society of Biomechanics, State College, PA, August 26-29, 2009.
87. **Hur, P.,** Kang, H.G., Lipsitz, L. A. and Hsiao-Wecksler, E.T. Invariant Density Analysis of postural sway and prospective fall risk in community-dwelling elderly. 33<sup>rd</sup> Annual Meeting of the American Society of Biomechanics, State College, PA, August 26-29, 2009.
88. **Hur, P. Shorter, K.A.,** and Hsiao-Wecksler, E.T. Examining quiet standing center of pressure data using invariant density analysis. ASME 2009 Summer Bioengineering Conference (SBC2009), Tahoe, CA, June 17-21, 2009.

89. **DiBerardino, L.A.**, Polk, J.D., Rosengren, K.S., and Hsiao-Weckler, E.T. Quantifying complexity and variability of gait phase portraits. ASME 2009 Summer Bioengineering Conference (SBC2009), Tahoe, CA, June 17-21, 2009. **Received Best Master's Student Poster Award.**
90. **Ragetly, C.A.**, Griffon, D.J., Thomas, J.E., Mostafa, A.A., Schaeffer, D.S., Pijanowski, G.J., and Hsiao-Weckler, E.T. Non invasive determination of body segment parameters of the hind limb in Labrador Retrievers with and without cranial cruciate ligament disease. American College of Veterinary Surgeons Veterinary Symposium in San Diego, CA, October 23-25, 2008.
91. **DiBerardino, L.A.**, Hong, S., Ragetly, C.A., Thomas, J.E. and Hsiao-Weckler, E.T. Analysis and classification methods for healthy and cruciate-deficient dogs. 45th Annual Society of Engineering Science Conference, Urbana, IL, Oct. 12-15, 2008.
92. **DiBerardino, L.A.**, Spencer-Smith, J.B., Polk, J.D., Rosengren, K.S., and Hsiao-Weckler, E.T. Elliptical Fourier analysis of joint angle phase portraits: application to simulated injury. 45th Annual Society of Engineering Science Conference, Urbana, IL, Oct. 12-15, 2008.
93. Hsiao-Weckler, E.T., **Shorter, K.A., and DiBerardino, L.A.** New Methods for Quantifying Asymmetric Gait. 45th Annual Society of Engineering Science Conference, Urbana, IL, Oct. 12-15, 2008.
94. **Hur, P., Shorter, K.A.,** and Hsiao-Weckler, E.T. Modeling and Analysis of Posturographic Data Using Markov Chains. 45th Annual Society of Engineering Science Conference, Urbana, IL, Oct. 12-15, 2008.
95. **Chin, R.**, Loth, E. and Hsiao-Weckler, E.T. Fluid-power harvesting through use of a bellows with application in advanced orthotic braces. ASME Fluids Engineering Division Summer Conference, 8<sup>th</sup> International Symposium on Fluid Power, Jacksonville, FL, August 10-14, 2008.
96. **Shorter, K.A.**, Polk, J.D., Rosengren, K.S., and Hsiao-Weckler, E.T. Tracking gait asymmetries during rehabilitation using regions of deviation measures: a case study. North American Congress of Biomechanics and 32<sup>nd</sup> Annual Meeting of the American Society of Biomechanics, Ann Arbor, MI, August 5-9, 2008.
97. **Park, K., Hur, P.,** Rosengren, K.S., Horn, G.P., and Hsiao-Weckler, E.T. Changes in kinetic and kinematic gait parameters due to firefighting air bottle configuration. North American Congress of Biomechanics and 32<sup>nd</sup> Annual Meeting of the American Society of Biomechanics, Ann Arbor, MI, August 5-9, 2008.
98. **Hur, P.** and Hsiao-Weckler, E.T. Estimating the moment of inertia of the human body as a single link inverted pendulum model. North American Congress of Biomechanics and 32<sup>nd</sup> Annual Meeting of the American Society of Biomechanics, Ann Arbor, MI, August 5-9, 2008.
99. **Ragetly, C.A.**, Griffon, D.J., Thomas, J.E., Mostafa, A.A., Schaeffer, D.S., Pijanowski, G.J., and Hsiao-Weckler, E.T. Non invasive determination of body segment parameters in Labrador Retrievers. North American Congress of Biomechanics and 32<sup>nd</sup> Annual Meeting of the American Society of Biomechanics, Ann Arbor, MI, August 5-9, 2008.
100. **Ragetly, C.A.**, Griffon, D.J., Thomas, J.E., Mostafa, A.A., Schaeffer, D.S., Pijanowski, G.J., and Hsiao-Weckler, E.T. Inverse dynamics analysis of the stifle joint in Labrador Retrievers with cranial cruciate ligament deficiency. North American Congress of Biomechanics and 32<sup>nd</sup> Annual Meeting of the American Society of Biomechanics, Ann Arbor, MI, August 5-9, 2008.
101. **Ragetly, C.A.**, Griffon, D.J., Thomas, J.E., Mostafa, A.A., Schaeffer, D.S., Pijanowski, G.J., and Hsiao-Weckler, E.T. Non invasive determination of body segment parameters in Labrador Retrievers with and without cranial cruciate ligament disease. European College of Veterinary Surgeon Meeting, Basel, Switzerland, July 10-12 2008.
102. **Chin, R.**, Hsiao-Weckler, E.T., Loth, E., Alleyne, A., Manwaring, S., **Shorter, K.A.**, Tyson, S.N., and Kogler, G. Portable pneumatic power-harvesting Ankle-Foot-Orthosis. ASME 2008 Summer Bioengineering Conference (SBC2008), Marco Island, FL, June 25-29, 2008. **Nominated for Best Master's Student Poster Award.**
103. **Hur, P.**, Rosengren, K.S., Horn, G.P., Smith, D., and Hsiao-Weckler, E.T. Effect of fatigue and protective clothing on functional balance of firefighters. 17<sup>th</sup> Congress of the International Society of Electromyography and Kinesiology, Niagara Falls, Ontario, Canada, June 18-21, 2008.
104. **Park, K.**, Rosengren, K.S., Horn, G.P., Smith, D., and Hsiao-Weckler, E.T. Assessing gait changes due to fatigue and protective clothing. 17<sup>th</sup> Congress of the International Society of Electromyography and Kinesiology, Niagara Falls, Ontario, Canada, June 18-21, 2008.

