

Jill Startzell Higginson

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Executive Summary

Dr. Higginson is an Associate Professor in the Departments of Mechanical Engineering and Biomedical Engineering at the University of Delaware. She was trained at Cornell University (BS Mechanical Engineering '96), Penn State University (MS Bioengineering '98), and Stanford University (PhD Mechanical Engineering '05). Dr. Higginson has also served as the Director of the Center for Biomechanical Engineering Research, was the founding Director of Biomedical Engineering at UD in 2010 and coordinated the undergraduate academic program through 2013. In recognition of her contributions, Dr. Higginson was awarded the College of Engineering Outstanding Junior Faculty Award in 2014 and the Excellence in Education Award in 2015.

The fundamental objective of the Higginson research group is to improve the understanding of muscle coordination for normal and pathological movements through coupled experimental and simulation studies. We use computational models to develop a cause-and-effect framework that relates muscle impairments to gait deviations. The overarching goal is to form a scientific rationale for therapeutic interventions to improve movement. Ongoing research projects are related to subject-specific interventions for post-stroke gait, cartilage contact and compressive forces in progressive knee osteoarthritis, and interactions between cognitive function and motor performance.

Research Interests

Normal and pathological movement; musculoskeletal modeling and simulation; controls and optimization; human gait; upper extremity tasks; biofeedback; gait and cognition; cortical control of movement; undergraduate research and education

Education

Ph.D. in Mechanical Engineering, 2005
Stanford University, Stanford, CA

M.S. in Bioengineering, 1998
The Pennsylvania State University, State College, PA

B.S. in Mechanical Engineering, 1996
Cornell University, Ithaca, NY

Research and Professional Experience

2010 to present: Associate Professor
Department of Mechanical Engineering, University of Delaware

2004 to 2010: Assistant Professor
Department of Mechanical Engineering, University of Delaware

2005 to present: Affiliated Faculty
Biomechanics and Movement Science Program, University of Delaware

2009 to present: Affiliated Faculty
Quantitative Biology, University of Delaware

9/2010 to 9/2011: Director
Biomedical Engineering Program, University of Delaware

9/2011 to 1/2014: Associate Director
Biomedical Engineering Program, University of Delaware

7/2008 to 1/2014: Director
Center for Biomechanical Engineering Research, University of Delaware

2000 to 2003: Biomedical Engineer
VA Palo Alto Health Care System, Palo Alto, CA

1998 to 2000: Biomechanical Engineer
Center on Aging, University of Kansas Medical Center, Kansas City, KS

1997 to 1998: Project Coordinator
Center for Locomotion Studies, Penn State University

6/1997 to 7/1997: Orthopedic Gait Laboratory Intern
University Clinic, Heidelberg, Germany

1996 to 1997: Research Assistant
Center for Locomotion Studies, Penn State University

1994 to 1995: Co-op Engineer
Intelligent Systems and Robotics Center, Sandia National Laboratories