105. **Hur, P.**, Rosengren, K.S., Horn, G.P., Schroeder, T., *Ashton-Szabo, S.E.*, and Hsiao-Wecksler, E.T. Assessment of postural sway during multiple load and visual conditions. 17<sup>th</sup> Congress of the International Society of Electromyography and Kinesiology, Niagara Falls, Ontario, Canada, June 18-21, 2008.
106. **Park, K.**, Rosengren, K.S., Horn, G.P., Schroeder, T., *Ashton-Szabo, S.E.*, and Hsiao-Wecksler, E.T. Effect of load carriage on ground reaction forces during obstacle crossing: an investigation of firefighter bottles. 17<sup>th</sup> Congress of the International Society of Electromyography and Kinesiology, Niagara Falls, Ontario, Canada, June 18-21, 2008.
107. **Naito, S.**, Obinata, G., Hase, K., and Hsiao-Wecksler, E.T. Effect of dual task on the postural control system. 28<sup>th</sup> Conference of the Society of Biomechanisms Japan, Gifu, Japan, November 10-11, 2007.
108. Yang, Y., Verkuilen, J.V., Rosengren, K.S., Grubisich, S.A., Reed, M.R., and Hsiao-Wecksler, E.T. Mechanisms for improved balance afforded by traditional Taiji (T'ai Chi) and Qigong exercise: A randomized controlled trial of older adults. 135<sup>th</sup> Annual Meeting & Exposition of the American Public Health Association, Washington, DC. November 3-7, 2007.
109. **Riemer, R.**, and Hsiao-Wecksler, E.T. Optimization-based inverse dynamics to reduce the effect of motion errors in joint torque calculations. 44<sup>th</sup> Annual Society of Engineering Science Conference, College Station, TX, October 21-25, 2007.
110. Hsiao-Wecksler, E.T. and **Hur, P.** Sway response and relative stability of the postural control system to an impulsive perturbation. 44<sup>th</sup> Annual Society of Engineering Science Conference, College Station, TX, October 21-25, 2007.
111. **Shorter, K.A.**, Polk, J.D., Rosengren, K.S., and Hsiao-Wecksler, E.T. Detecting asymmetries in braced and unbraced limbs. 31<sup>st</sup> Annual Meeting of the American Society of Biomechanics, Stanford, CA, August 22-25, 2007.
112. **Hur, P., Duiser, B.A.**, and Hsiao-Wecksler, E.T. Exploring the impulse response of the postural control system. 31<sup>st</sup> Annual Meeting of the American Society of Biomechanics, Stanford, CA, August 22-25, 2007.
113. **Hur, P., Naito, S.**, and Hsiao-Wecksler, E.T. Estimating lean angle through application of the gravity line projection algorithm. 31<sup>st</sup> Annual Meeting of the American Society of Biomechanics, Stanford, CA, August 22-25, 2007.
114. **Riemer, R.**, and Hsiao-Wecksler, E.T. Reducing errors in inverse dynamics-based joint torques through optimized body segment parameters and segment motion profiles. 31<sup>st</sup> Annual Meeting of the American Society of Biomechanics, Stanford, CA, August 22-25, 2007.
115. **Jang, J.** and Hsiao-Wecksler, E.T. Repeated quiet-stance stabilometric balance testing over a 15-month period. 18<sup>th</sup> meeting of the International Society of Posture and Gait Research, Burlington, VT, July 14-18, 2007.
116. **Jang, J.**, Hsiao, K.T., and Hsiao-Wecksler, E.T. Increasing stance width compensates for perceived degradation in balance during pregnancy. 18<sup>th</sup> meeting of the International Society of Posture and Gait Research, Burlington, VT, July 14-18, 2007.
117. **Shorter, K.A.**, Polk, J.D., Rosengren, K.S., and Hsiao-Wecksler, E.T. A new method for assessing gait symmetry. 18<sup>th</sup> meeting of the International Society of Posture and Gait Research, Burlington, VT, July 14-18, 2007.
118. Hsiao-Wecksler, E.T. and **Duiser, B.A.** Characterizing the sway response of the human postural control system to an impulse perturbation. 36<sup>th</sup> Annual Meeting of the Society for Neuroscience, Atlanta, GA, October 14-18, 2006.
119. Hsiao-Wecksler, E.T., **Jang, J., Ramachandran, A.K.**, Yang, Y., and Rosengren, K.S. Gait and obstacle crossing behaviors of older adults during five months of Tai Chi training. 5<sup>th</sup> World Congress of Biomechanics, Munich, Germany, July 29 – August 4, 2006. *Invited Paper. Journal of Biomechanics*, 39(S1): S88-S89, 2006.
120. Hsiao-Wecksler, E.T., and **Jang, J.** Effect of pregnancy on balance throughout nine months of pregnancy and six months post-partum. 5<sup>th</sup> World Congress of Biomechanics, Munich, Germany, July 29 – August 4, 2006. *Journal of Biomechanics*, 39(S1): S506, 2006.
121. **Major, M.J.**, Beaudoin, A., Kurath, P., and Hsiao-Wecksler, E.T. Biomechanical analysis of Aggressive in-line skating: biomechanics of landing and balancing on a grind rail. XX<sup>th</sup> Congress of the International Society of Biomechanics and 29<sup>th</sup> Annual Meeting of the American Society of Biomechanics, Cleveland, OH, July 31st - August 5th, 2005.

122. **Riener, R.**, Hsiao-Wecksler, E.T. and Zhang, X. An analysis of uncertainties in inverse dynamics solutions. XXth Congress of the International Society of Biomechanics and 29th Annual Meeting of the American Society of Biomechanics, Cleveland, OH, July 31st - August 5th, 2005.
123. **Ramachandran, A.K.**, Yang, Y., Rosengren, K.S., and Hsiao-Wecksler, E.T. Tai Chi and stance width effects on postural sway and knee flexion. 28th Annual Meeting of the American Society of Biomechanics, Portland, OR, September 8-11, 2004.
124. Hsiao-Wecksler, E.T., **Ramachandran, A.K.**, Reed, M., Yang, Y., and Rosengren, K.S. Effect of Tai Chi on gait and obstacle crossing behaviors. 15<sup>th</sup> Congress of the International Society of Electromyography and Kinesiology, Boston, MA, June 18-21, 2004.
125. **Major, M.J.**, Kurath, P., Bange, M., Beaudoin, A., Hsiao-Wecksler, E.T. Biomechanical analysis of aggressive in-line skating: landing and balance during a stall. 15<sup>th</sup> Congress of the International Society of Electromyography and Kinesiology conference, Boston, MA, June 18-21, 2004.
126. **Doyle, R.J.**, Ragan, B.G., Melnyk, L.A., Hsiao-Wecksler, E.T., Rosengren, K.S. Generalizability of Stabilogram Diffusion Analysis. 15<sup>th</sup> Congress of the International Society of Electromyography and Kinesiology conference, Boston, MA, June 18-21, 2004.
127. **Doyle, R.J.**, Ragan, B.G., Melnyk, L.A., Hsiao-Wecksler, E.T., Rosengren, K.S. Generalizability of Force Plate Measures. North American Society for the Psychology of Sport and Physical Activity (NASPPSA) conference, Vancouver, British Columbia, June 10-12, 2004.
128. Hsiao-Wecksler, E.T., **Ramachandran, A.K.**, Reed, M., Yang, Y., and Rosengren, K.S. Tai Chi affects gait and obstacle crossing behaviors. Annual Meeting of the American College of Sports Medicine, Indianapolis, IN, June 2-5, 2004. *Medicine & Science in Sports & Exercise*, 36(s5):S46, 2004.  
<http://dx.doi.org/10.1097/00005768-200405001-00219>
129. **Ramachandran, A.K.**, *Riskus, A.V.*, *Schultz, J.E.*, Reed, M., Yang, Y., Rosengren, K.S., and Hsiao-Wecksler, E.T. Effect of Tai Chi expertise and stance width on balance. 9<sup>th</sup> Annual Gait and Clinical Movement Analysis Society, Lexington, KY, April 21-24, 2004.
130. Hillman, C.H., Hsiao-Wecksler, E.T., & Rosengren, K S. Postural responses to the defensive startle reflex. Society for Psychophysiological Research. Chicago, IL, October 29-November 2, 2003. *Psychophysiology*, 40(s1):S47, 2003.
131. Hsiao-Wecksler, E.T., Narayanan, K., Lee, B.S., Laughton, C.A., and Lipsitz, L.A. Does Tai Chi affect postural sway & muscle activity in older adults? 27th Annual Meeting of the American Society of Biomechanics, Toledo, OH, September 25-27, 2003.
132. Hsiao-Wecksler, E.T., Hillman, C.H., and Rosengren, K.S. Postural responses and the defensive startle reflex. 27th Annual Meeting of the American Society of Biomechanics, Toledo, OH, September 25-27, 2003.
133. Hsiao-Wecksler, E.T., Narayanan, K., Lee, B.S., Laughton, C.A., and Lipsitz, L.A. Exploring effects of Tai Chi on balance in older adults. ASME Summer Bioengineering Conference, Key Biscayne, FL, June 25-29, 2003.
134. Laughton, C., Slavin, M., Hsiao-Wecksler, E., Katdare, K., Gravelle, D. Lipsitz, L.A., and Collins, J.J. Age-related effects on momentum generation and muscle activity during gait-initiation. 4th World Congress in Biomechanics, Calgary, Canada, August 4-9, 2002.
135. Hsiao-Wecksler, E.T., Katdare, K., Matson, J., Liu, W., Lipsitz, L.A., and Collins, J.J. Predicting dynamic postural control response from quiet-stance behavior. 78th Annual Meeting of the American Congress of Rehabilitation Medicine, Tucson, AR, October 25-28, 2001.
136. Hsiao-Wecksler, E.T., Katdare, K., Matson, J., Liu, W., Lipsitz, L.A., and Collins, J.J. Quiet-stance behavior can predict the dynamic postural control response. 25th Annual Meeting of the American Society of Biomechanics, San Diego, CA, August 8-10, 2001.
137. Hsiao-Wecksler, E.T., Stotz, P.J., and Robinovitch, S.N. Big steps for fall prevention: Effect of age and step size on ability to recover balance by stepping. XVII World Congress of the International Association of Gerontology, Vancouver, British Columbia, Canada, July 1-6, 2001.
138. Hsiao-Wecksler, E.T., Stotz, P.J., and Robinovitch, S.N. Effect of step length on ability of young and elderly to recover balance. ASME Summer Bioengineering Conference, Snowbird, Utah, June 27 - July 1, 2001.