Other Experience

3/2000 to 6/2000: Substitute Teacher

Sandia Preparatory School, Albuquerque, NM

1998: Undergraduate Project Advisor

Center for Locomotion Studies, Penn State University

1987 to 1992: Swim / Gymnastics Instructor

Pennsbury School District, Fallsington, PA

Professional Activities

2015	NIH SBIR Study Section (Risk, Prevention, and Health Behavior Small Business Panel)
2014-2015	Cecil County STEM Academy (capstone mentor)
2014	UD COE Diversity Workshop
2014	Moderator, World Congress of Biomechanics
2014	Moderator, GCMAS Annual Meeting
2014	Symposia Chair, World Congress Biomechanics
2012-2013	Penn State University Biomechanics Affiliated Program Group
2012-2013	NIBIB Study Section (Predictive Multiscale Models for Biomedical, Biological, Behavioral, Environmental and Clinical Research (U01))
2011-present	Scientific Advisory Board, National Center for Simulation in Rehabilitation Research (Stanford University)
2011-present	Perry Initiative (perryinitiative.org)
2011	Co-organizer, Co-moderator, GCMAS Clinical-Technical Symposium
2009	Reviewer, Italian Ministry of Health
2008	Session Chair, Biomedical Engineering Society 2008 Annual Meeting
2008	Reviewer, NACOB abstracts
2008-present	Member, GCMAS Education Committee
2008	Reviewer, Bertec Equipment Loan Competition
2007-present	Reviewer, Gait and Clinical Movement Analysis Society Annual Meeting
2006	Moderator, American Society of Biomechanics Annual Meeting
2003	Student member, Faculty search committee (Bioengineering and Mechanical Engineering)
2003	Organizing committee, Mechanical Engineering Women's Group
2002	Seminar Coordinator, Neuromuscular Biomechanics Laboratory, Stanford University
2002	Science Fair Judge, 3rd Annual Synopsys Silicon Valley Sci. & Tech. Championship
2001, 2002	Volunteer, Biomedical Computation at Stanford (BCATS) Conference
2001	Volunteer, Exploring New Worlds, Stanford University
2001	Poster Session Coordinator, Gait and Clinical Movement Analysis Society Annual Meeting, Sacramento, CA
1998-2001	MARey Software Developer (Penn State University)
1997	Seminar Coordinator, Center for Locomotion Studies, Penn State University

Professional Development Activities

Moving On: A Workshop for Associate Professors. 2/12/2014.
Inspiring Women in Science & Technology. 10/3/2013.
CPR/AED Training. 1/24/2013.
AWIS Workshop: Improving Work-Life Satisfaction. 4/19/2013.
ASEE Workshop: Active learning approaches for first-year engineering. 4/21/2012.
DHSA Educational Proposal Workshop. 1/10/2012.
COBRE Grant Writing Workshop. 1/11/2012, 1/17/2013.
Insight to Philanthropy Workshop. 3/18/2011.
ExCEED Teaching Workshop, 12/2007.
W.I.S.E. Negotiating Skills Faculty Workshop, 10/20/2006.
ITUE Problem-Based Learning Workshop, 1/2005.

Society Membership

American Society of Biomechanics
American Society of Engineering Education
American Society of Mechanical Engineers
Gait and Clinical Movement Analysis Society

Journal Reviewer

American Journal of Physical Medicine & Rehabilitation
Clinical Biomechanics
Computer Methods in Biomechanics and Biomedical Engineering
Gait and Posture
Journal of Applied Biomechanics
Journal of Applied Physiology
Journal of Biomechanics
Journal of Engineering in Medicine
Journal of Orthopaedic & Sports Physical Therapy
Prosthetics & Orthotics International
The Journals of Gerontology Series A: Medical Sciences

Honors and Awards

2015	College of Engineering Excellence in Teaching Award, University of Delaware
2014	Outstanding Junior Faculty Award, College of Engineering, University of Delaware
2014	Nomination, Excellence in Teaching Award
2014	OpenSim Fellow, National Center for Simulation in Rehabilitation Research
2005	Finalist, Young Investigator Award, International Society of Biomechanics
2003-2004	Predocorial Fellow, National Institute on General Medical Science (NIH GM 63495)
2003	Finalist, Best Paper Award, Gait and Clinical Movement Analysis Society
2003	Travel Grant, Gait and Clinical Movement Analysis Society Annual Meeting
1997	Travel Grant, American Society of Biomechanics Annual Meeting

1992-1996	McMullen's Dean Scholar Award, Cornell University
1992-1996	Dean's List, Cornell University
1995	Pi Tau Sigma National Mechanical Engineering Honor Society
1995	President, Mu Sigma Tau, Cornell Engineering Co-op Honor Society