139. Hsiao, E.T., Liu, Q., and Robinovitch, S.N. Step length affects young and elderly women's ability to recover balance with a single forward step. World Congress on Medical Physics and Biomedical Engineering, Chicago, IL, July 23-28, 2000.
140. Hsiao, E.T., and Robinovitch, S.N. Balance recovery by stepping during backward falls. 23rd Annual Meeting of the American Society of Biomechanics, Pittsburgh, PA, October 21-23, 1999.
141. Hsiao, E.T., Wang, J., and Robinovitch, S.N. Measurement and analysis of lower extremity joint mechanics during balance recovery by stepping. 45th Annual Meeting of the Orthopaedic Research Society, Anaheim, CA, February 1-4, 1999. Awarded the New Investigator Recognition Award, co-sponsored by the American Geriatrics Society.
142. Hsiao, E.T., and Robinovitch, S.N. Mathematical modeling of balance recovery by stepping. Fourth US National Congress on Computational Mechanics, Symposium on Computational Musculoskeletal Biomechanics, San Francisco, CA, August 6-8, 1997.
143. Hsiao, E.T., Frenk, V., and Robinovitch, S.N. Stepping mechanics used in balance recovery: swing and contact phase modeling. 20th Annual Meeting of the American Society of Biomechanics, Atlanta, GA, October 17-19, 1996.
144. Robinovitch, S.N., Hsiao, E., Kearns, M., and Frenk, V. Analysis of movement strategies during unexpected falls. 20th Annual Meeting of the American Society of Biomechanics, Atlanta, GA, October 17-19, 1996.
145. Hsiao, E.T. A dynamic model to study the influence of alpine ski boot characteristics on heel retention force. ASTM Committee F27 on Snow Skiing, Summer Symposium, Burlington, VT, August 5-7, 1994.

#### Conference honors received by my students

1. DiBerardino, L.A., Polk, J.D., Rosengren, K.S., and Hsiao-Weckler, E.T. Quantifying complexity and variability of gait phase portraits. ASME 2009 Summer Bioengineering Conference (SBC2009), Tahoe, CA, June 17-21, 2009. **Received Best Master's Student Poster Award.**
2. Hur, P., Kang, H.G., Lipsitz, L. A. and Hsiao-Weckler, E.T. Invariant Density Analysis of Postural Sway and Fall-risk Estimation Model of Community-Dwelling Elderly Adults. 6th World Congress of Biomechanics, Singapore, August 1-6, 2010. **Invited Paper**
3. Hsu, M-K. I., Jayaraman, C., Culp, S., Rice, I.M., Hsiao-Weckler, E.T., and Sosnoff, J.J. "Variability and Complexity of Shoulder Motion During Wheelchair Propulsion", Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) 2012 Annual Conference, Baltimore, MD, June 28 – July 3, 2012. **(Honorable Mention - Student Scientific Paper competition)**
4. Li, Y.D., and Hsiao-Weckler, E.T., "Gait Mode Recognition Using an Inertial Measurement Unit to Control an Ankle-Foot Orthosis During Stair Ascent and Descent", ASME Dynamic Systems and Control Conference (DSCC), Fort Lauderdale, FL, October 17-19, 2012. **Best Paper in Session**  
<http://dx.doi.org/10.1115/DSCC2012-MOVIC2012-8651>
5. Moon, Y., Jayaraman, C., Hsiao-Weckler, E.T, Sosnoff, J.J. Variability structure in hand-rim peak force during manual wheelchair propulsion: A pilot study", 7<sup>th</sup> World Congress of Biomechanics, Boston, MA, July 6-11, 2014. **(Third place – Best Poster for Masters Student)**
6. Jahanian, O., Gaglio, A., Daigle, S., Muqet, V., Schorenberg, A.J., Hsiao-Weckler, E.T., Slavens, B.A., "Hand-rim Biomechanics of Geared Manual Wheelchair Mobility" Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) 2018 Annual Conference, Arlington, VA, July 13 - 15, 2018. **Student Scientific Paper Winner.**
7. Song, S.Y., Pei, Y., Hsiao-Weckler, E.T. "Simple and Low-Cost Methods of Computing Joint Angles Using Inertial Measurement Units Without Magnetometers," 44<sup>th</sup> American Society of Biomechanics Annual Meeting (virtual), Atlanta, GA, August 4-7, 2020. **Finalist in MS student 3-minute presentation competition**

#### SYMPOSIA, INDUSTRIAL, FUNDING AGENCY OR CENTER MEETINGS

1. Duiser, B.A., and Hsiao-Weckler, E.T. Effects of aging on postural control robustness. Midwest Graduate Student Biomechanics Symposium, Milwaukee, WI, March 31 – April 1, 2006.
2. Holm, J.K., Lee, S.W., Jang, J. and Hsiao-Weckler, E.T. Passive parameters of the human ankle in downhill walking Midwest Graduate Student Biomechanics Symposium, Milwaukee, WI, March 31 – April 1, 2006.

3. Jang, J. and Hsiao-Wecksler, E.T. Assessment of standing balance throughout pregnancy and 6 months postpartum Midwest Graduate Student Biomechanics Symposium, Milwaukee, WI, March 31 – April 1, 2006.
4. Hsiao-Wecksler, E.T., Dankowicz, H., Hong, S., Lague, M.R., Polk, J.D., Rosengren, K.S., DiBerardino, L.A., Helwig, N.E., Park, K. Quantitative Characterization of Complex Motion Patterns Using Shape-based and Multivariate Techniques. Proceedings of 2009 NSF Engineering Research and Innovation Conference, Honolulu, HI, June 22-26, 2009.
5. An, Z., Culp, S., Jayaraman, C., Daigle, S.C., Beck, C., Hsiao-Wecksler, E.T., Sosnoff, J.J. Three Wheelchair Propulsion Analyses, 4<sup>th</sup> Annual Symposium of the Center on Health, Aging and Disability, UIUC, December 9, 2010.
6. Morris, E.A., and Hsiao-Wecksler, E.T. Time normalizing gait data based on gait events, 4<sup>th</sup> Annual Symposium of the Center on Health, Aging and Disability, UIUC, December 9, 2010.
7. Park, K., Dankowicz, H., and Hsiao-Wecksler, E.T. Assessing spatiotemporally complex and coupled gait patterns using temporal cross-correlation, 4<sup>th</sup> Annual Symposium of the Center on Health, Aging and Disability, UIUC, December 9, 2010.
8. DiBerardino, L.A., Shorter, K.A., and Hsiao-Wecksler, E.T. “Regions of Deviation (ROD) Analysis – a method for quantifying sections of abnormal movement behavior during the gait cycle”, 4<sup>th</sup> Annual Symposium of the Center on Health, Aging and Disability, University of Illinois, Urbana, IL, December 9, 2010.
9. Shorter, K.A., Morris, E.A., Li, Y., and Hsiao-Wecksler, E.T. “A Pneumatically Powered Portable Ankle-Foot Orthosis”, 4<sup>th</sup> Annual Symposium of the Center on Health, Aging and Disability, UIUC, December 9, 2010.
10. Morris, E.A., Gordon, S.E., Kesler, R.M., Morris, M.J., and Hsiao-Wecksler, E.T. “Thermal Regulation and Improving Longevity in Pneumatic Power Systems”, National Fluid Power Association’s Industry and Economic Outlook Conference, Schaumburg, IL, August 15-17, 2011
11. Li, Y., Xia, J., Durfee, W., Hsiao-Wecksler, E., Banco, G., and Kovach, J.” Power System Selection Analysis for A Knee Prosthesis”, National Fluid Power Association’s Industry and Economic Outlook Conference, Schaumburg, IL, August 15-17, 2011
12. Daigle, S.C., Sosnoff, J.J., and Hsiao-Wecksler, E.T., “Usability of an Automatic Gear-Shifting Wheelchair”, 5<sup>th</sup> Annual Symposium of the Center on Health, Aging and Disability, UIUC, October 13, 2011.
13. Petrucci, M.N., MacKinnon, C.D., and Hsiao-Wecksler, E.T., “Mechanical Cueing Using a Portable Powered Ankle-Foot Orthosis”, Chicago Neuromechanics Symposium, University of Chicago, April 27, 2012.
14. Boes, M.K. and Hsiao-Wecksler, E.T. “Proposal for Pneumatically-Powered Portable Ankle-Foot Orthosis for Seated Rehabilitation Therapies”, Chicago Neuromechanics Symposium, University of Chicago, April 27, 2012.
15. Tilton, A.K., Hsiao-Wecksler, E.T., and Mehta, P.G. “Bayesian Inference with Oscillator Models: A possible Role of Neural Rhythms.”, Chicago Neuromechanics Symposium, University of Chicago, April 27, 2012.
16. Nicholas Thompson, Augmented Joint Stiffness and Actuation using Architectures of Soft Pneumatic Actuators”, 2018 Midwest Robotics Workshop (MWRW), Chicago, IL, June 14–15, 2018.
17. Yinan Pei, Revised Design of a Passive Hydraulic Training Simulator of Biceps Spasticity”, 2018 Midwest Robotics Workshop (MWRW), Chicago, IL, June 14–15, 2018.
18. Chenzhang Xiao, Pneumatic Ergonomic Crutches: A Self Contained Soft Robotic Energy Harvesting Platform”, 2018 Midwest Robotics Workshop (MWRW), Chicago, IL, June 14–15, 2018.
19. Seung Yun (Leo) Song, Quantification of Abnormal Hypertonic Muscle Behavior Using Wearable Measurement Device (PVRM - Position, Velocity, Resistance Meter)”, 2018 Midwest Robotics Workshop (MWRW), Chicago, IL, June 14–15, 2018.
20. He, M., Gim, K.G., Ripperger, E., Zallek, C.M., and Hsiao-Wecksler, E.T. “Robotic Arm Training Simulator for Mimicking Rigidity”, 7th Health Care Engineering Systems Symposium (virtual), UIUC, October 13, 2020. (Live demo)
21. Mansouri, M., Edward, S., Alabed, M., Krishnan, G., McDonagh, D.C., Zallek, C.M., and Hsiao-Wecksler, E.T. “Design of a soft air cell bed mattress to address pressure relief, repositioning, and transfer”, 7th Health Care Engineering Systems Symposium (virtual), UIUC, October 13, 2020. (Poster)
22. Mansouri, M., Edward, S., Krishnan, G., and Hsiao-Wecksler, E.T. “Using traveling waves for moving a human body on a bed”, 8<sup>th</sup> Health Care Engineering Systems Symposium (virtual), UIUC, October 15, 2021.