Publications

In press or in print

1. Needle, A., Kaminski, T.W., Baumeister, J., **Higginson, J.S.**, Farquhar, W.B., Swanik, C.B. "The relationship between joint stiffness and muscle activity differs in unstable ankles and copers." *Journal of Sport Rehabilitation*.
2. Koshy, J., Hall, M.L., Erol, O., Cao, H., Buckley, J.M., **Higginson, J.**, Galloway, J.C., and Lobo, M.A. "Playskin Lift™: Development and initial testing of a do-it-yourself exoskeletal garment to assist upper extremity mobility and function. *Physical Therapy*. (Accepted)
3. Arch, E.S., Stanhope, S., **Higginson, J.S.**, "Passive-dynamic ankle-foot orthosis replicates soleus but not gastrocnemius muscle function during stance in gait: insights for orthosis prescription." *Prosthetics and Orthotics International*. (Accepted)
4. Knarr, B.K. and **Higginson, J.S.** "Practical approach to subject-specific estimation of knee joint contact force." *Journal of Biomechanics*. 2015 Apr 22. pii: S0021-9290(15)00240-7. doi: 10.1016/j.jbiomech.2015.04.020. [Epub ahead of print]
5. Hsiao, H., Knarr, B.K., **Higginson, J.S.**, Binder-Macleod, S.A. Mechanisms to increase propulsive force for individuals post-stroke. *Journal of NeuroEngineering and Rehabilitation*. 2015 Apr 18;12(1):40. doi: 10.1186/s12984-015-0030-8.
6. Kao, P-C., Higginson, C.I., Seymour, K., Kamerdze, M., **Higginson, J.S.** "Walking stability during cell phone use in healthy adults." *Gait and Posture*. 015 May;41(4):947-53. doi: 10.1016/j.gaitpost.2015.03.347.
7. Knarr, B., **Higginson, J.**, Zeni, J. "Change in knee contact force with simulated change in body weight." *Computer Methods in Biomechanics and Biomedical Engineering*. 2015 Mar 11:1-4. [Epub ahead of print]
8. Hsiao, H., Knarr, B.K., **Higginson, J.S.**, Binder-Macleod, S.A. The relative contribution of ankle moment and trailing limb angle to propulsive force during gait. *Human Movement Science*. 2015 Feb;39:212-21. doi: 10.1016/j.humov.2014.11.008.
9. Srivastava, S., Kao, P-C., Kim, S.H., Agrawal, S.K., **Higginson, J.S.**, Scholz, J.P. "Assist-as-needed robot-aided gait training improves walking function in individuals following stroke." *IEEE Trans Neural Systems Rehab Engr*. (Accepted)
10. Kao, P-C., Dingwell, J.B., **Higginson, J.S.**, Binder-Macleod, S.A. "Dynamic instability during post-stroke hemiparetic walking." *Gait & Posture*. 2014. 40(3): 457-63.
11. Ramsay, J., Buchanan, T.S., **Higginson, J.** "Differences in Plantar Flexor Fascicle Length and Pennation Angle Between Healthy and Post-Stroke Individuals and

Implications for Post-Stroke Plantar Flexor Force Contributions." *Stroke Research and Treatment*. 2014;2014:919486. doi: 10.1155/2014/919486.