23. Edward, S., Mansouri, M., Krishnan, G., Hsiao-Wecksler, E.T., McDonagh, D.C., Arquines, K., Alabed, M., and Myers, N. “Design guidelines of a single unit bladder or a bellow actuator”, 8<sup>th</sup> Health Care Engineering Systems Symposium (virtual), UIUC, October 15, 2021.
24. Hsiao-Wecksler, E.T., McDonagh, D.C., Norris, W.R., Almeida de Souza Ramos, J.L., Bleakney, A.W., Elliott, J.R., Malik, P.B., Chen, Y., Song, S.Y., Xiao, C., Roethler, K. “NRI: INT: MiaPURE (Modular, Interactive and Adaptive Personalized Unique Rolling Experience).” 2021 NSF NRI & FRR Principal Investigators' Meeting (virtual), March 10-12, 2021.
25. Bleakney, A., McDonagh, D., Mansouri, M., Marin, N., and Hsiao-Wecksler, E. “Design and usability of the PURE ballbot wheelchair”, submitted to Paralyzed Veterans of America (PVA) Healthcare Summit + Expo, Orlando, FL, August 14 - 17, 2023.
26. Peters, J., Chen, M., Huang, K., Bleakney, A., Siero, M., Hsiao-Wecksler, E., McDonagh, D. “A user-inspired mobility experience of the future”, submitted to Paralyzed Veterans of America (PVA) Healthcare Summit + Expo, Orlando, FL, August 14 - 17, 2023.

## INVITED LECTURES

1. Title TBD, Department of Kinesiology & Integrative Physiology (virtual), Michigan Tech University, fall 2023
2. On medical education task trainers, wearable intelligent technologies, and revolutionizing wheelchairs, Department of Mechanical and Aerospace Engineering (virtual), University of Virginia, February 17, 2022
3. On medical education task trainers, wearable intelligent technologies, and revolutionizing wheelchairs, Department Colloquium (virtual), Kinesiology and Community Health, UIUC, February 4, 2022
4. Adventures in Biomechanics and Beyond. Keynote Lecture. 2021 Northwest Biomechanics Symposium (virtual), Willamette University, July 15, 2021.
5. Using Engineering and Technology to Address the Neurology Care Crisis, with Christopher Zallek, MD, Innovation Grand Rounds (virtual), Carle Illinois College of Medicine, April 9, 2021.
6. New Opportunities in Assistive Devices, Campus Research Administrators Working Group (virtual), Office of the Vice Chancellor for Research, UIUC, December 4, 2020.
7. Personal (historical) perspective of living as a LGBT STEM person, Out in Chemistry (virtual), UIUC, June 25, 2020.
8. Minimum sensor configuration for maximum gait event detection with a powered ankle-foot orthosis, with Ziming Wang. XXVII Congress of the International Society of Biomechanics and 43<sup>rd</sup> American Society of Biomechanics Annual Meeting, Calgary, Alberta, Canada, July 31-August 4, 2019.
9. Fluid-powered Biomechatronics to Improve Human Movement and Medical Training, Lindbergh Lecture Series, Department of Mechanical Engineering, University of Wisconsin - Madison, March 14, 2019.
10. Biomechatronics to Improve Medical Training and Human Movement, Mechanical Engineering Graduate Seminar Series, Department of Mechanical Engineering, Texas A&M, February 6, 2019.
11. Biomechatronics to Improve Medical Training and Human Movement, Institute of Micro /Nanotechnology and Precision Engineering, State Key Laboratory of Fluid Power and Mechatronic Systems, Zhejiang University, Hangzhou, China, December 12, 2018.
12. Using Pneumatics and Bio-mechatronics to Improve Human Movement Department of Mechanical Engineering, KAIST, Daejeon, Korea, October 1, 2018.
13. Design and Control of the Portable Powered Ankle-Foot Orthosis (PPAFO), 2018 Midwest Robotics Workshop (MWRW), Chicago, IL, June 14–15, 2018.
14. Engineer, biomechanicist, designer, student, worker bee, researcher, professor, advisor, mentor – wow what a life!, Illinois Scholars Undergraduate Research (ISUR) Program Banquet, UIUC, April 18, 2018.
15. Bio-mechatronics: Using Technology to Improve Human Movement, Distinguished Seminar Series, Department of Mechanical Engineering, University of Delaware, December 1, 2017.
16. Bio-mechatronics: Using Technology to Improve Movement of People with Disabilities, Joint Department of Biomedical Engineering, North Carolina State University and University of North Carolina at Chapel Hill, April 7, 2017.
17. Soft Robotics and FREEs (Fiber Reinforced Elastomeric Enclosures), Energy Efficient Hydraulics and Pneumatics Conference, International Fluid Power Exposition (IFPE), Las Vegas, NV, March 10, 2017.
18. Prairie Futures General Meeting, UIUC, December 6, 2016.

19. Bio-mechatronics: Using Technology to Improve Movement of People with Disabilities, Keynote Speaker, 12th Annual Dayton Engineering Sciences Symposium, Dayton, OH, November 1, 2016.
20. Advances in pneumatically powered orthoses and exoskeletons, Keynote Speaker, Prosthetic Orthotic Research Symposium, School of Applied Physiology, Georgia Tech, April 22, 2016.
21. Portable Powered Ankle-Foot Orthosis for Gait Initiation and Assistance, Design of Medical Devices Conference, Minneapolis, MN, April 13, 2016.
22. Powered orthotic devices for gait assistance, Rehabilitation Robotics Institute, University of Michigan, March 24, 2015.
23. Portable Powered Ankle-Foot Orthosis: a Research Platform for Exploring Challenges of Wearable and Portable Robotic Devices, The Chittenden Symposium on Mobility, Technology and the Future of Health, UIUC, January 29, 2015.
24. Powered orthoses for gait and rehabilitation, Biorobotics Laboratory, University of California – Irvine, April 9, 2014.
25. Portable powered ankle-foot-orthosis (PPAFO) for gait and rehabilitation. Mechanical Engineering, Michigan State University, February 26, 2013.
26. Portable powered ankle-foot-orthosis (PPAFO) for gait and rehabilitation. Bioengineering Seminar, University of Wisconsin-Milwaukee, October 5, 2012.
27. Portable powered ankle-foot-orthosis (PPAFO) for gait and rehabilitation. Prosthetics and Orthotics Center, Northwestern University, July 17, 2012.
28. Portable powered ankle-foot-orthosis (PPAFO). Neuroengineering IGERT Program. UIUC, February 17, 2012.
29. Development of powered ankle-foot-orthoses and tools for quantifying motion patterns to improve gait. Information Trust Institute, UIUC, July 17, 2011.
30. Development of powered ankle-foot-orthoses and tools for quantifying motion patterns to improve gait. Department of Mechanical and Aerospace Engineering, Ohio State University, May 20, 2011.
31. Development of powered ankle-foot-orthoses and tools for quantifying motion patterns to improve gait. Department of Mechanical and Aerospace Engineering, University of Virginia, March 3, 2011.
32. Development of tools for quantifying motion patterns and powered ankle-foot-orthoses to improve gait. Department of Bioengineering, BioE120 course, UIUC, October 20, 2010.
33. Improving gait: development of tools for quantifying gait asymmetry and powered ankle-foot-orthoses. Department of Kinesiology and Nutrition, University of Illinois at Chicago, September 3, 2010.
34. Improved methods to quantify gait and balance using motion capture and other technologies. Department of Kinesiology and Community Health, UIUC, April 2, 2010.
35. Portable active ankle-foot-orthoses. Department of Mechanical and Aerospace Engineering, University of Florida, October 20, 2009.
36. Biomechanics of posture and movement. Dept of Bioengineering, BioE120 course, UIUC, November 20, 2008.
37. Improving gait: development of a power-harvesting AFO and tools for quantifying gait asymmetry. Department of Physical Medicine and Rehabilitation, Feinberg School of Medicine, Northwestern University, February 1, 2008.
38. Assessing changes in balance and gait due to Tai Chi and fire fighting. Research Centre on Aging, University of Sherbrooke, Sherbrooke, Quebec, Canada, January 9, 2008.
39. Biomechanics of posture and movement. Dept of Bioengineering, BioE120 course, UIUC, November 15, 2007.
40. Examining the effects of Tai Chi on balance and gait. Department of Kinesiology and Health Education, University of Texas at Austin, October 22, 2007.
41. Exploring (human) standing balance and postural control. Department of Industrial and Enterprise Systems Engineering, UIUC, April 26, 2007.
42. Exploring (human) standing balance and postural control ... and a little on orthoses. Department of Applied Physiology, Georgia Tech, April 13, 2007.
43. Biomechanics of balance and movement strategies. Picker Engineering Program, Smith College, March 2, 2005.
44. Exploring disturbances to balance and falls. Initiative on Aging Program, UIUC, November 8, 2004.

45. Slips, trips, and tugs: exploring disturbance to balance and falls. Department of Applied Physiology, Georgia Tech, October 24, 2002.
46. Slips, trips, and tugs: exploring disturbance to balance and falls. Department of Kinesiology, University of Illinois at Urbana-Champaign, October 18, 2002.
47. Slips, trips, and tugs: exploring disturbance to balance and falls. Department of Mechanical & Industrial Engineering, University of Illinois at Urbana-Champaign, April 2002.
48. Slips, trips, and tugs: exploring disturbance to balance and falls. Department of Movement Sciences, University of Illinois at Chicago, April 2002.
49. Slips, trips, and tugs: exploring disturbance to balance and falls. Department of Mechanical Engineering, University of South Florida, March 2002.
50. Slips, trips, and tugs: exploring disturbance to balance and falls. Department of Mechanical Engineering, Rochester Institute of Technology, March 2002.
51. Slips, trips, and tugs: exploring disturbance to balance and falls. Department of Applied Science, College of William and Mary, March 18, 2002.
52. Slips, trips, and tugs: exploring disturbance to balance and falls. Department of Mechanical Engineering, The Johns Hopkins University, March 2002.
53. Slips, trips, and tugs: exploring disturbance to balance and falls. Department of Kinesiology and Health Science, California State University – Sacramento, March 2002.
54. Slips, trips, and tugs: exploring disturbance to balance and falls. Department of Exercise and Sport Sciences, Ithaca College, February 2002.
55. Slips, trips, and tugs: exploring disturbance to balance and falls. Department of Biomedical Engineering, Worcester Polytechnic Institute, February 2002.
56. Balance recovery by stepping during backward falls. 12th Annual AFAR Grantee Conference, Santa Barbara, CA, June 9-11, 1999.

## **COURSES**

- Short course: “Design and Development of Advance Rehabilitative Devices for Lower Extremities” May 13-17, 2019, Shri Govindram Seksaria Institute of Technology and Science, Indore, Madhya Pradesh, India; supported by a grant from the GIAN (Global Initiative of Academic Networks) program of Ministry of HRD, Govt. of India.
- Clinical Neuroscience, for Phase I medical students in UIUC CI MED: co-developed course including engineering challenge lab to teach user-centered design and business pitch tools, 03/17 – 01/20
- Statics (TAM 210/211): Spring 2018, Fall 2018 (@ZJUI)
- Whole-body Musculoskeletal Biomechanics (ME/BIOE 481): Fall 2010/2011/2012/2013/2015, Spring 2020
- LEGO Robotics Mentoring (ENG 298): Fall 2012/2013/2014/2015/2016/2017/2018/2019
- Mechanical Design II (ME 371): Spring 2015
- Mechanical Design I (ME 370): Fall 2002/2014/2020/2021, Spring 2003/2006/2007/2008/2012/2013/2014
- Dynamics of Mechanical Systems (ME 340): Spring 2009/2011
- Modeling of Musculoskeletal Biomechanics (ME 498): Developed course for senior/graduate elective (ME 481). Fall 2003/2004/2005/2006/2007/2008
- MechSE Bio-Interest Group Seminar Course (ME 591): Fall 2013, Spring 2014
- Human and Robotic Locomotor Issues (ME 598): Coordinator of interdisciplinary graduate seminar for members of eight research groups. AY03-04, AY04-05, AY05-06, AY06-07

## **STUDENT MENTORING**

### **Doctoral Students**

1. Razieli Riemer, Ph.D., Mechanical Engineering. “Optimization-based Inverse Dynamics to Reduce Errors in Estimated Joint Torques”, May 2007. (Associate Professor, Ben-Gurion University of the Negev, Beer-Sheva, Israel) <http://hdl.handle.net/2142/83875>
2. Richard J. Doyle, Ph.D., Kinesiology. “Generalizability of center of pressure measurements across age populations”, primary co-advisor: Prof. Karl Rosengren (Kinesiology/Psychology), May 2008. (medical Student - University of Illinois at Chicago Medical School) <http://hdl.handle.net/2142/86397>

3. Pilwon Hur, Ph.D., Mechanical Engineering. “Quantification of the human postural control system to perturbations”, Dec 2010. (Assistant Professor, Texas A&M University. Now Associate Professor, Gwangju Institute of Science and Technology) <http://hdl.handle.net/2142/18566>
4. K. Alex Shorter, Ph.D., Mechanical Engineering. “The design and control of active ankle-foot orthoses”, January 2011. (Assistant Professor, University of Michigan) <http://hdl.handle.net/2142/24113>
5. ♀ Chantal A. Ragetly, DMV, Ph.D., Veterinary Medicine. “Gait analysis of the hind limb in Labrador Retrievers with and without cranial cruciate ligament disease”, primary co-advisor: Prof. Dominique Griffon (Veterinary Medicine), July 2011. (private practice, Paris, France) <http://hdl.handle.net/2142/26019>
6. Kiwon Park, Ph.D., Mechanical Engineering. “Quantitative assessment of human gait patterns using biomechanical and dynamical tools”, March 2012. (Associate Professor, Incheon University) <http://hdl.handle.net/2142/31153>
7. Yifan (David) Li, Ph.D., Mechanical Engineering. “On Improving Control and Efficiency of a Portable Pneumatically Powered Ankle-Foot Orthosis”, June 2013. (Western Digital Corporation. Now CEO and co-founder, Hesai Photonics Technologies, Shanghai, China – listed as one of the top new companies in Shanghai in 2017) <http://hdl.handle.net/2142/45511>
8. Louis A. DiBerardino III, Ph.D., Mechanical Engineering. “Neuromuscular Control Adaptation During Recovery From Injury,” equal co-advisor: Prof. Harry Dankowicz (MechSE), July 2014. (Associate Professor, Ohio Northern University) <http://hdl.handle.net/2142/50743>
9. Mazharul Islam, Ph.D., Mechanical Engineering. “Studies on gait control using a portable pneumatically powered ankle-foot orthosis (PPAFO) during human walking,” February 2016. (Intel Corporation) <http://hdl.handle.net/2142/90719>
10. ♀ Morgan K. Boes, Ph.D., M.D. joint program, Bioengineering. “Evaluation of a pneumatic ankle-foot orthosis: portability and functionality”, April 2016. (Medical Student, University of Illinois College of Medicine Urbana-Champaign. Now Innovation Fellow and Pediatric Emergency Medicine Fellow at Children’s Minnesota) <http://hdl.handle.net/2142/90568>
11. Matthew N. Petrucci, Ph.D., Neuroscience, “Modulation and modeling of anticipatory postural adjustments for gait initiation in persons with Parkinson’s disease”, July 2016. (MnDRIVE Postdoctoral Fellow in Neuromodulation, University of Minnesota. Now Postdoctoral Fellow/Research Engineer, Stanford University) <http://hdl.handle.net/2142/92843>
12. ♀ Maria C. Fox, Ph.D., Anthropology, “The Biomechanical Consequences of Body Size Differences in Humans”, primary co-advisor: Prof. John Polk (Anthropology), May 2020. (Lead Data Scientist, REEF) <http://hdl.handle.net/2142/107990>
13. Nicholas A. Thompson, Ph.D., Mechanical Engineering, “On the Design, Modeling, Fabrication, and Application of Fiber-Reinforced Soft Pneumatic Actuators”, primary co-advisor: Prof. Girish Krishnan (ISE), May 2022. (Product Design Specialist, 3M) <https://hdl.handle.net/2142/115815>
14. Chenzhang Xiao, Ph.D. candidate, Mechanical Engineering, “Personal Unique Rolling Experience: Design, Modeling, and Control of a Riding Ballbot”, co-advisor: Prof. João Ramos (MechSE), December 2022. (Systems Analyst, Intuitive Surgical, Inc.)
15. Yinan Pei, Ph.D. Mechanical Engineering, “Development and Validation of Lower- and Upper-extremity Robotic Medical Education Task Trainers for Neurologic Exams”, Dec 2022. (Post-doc, Amazon)
16. Yu Chen, Ph.D. candidate, Mechanical Engineering, primary co-advisor: Prof. Bob Norris (ISE), anticipated August 2023
17. Abdulrahman (Abdul) Alkurdi, Ph.D. candidate, Mechanical Engineering, anticipated December 2023
18. Ezekiel (Zeke) Y. Hsieh, Ph.D. candidate, Mechanical Engineering, primary co-advisor: Prof. SungWoo Nam (MechSE), anticipated Dec 2023
19. ♀ Mahshid Mansouri, Ph.D. candidate, Mechanical Engineering, anticipated May 2024
20. ♀ Maxine He, Ph.D. candidate, Neuroscience, equal co-advisor, Manuel Hernandez (Kinesiology/ Neuroscience), anticipated May 2024.