12. Ramsay, J., Wessel, M., Buchanan, T.S., **Higginson, J.** "Post-stroke Muscle Architectural Parameters of the Tibialis Anterior and the Potential Implications for Rehabilitation of Foot Drop." *Stroke Research and Treatment*. 2014;2014:948475. doi: 10.1155/2014/948475.
13. Knarr, B., Reisman, D., Binder-Macleod, S., **Higginson, J.S.** "Changes in Predicted Muscle Coordination with Subject-Specific Muscle Parameters for Individuals Post-Stroke." *Stroke Research and Treatment*. 2014;2014:321747. doi: 10.1155/2014/321747.
14. Needle, A.R., Swanik, C.B., Baumeister, J., Schubert, M., Reinecke, K., Kaminski, T.W., Farquhar, W.B., **Higginson, J.S.** "Decoupling of Laxity & Cortical Activation in Unstable Ankles During Ligamentous Loading." *European Journal of Applied Physiology*. 2014 Oct;114(10):2129-38. doi: 10.1007/s00421-014-2929-3.
15. Stanhope, V.A., Knarr, B.A., Reisman, D.S., **Higginson, J.S.** "Frontal plane compensatory strategies associated with self-selected walking speed in individuals post-stroke." *Clinical Biomechanics*. 2014. 29(5): 518-22.
16. Collins, A.T., Richardson, R.T., **Higginson, J.S.** "Interlimb symmetry of dynamic knee joint stiffness and co-contraction is maintained in early stage knee osteoarthritis." *Journal of Electromyography and Kinesiology*. 2014.24(4): 497-501.
17. Needle, A.R., Baumeister, J., Kaminski, T.W., **Higginson, J.S.**, Farquhar, W., Swanik, C.B. "Neuromechanical coupling in the regulation of muscle tone and joint stiffness." *Scandinavian Journal of Medicine and Science in Sports*. *Scandinavian Journal of Medicine & Science in Sports*. 2014. Oct;24(5):737-48.
18. Reisman, D., Kesar, T., Perumal, R., Roos, M., Rudolph, K., **Higginson, J.**, Helm, E., Binder-Macleod, S. "Time course of functional and biomechanical improvements during a gait training intervention in persons with chronic stroke." *Journal of Neurologic Physical Therapy*. 2013. 37(4): 159-65.
19. Knarr, B.A., Ramsay, J.W., Buchanan, T.S., **Higginson, J.S.**, Binder-Macleod, S.A. "Muscle volume as a predictor of maximum force generating ability in the plantar flexors post-stroke." *Muscle and Nerve*. 2013. 48(6): 971-6.
20. Knarr, B.A., Reisman, D.S., Binder-Macleod, S.A. and **J.S. Higginson**. "Understanding compensatory strategies for muscle weakness during gait by simulating activation deficits seen post-stroke." *Gait and Posture*. 2013. 38(2): 270-5. NIHMSID in progress.
21. Knarr, B.A., Kesar, T.M., Reisman, D.S., Binder-Macleod, S.A. and **J.S. Higginson**. "Changes in the activation and function of the ankle plantarflexor muscles due to gait retraining in chronic stroke survivors." *Journal of NeuroEngineering and Rehabilitation* 2013. 31: 10-12. PMC3565909.
22. Knarr, B., **Higginson, J.** and Binder-Macleod, S. "Validation of an adjustment equation for the burst superimposition technique in subjects post-stroke." *Muscle and Nerve*. 2012. 46(2):267-9. PMC3400120.