21. Seung Yun (Leo) Song, Ph.D. candidate, Mechanical Engineering, co-advisor: Prof. João Ramos (MechSE), anticipated May 2025
22. ♀ Yixiao Liu, Ph.D. candidate, Mechanical Engineering, anticipated May 2027
23. Tianyi (Tim) Han, Ph.D. candidate, Mechanical Engineering, anticipated May 2027

### **Masters Students (Thesis)**

1. Arun Kumar Ramachandran, M.S., Mechanical Engineering. “Effects of Tai Chi on Quiet Standing Balance and Obstacle Crossing Strategies: A Biomechanical Analysis,” December 2004. <http://hdl.handle.net/2142/104067>
2. Matthew Justin Major, M.S., Mechanical Engineering. “Biomechanical Analysis of Aggressive Inline Skating: Landing and Balance on a Grind Rail,” December 2004.
3. ♀ Kelly Marie McHugh, M.S., Mechanical Engineering. “Assessing Skill Due to Tai Chi Experience: A Biomechanical Analysis of Long Term Practitioners and Older Adults Enrolled in Tai Chi Training,” July 2005.
4. Brett A. Duiser, M.S., Mechanical Engineering. “Analysis of Human Postural Control Response to an Impulsive Perturbation,” May 2006.
5. Kenneth Alex Shorter, M.S., Mechanical Engineering. “Detecting Asymmetries in Gait”, May 2007.
6. John Jang, M.S., General Engineering. “Longitudinal balance in pregnant women and young healthy adults”, August 2007.
7. Robin Chin, M.S., Mechanical Engineering.” Portable pneumatic power-harvesting ankle-foot-orthosis for foot-drop”, co-advisor: Prof. Eric Loth (Aerospace Engineering), October 2008.
8. Louis A. DiBerardino, M.S., Mechanical Engineering. “Assessing gait differences through the complexity and variability of motion shapes”, December 2008.
9. ♀ Emily A. Morris, M.S., Mechanical Engineering. “Gait analysis techniques to understand the effect of a hip strength improving program on lower-limb amputees”, July 2011. <http://hdl.handle.net/2142/26194>
10. Scott C. Daigle, M.S., Mechanical Engineering. “Design and evaluation of an automatic gear-shifting system for a manual wheelchair”, co-advisor: Prof. Jacob Sosnoff (Kinesiology), December 2011. <http://hdl.handle.net/2142/29568> Co-founder of IntelliWheels, Inc.
11. ♀ Morgan K. Boes, M.S., Bioengineering. “Postural control in persons with Multiple Sclerosis: an investigation of dual task cost and physical modeling”, primary co-advisor: Prof. Jacob Sosnoff (Kinesiology), December 2011. <http://hdl.handle.net/2142/29697>
12. Michael J. Socie, M.S., Mechanical Engineering. “Gait variability in Multiple Sclerosis”, primary co-advisor: Prof. Jacob Sosnoff (Kinesiology), May 2012. <http://hdl.handle.net/2142/31135>
13. Richard M. Kesler, M.S., Bioengineering “Analysis of Fatigue in Firefighters: Foot Clearances Over Stair Edges and Validation of a Novel Means for Metabolic Data Collection”, April 2013. <http://hdl.handle.net/2142/44110>
14. Michael J. Wineman, M.S., Mechanical Engineering. “Design and effects on handrim kinetics of an automatic gear-shifting wheel for manual wheelchairs”, December 2013. <http://hdl.handle.net/2142/49355>
15. Michael J. Angelini, M.S., Mechanical Engineering. “Obstacle Crossing Behaviors in Firefighters: Effects of Personal Protective Equipment and Firefighter Activity”, May 2015. <http://hdl.handle.net/2142/78552>
16. Deen Farooq, M.S., Mechanical Engineering. “Modifications and Upper Extremity Orthotics for the Lofstrand Crutch”, September 2015. <http://hdl.handle.net/2142/88952>
17. Matthew N. Petrucci, M.S., Mechanical Engineering. “Evaluation of gait kinematics and kinetics using a powered ankle-foot orthosis for gait assistance in people with multiple sclerosis”, May 2016. <http://hdl.handle.net/2142/90684>
18. Ziming Wang, M.S., Mechanical Engineering, “Design of actuation system and minimization of sensor configuration for gait event detection for Gen 3.0 Portable Powered Ankle-Foot Orthosis (PPAFO)”, June, 2016. <http://hdl.handle.net/2142/92719>

19. ♀ Jaihui (Carrie) Liang, M.S., Mechanical Engineering, “Design of a passive hydraulic simulator for abnormal muscle behavior replication”, July 2016. Co-advisor: Prof. Randy Ewoldt (MechSE) <http://hdl.handle.net/2142/92848>
20. Austin (Ruixi) Chen, M.F.A., Industrial Design, “Inappropriate posture: Device to Regain Awareness on Postures and Prevent Trauma, Case Study: How Can Young Adults’ Posture Be Monitored Discreetly By Sensing and Movement Assistive Technology”, July 2017. MFA Committee: Prof. Deanna McDonagh (Chair, Industrial Design), Prof. David Weightman (Industrial Design) <http://hdl.handle.net/2142/98422>
21. Chenzhang Xiao, M.S., Mechanical Engineering, “Pneumatic Ergonomic Crutches”, July 2017. <http://hdl.handle.net/2142/98433>
22. Yinan Pei, M.S., Mechanical Engineering, “Design and evaluation of a passive hydraulic simulator for biceps spasticity”, July 2018. <http://hdl.handle.net/2142/101602>
23. Seung Yun (Leo) Song, M.S., Mechanical Engineering, “Quantification of Spasticity and Rigidity for Biceps and Triceps Using the PVRM (Position, Velocity, and Resistance Meter)”, May 2019. <http://hdl.handle.net/2142/104925>
24. Prateek Garag, M.S., Mechanical Engineering, “Mechatronic and Biomechanical Considerations Toward the Design of an Ankle Clonus Simulator”, December 2019 <http://hdl.handle.net/2142/106403>
25. ♀ Mahshid Mansouri, M.S., Mechanical Engineering, “Exploring Patient Pressure Relief, Repositioning and Transfer While in a Bed”, May 2022. <https://hdl.handle.net/2142/116161>
26. ♀ Nadja Marin, M.S. candidate, Mechanical Engineering, anticipated August 2023
27. ♀ Keona Banks, M.S. candidate, Mechanical Engineering, anticipated May 2024

#### **Masters Students (Non-Thesis)**

28. Karthikeyan Rajendran, M.S., General Engineering, “Slips, Trips, and Falls Research Study Report”- MS project, co-advisor: Prof. Karl Rosengren (Kinesiology/Psychology), September, 2006.
29. Andrew T. Bosiljevac, M.S., Mechanical Engineering. “The effects of Tai Chi training on kinematic and kinetic obstacle crossing behaviors”- MS project, May 2007.
30. Jason A. Thomas, M.S., Mechanical Engineering. “Active Torque Ankle Foot Orthosis”, MS project, co-advisor: Prof. Eric Loth (Aerospace Engineering), May 2009.
31. Zanxi (Lloyd) An, M.S., Mechanical Engineering. “Complexity and Variability Analysis of Phase Portrait of Upper Arm Segment Angle in Manual Wheelchair Propulsion”, MS project, May 2011.
32. Douglas Wajda, M.S., “Wireless accelerometry using a smartphone”, primary co-advisor: Prof. Jacob Sosnoff (Kinesiology), MS project, May 2012.
33. Ayush Sinha, M.S., Mechanical Engineering. “HDCL Exoskeleton Test Bed”, Mechanical Engineering, MS project, May 2019 <https://hdcl.mechanical.illinois.edu/research/exo-test-bed/>
34. Ze (Fred) Wang, M.S. candidate, Mechanical Engineering, anticipated May 2023

#### **Undergraduate Student Independent Study Research Projects**

1. Abner Satterthwaite-Phillips, “Postural stability of humans during quiet stance and when startled,” December 2002.
2. Kurt Beschoner, “An Analysis of the Effect of Approach Distance on the Maximum Foot-Obstacle Clearance of the Elderly During Obstacle Crossing,” May 2004.
3. Susan Shah, “Variations in Balance and Postural Control throughout Pregnancy and up to Six Months Postpartum,” May 2004.
4. Nicholas Wills, “The Relationship between Back Pain and Stability throughout Pregnancy and up to Six Months Postpartum,” August 2004.
5. Kathy Wingate, “Biomechanics of Object Crossing Landings,” September 2004.
6. Todd Mayer, “GUI Modification of MATLAB code for Pregnancy Project,” December 2004.
7. James Jackson Potter, “Analysis of Quiet Standing Stance Width and its Effect on Balance Parameters throughout Pregnancy up to Delivery,” January 2005.
8. Scott Block, “A Hand Study: Development of an Inexpensive Data Glove,” May 2005.
9. Laura Gerke, “Motion and Force Data from the Canine Gait Cycle,” December 2005.

10. Farooq Khan, "Three Dimensional Joint Angle Calculations for the Detection of Gait Asymmetries", May 2006.
11. Michael Kern, "Personality and Postural Responses to Affective Pictures", May 2006
12. Vladimir Cabildo, "Motion and Force Data from the Canine Gait Cycle - II," May 2006.
13. Jason Thomas, "Air Cylinder Designs for Firefighter Gait and Balance Assessment Study", May 2007.
14. Joel Gilmer, "Fluid powered ankle-foot-orthosis", May 2009.
15. Sara Neitzke, "Analysis of center of pressure and knee angle during standing balance of Tai Chi practitioners", May 2010.
16. Mei Kuen (Iris) Hsu, "Electromyographic study of canine gait in Labrador Retrievers", May 2010.
17. LeeAnn Monahan, "Design of a Life-Cycle Testing System for Manual Wheelchairs", May 2011.
18. Stephen Braun, "Chainless Challenge Report", May 2012.
19. Casey Barnash, "Study of Actuation Using Worm Gear and Pneumatic Motor", August 2012.
20. Michael Angelini, "Effects of firefighter load carriage and fatigue on the utilized dynamic coefficient of friction during obstacle crossing", December 2012
21. Julian Sy, "Assessing gait changes in firefighters due to fatigue and asymmetrical load carriage" December 2012
22. Lela DiMonte, "Differences in Firefighter Fatigue Protocols as Measured by a Functional Balance Obstacle Course", May 2013
23. Joshua Kim, "Investigation of Beaglebone Black", December 2013
24. Kathleen Neville, "Design and Testing of a Portable Ankle Angle Capture Device (PAAC)", May 2014
25. Grace Deetjen, "Duration of Exertion and SCBA Design Affect Firefighter Balance", May 2014. Presented at 2015 ASB conference, co-author on Kesler Ergonomics 2018, Kesler et al. Applied Ergonomics 2018.
26. Emily Matijevich, College of Engineering: ISUR program: "Kinematic Compensation to Increased Ankle Stiffness During Gait", May 2014, "Measuring Changes in Gait Variability in Persons with Multiple Sclerosis while wearing Pneumatically Powered Ankle Foot Orthosis", May 2015, "Method for quantifying hip circumduction during over-ground walking in persons with mild and moderate multiple sclerosis severity", May 2016 (presented at 2016 ASB conference)
27. Kevin Kibler, "Implementing bath lift for person with cerebral palsy", co-advised by Yih-Kuen Jan (Kinesiology and Community Health), May 2015
28. Dayae Frail, "HDCL Test Bench Improvement for Data Collection", May 2015
29. David Lin, "Modeling Effects of Body Size on Force Generation", May 2015
30. Zonghe Chua, "Affordable Electrogoniometer for Rehabilitative Gait Analysis", May 2015
31. Jared Ripoli, "Implementing bath lift for person with cerebral palsy", co-advised by Yih-Kuen Jan (Kinesiology and Community Health), December 2015
32. Jason Troutner, "Cast21: Advanced Orthopedic Casts", December 2015
33. Ye Oo, "Pneumatic Elastomeric Accumulator", May 2016
34. Jong Hyun (Jay) Son, "Design of Next Generation Ankle Foot Orthosis", May 2016
35. Elizabeth Gacek, "An Investigation of the Effect of Gear Ratio on Manual Wheelchair Kinetics", May 2017. Presented at 2017 ASB Midwest Regional Meeting
36. Viviana Bermúdez Reyes, "Investigating a cost-efficient and comfortable electrode to generate and interpret surface electromyographic signals for muscle activation", August 2016
37. Kayla Arquines, "Industrial Design of the Next Generation PVRM", Spring 2018
38. Sonia Zhang, "Implementation of Force Sensing Resistors in an Ankle Clonus Simulator", December 2019.
39. Tianyi (Tim) Han, "The Mechanical and Aesthetic Design of an Ankle-Foot Simulator for Clonus Assessment Training", Spring 2020. Co-author in Pei et al., IEEE RA-L 2021
40. Evan Ripperger, "Plastic shroud for robotic arm neurological exam training simulator", Fall 2020. Co-author in Gim et al. ICRA 2021, co-inventor on US patent application 2021
41. Zeying Lang, "Clinical validation study on an ankle-foot training simulator for clonus assessment", Fall 2020
42. Devansh Sethia, "MiaPURE Ballbot Simulation Study", December 2021.

43. Hanyu (Tim) Gan, “Mechanical Design of an Artificial Achilles Tendon for Ankle Tendon Reflex Tapping Assessment Training and Clinical Data Analysis”, December 2021.
44. David Lam, “Development of a Planar Inverted Pendulum Test Bed (PIPTB)”, May 2022
45. Piyush Sud, “Full State Estimation of a Ballbot Using a Contactless Optical Flow Sensor”, May 2022

### **VISITING SCHOLARS**

1. Haitao Wang, PhD, Professor, Department of Mechanical Engineering, Dalian Maritime University, China, October 2017 - present

### **POST-DOCTORAL ADVISEES**

1. Manak Lal Jain, August 2008 - August 2009.

### **SERVICE**

#### **University of Illinois at Urbana-Champaign:**

##### **Campus:**

Science, Technology, Health, and Justice Program Proposal Committee: Appointed 12/22 - 4/23

Health Innovation Visioning Committee: Appointed 6/22 – 01/23

Disability Resources & Educational Services (DRES) Working Group: Appointed 2/22 - 08/22

Chancellor’s Call to Action to Address Racism and Social Injustice – Working Group 2 (Diversity and a Culture of Inclusion): Appointed 9/20-8/21

Provost’s Design Initiative Executive Committee: Appointed 8/16-1/18

Chancellor and Provost’s Committee on LGBTQ Concerns: Appointed 8/04 – 2/05, Appointed 8/12-8/18

Office of Technology Management Advisory Committee: Appointed 8/13-8/16

Academic Senate: AY 2011-2013

Graduate College Fellowship Review Board: Appointed 8/10-8/14

##### **College:**

Promotion and Tenure committee, 8/21-present

Ad hoc committee for new undergraduate Environmental Engineering program review, fall 2021

Ad hoc promotion and tenure review for ZJUI faculty, spring 2021

Ad hoc committee for 5-year evaluation of a department head, 9/20-1/21

Ad hoc committee for 5-year evaluation of a college center director, 9/19-1/20

Steering committee of the Health Care Engineering Systems Center, 6/19 - present

Associate Dean of Undergraduate Programs Search Committee, 11/17 (chair)

Ad hoc Prospective Program Review Committee: 5/16 (member) & 10/16 (chair)

Academic Advisor and Coordinator of Engineering Pathways Program Search Cmte: 4-8/16 (chair)

Ad hoc Course Review Committee: 8/15

Olin College Visitation Group: 4/14

Technical Entrepreneurial Center Review Committee: 8/12-5/13

Department Head Search Committee: (M&IE) 9/04 – 5/05, (MechSE) 5/14

Mentor, ENG 199W (Networking and Mentoring for Women in Engineering): 8/03 – 8/05

##### **Department:**

Diversity, Equity, and Inclusion Committee: 08/22-present

Promotion and Tenure Committee (chair): 8/21-present

Teaching and Research Faculty Search Committee: 10/19 – 3/20

Lecturer Search Committee: 6-8/19 (chair)

Graduate Admissions Coordinator Search Committee: 10-11/17 (chair)

Major Grants Officer Search Committee: 6-11/17

Promotion and Tenure Committee: 1/16- present

Faculty Recruiting Committee: 8/10 – 8/19

Undergraduate Programming Committee: 8/03 – 8/05, 8/12-8/19

Department Safety Committee: 8/03 – 8/05

Awards Committee: 8/07 – 8/10

Qualifying Exam Committee (dynamics): 8/07, 8/12, 1/13, 8/13



Ad-hoc Committee on Diversity: 8/06 – 5/07  
Ad-hoc Committee on Biomechanical Sciences: 1/06 – 5/06  
Seminar Committee: 8/05 – 8/07, 8/20-present  
Rapid Strategic Planning Committee: 10/04

Community:

IntelliWheels, Inc. – Board of Directors, Scientific Advisory Board: 5/11-5/12  
Illini Robotics, NFP – Board of Directors: 5/12- 5/15; Secretary: 1/13-4/14

### ADVISORY BOARDS

- Jump ARCHES Steering Committee, UIUC. 9/19 – 1/22
- Collaborative Machines Enhancing Therapies (CoMET Center), Shirley Ryan AbilityLab. 1/20 - present

### OUTREACH

FIRST Lego League Competition (for 4<sup>th</sup>-8<sup>th</sup> graders): team coach 2011, 2012, 2013 seasons (advanced to State Competition 2012, 2013)

Parker Hannifin Chainless Challenge (for college students): faculty mentor 2011-2012, 2012-2013 (National Champs!), 2013-2014, 2014-2015 seasons

Urbana City T-ball Recreation League (for K-2<sup>nd</sup> graders): team coach 2011 season

Phi Sigma Rho (sorority for engineering and engineering technology students): faculty advisor 11/2012 – spring 2015

ASME UIUC Student Chapter: faculty advisor 8/2012 – 8/2014

Pi Tau Sigma (Mechanical Engineering Honor Society): faculty advisor 1/13 – 8/13

oSTEM@Illinois (Out in STEM student LGBTQ+ organization at UIUC): faculty advisor 1/15 – 8/19

iRobotics (student robotics organization at UIUC): faculty advisor 9/13 – present

Illini VEX Robotics (student robotics organization at UIUC): faculty advisor 8/21 – present

### REVIEWER

Journals: *Clinical Biomechanics*, *Clinical Neurophysiology*, *Complexity*, *Dynamic Medicine*, *Gait & Posture*, *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, *Journal of Aging and Physical Activity*, *Journal of the American Geriatrics Society*, *Journal of Applied Biomechanics*, *Journal of Biomechanics*, *Journal of Gerontology: Medical Sciences*, *Journal of Motor Behavior*, *Journal of NeuroEngineering and Rehabilitation*, *Journal of Neurophysiology*, *Journal of Rehabilitation Research and Development*, *Medical Engineering & Physics*, *IEEE Transactions on Robotics, Prosthetics & Orthotics International*, *Annals of Biomedical Engineering*, *Mechatronics*, *ASME J Applied Mechanics*, *BioMed Research International*, *ASME J Medical Devices*, *Applied Ergonomics*, *ASME Journal of Dynamic Systems, Measurement and Control*

Study sections:

NIH – Musculoskeletal Rehabilitation Sciences (ad-hoc reviewer 3/06, 3/09, 6/10),

NIH - Bioengineering Sciences and Technologies IRG, "Indo-US Collaboration on Low Cost Medical Devices" (7/14)

NSF – Graduate Research Fellowship Program – Bioengineering panel (2/07, 1/14)

NSF – CMMI (panel reviewer 2007, 5/09, 12/11, 10/12, 3/13, 5/16, 5/21), LEAP-HI (04/22)

VA - Career Development Panel (8/14)

American Institute of Biological Sciences – 11/18

Congressionally Directed Medical Research Programs (CDMRP) – 10/20

NSERC (Canada), Alliance-Mitacs Accelerate Program – 1/22

Conferences: *International Society of Electromyography and Kinesiology* (2004\*), *American Society of Mechanical Engineering – Bioengineering Division* (2010) (\*Also session co-chair.) Track chair and session co-chair, IEEE- EMBS 2011, Boston, MA, August 30 – September 3, 2011; DSCC 2012, Fort Lauderdale, FL, October 17-19, 2012; DSCC 2013; ICORR 2013

## **PROFESSIONAL MEMBERSHIPS AND ACTIVITIES**

### **American Society of Mechanical Engineers:**

Associate Editor, ASME Journal of Medical Devices –7/2016 - present

Fellow 2015

Member 1995-present; (Initially student member ca. 1983-1988)

Reviewer: Summer Bioengineering Conference (SBC) – 2010, 2013, Dynamic Systems and Control Conference (DSCC) – 2012, 2013; ASME/Bath - 2013; SBC – 2015 (session organizer)

Founding member of Bio-Systems and Health Care Technical Committee in Dynamic Systems and Control Division (2011)

Student Section Faculty Advisor for U Illinois: 2012- 2014

Session Chair: DSCC – 2012, 2013

Session Organizer: Design of Medical Devices Conference (DMD) – 2014, 2016, 2017, 2018, 2019, 2021, 2022

### **American Society of Biomechanics:**

Presidential line (President-Elect, President, Past-President): 2020-2023

Fellow 2018

Member 1996-present

Reviewer: 2003, 2004, 2006, 2007, 2008, 2010, 2011, 2012, 2013, 2015, 2016, 2017, 2020, 2021

Session co-chair: 2003, 2004, 2007, 2008, 2010, 2013, 2015, 2016, 2019

Judge, 3-Minute Thesis competition: 2020

Program Chair Elect 2010-2011

Program Chair 2011-2012 (36th Annual Meeting, Gainesville, FL, August 15-18, 2012)

Workshop co-organizer: Initiated first Junior Faculty Mentoring Workshop, (with Kim Bigelow, 34<sup>th</sup> Annual Meeting, Providence, RI, August 18-21, 2010)

Tutorial co-organizer: Best Practices in Laboratory Management (with Dan Ferris and Chris Haas, 40th Annual Meeting of the American Society of Biomechanics, Raleigh, NC, August 2-5, 2016)

Diversity Committee 2014-2015

Woman in Science Committee 2007-2009, Women in Biomechanics luncheon (speaker) 2008

New Member Committee 2007-2008

### **Institute of Electrical and Electronics Engineers**

Member 2011 – present

Reviewer: IEEE RoboSoft Conference (2019), IEEE RA-L/BioRob Conference (2022)

### **American Association for the Advancement of Science**

Member 2017 – present

### **World Association for Chinese Biomedical Engineers**

Founding member 2005

### **Society of Women Engineering**

Distinguished Engineering Educator Awardee, Society of Women Engineers - 2018

Professional member 1987-1994 (external advisor for University of Rochester section)

Student member 1983-1987 (Publicity chair 8/86-5/87), 1994-2000

### **Pi Tau Sigma** (Mechanical Engineering Honor Society) – Member 1986 (Cornell Chapter)

Student Section Faculty Advisor for U Illinois: 1/13 – 8/13

### **Symposium co-organizer:**

Design of Medical Devices Conference: “Fluid Power Medical Devices” (April 7-11, 2014); “Wheelchair Technologies” and “Prosthetics & Orthotics” sessions (co-chair for April 12-14, 2016, April 11-13, 2017); “Rehabilitation Technologies 1” and “Rehabilitation Technologies 2” sessions (co-chair for April 10-12, 2018,

April 16-18, 2019), “Rehabilitation Devices 1” and “Rehabilitation Devices 2” (co-chair for April 6-9, 2020 – cancelled), “Rehabilitation and Medical Devices” (co-chair for April 13-15, 2021 (virtual)), “Wheelchair Technology” and “Prosthetic Technologies” (co-chair for April 12-14, 2022)

“Rehabilitation methods, tools, and devices for the ankle-foot” (invited sessions), 8th World Congress of Biomechanics, Dublin, Ireland, July 8-12, 2018.

“Medical Device Technology Transfer” (Special Session), Summer Biomechanics, Bioengineering and Biotransport Conference (SB<sup>3</sup>C), formerly ASME Summer Bioengineering Conference, Snowbird Utah, June 17-20, 2015

“Wearable Robotic Systems: Orthotics” (session), 33rd Annual International IEEE EMBS Conference, Boston, MA, August 30 - September 3, 2011.

“Musculoskeletal Biomechanics Symposium”, 44<sup>th</sup> Annual Society of Engineering Science Conference, College Station, TX, October 21-25, 2007.

“Dynamics of Biomechanical Processes”, 45th Annual Society of Engineering Science Conference, Urbana, IL, Oct. 12-15, 2008.

Invited Participant:

NSF SBIR/STTR Emerging Opportunities in Biotechnology Future Topics Workshop, July 26, 2007. NSF/CMMI Neuromechanical Engineering Workshop, September 14-15, 2009.

### **INTERESTS/HOBBIES**

Downhill skiing, cycling, camping, cooking, gardening, promoting STEM to women and girls, FIRST Robotics for K-12, LBGTQ+ ally and mentoring