23. Thomas, S.J., Swanik, C.B., **Higginson, J.S.**, Kaminski, T.W., Swanik, K.A., Kelly, J.D. 4th, Nazarian, L.N. "Neuromuscular and stiffness adaptations in Division I collegiate baseball players." *Journal of Electromyography and Kinesiology*. 2013 23(1):102-9.
24. Thomas, S.J., Swanik, C.B., Kaminski, T.W., **Higginson, J.S.**, Swanik, K.A., Nazarian, L.N. "Assessment of subacromial space and its relationship with scapular upward rotation in college baseball players." *J Sport Rehabil*. 2013 Aug;22(3):216-23.
25. Knarr, B.A., Zeni, Jr., J.A., and **Higginson, J.S.** "Comparison of electromyography and joint moment as indicators of co-contraction." *Journal of Electromyography and Kinesiology*. 2012; 22(4):607-11. PMC3506260.
26. **Higginson, J.S.**, Ramsay, J.W. and Buchanan, T.S. "Hybrid models of the neuromusculoskeletal system improve subject-specificity." *Proceedings of the Institution of Mechanical Engineers, Part H, Journal of Engineering in Medicine* 226(2): 113-119, 2012. (Invited submission) PMC3573850.
27. John, C., Anderson, F., **Higginson, J.** and Delp, S. "Stabilisation of walking by intrinsic muscle properties revealed in a three-dimensional muscle-driven simulation." *Computer Methods in Biomechanics and Biomedical Engineering*. 1-12, 2011. PMC3397280.
28. Altman, A.R., Reisman, D.S., **Higginson, J.S.** and I.S. Davis. "Kinematic comparison of split-belt and single-belt treadmill walking and the effects of accommodation." *Gait and Posture*. 2012; 35(2):287-91. PMC3274623.
29. Ramsay, J.W., Barrance, P.J., Buchanan, T.S., and **J.S. Higginson**. "Paretic muscle atrophy and non-contractile tissue content in individual muscles of the post-stroke lower extremity." *Journal of Biomechanics* 44 pp. 2741-2746, 2011. PMID: PMC3208767.
30. Kubinski, A.J. and **Higginson, J.S.** "Strategies used during a challenging weighted walking task in healthy adults and individuals with knee osteoarthritis." *Gait and Posture* 35(1): 6-10, 2012. PMC3251734. PMID: 21962404.
31. Thomas, S.J., Swanik, C.B., Kaminski, T.W., Swanik, K.A., **Higginson, J.S.**, Bartolozzi, A.R., and Nazarian, L. "Humeral retroversion and its association with posterior capsule thickness in collegiate baseball players." *Journal of Shoulder and Elbow Surgery*. 2012; 21(7):910-6.
32. Kesar, T.M., Perumal, R., Reisman, D.S., Rudolph, K.S., **Higginson, J.S.** and Binder-Macleod, S.A. "Combined effects of fast treadmill walking and functional electrical stimulation on post-stroke gait." *Gait and Posture* 33 (2), pp. 309-313, 2011. PMID: 21183351. PMC3042540.
33. Hakansson, N.A., Kesar, T., Reisman, D., Binder-Macleod, S. and **J.S. Higginson**. "Effects of FastFES gait training on mechanical recovery in post-stroke gait." *Artificial Organs* 35(3): 217-20, 2011. PMID: 21401663. PMC3081781.
34. Henderson, C.E., Barrance, P.J., and **Higginson, J.S.** "Comparison of MRI-based estimates of articular cartilage contact area in the tibiofemoral joint". *Journal of Biomechanical Engineering* 133 (1), 2011. PMID: 21186904. PMC3068480. [doi:10.1115/1.4002938](https://doi.org/10.1115/1.4002938).

35. Thomas, S.J, Swanik, C.B., **Higginson, J.S.**, Kaminski, T.W., Swanik, K.A., Bartolozzi, A.R., Abboud, J.A., and Nazarian, L. "A Bilateral Comparison of Posterior Capsule Thickness and Its Correlation with Glenohumeral Range of Motion and Scapular Upward Rotation in Collegiate Baseball Players" *Journal of Shoulder and Elbow Surgery*. 2011 Jul;20(5):708-16.
36. Richards, C. and **Higginson, J.S.** "Knee Contact Force in Subjects with Symmetrical OA Grades: Differences between OA Severities". *Journal of Biomechanics* 43: 2595-2600, 2010. PMID: 20627301. PMC 2937066.
37. Zeni, Jr., J.A. and **Higginson, J.S.** "Knee osteoarthritis affects the distribution of joint moments during gait." *The Knee* 18(3): 156-9, 2011. PMID: 20510618. PMC2970742.
38. Zeni, Jr., J.A. and **Higginson, J.S.** "Gait parameters and stride-to-stride variability during familiarization to walking on a split-belt treadmill." *Clinical Biomechanics* 25 (4): 383-6, 2010. PMID: 20004501. PMC2847055.
39. Barrios, J.A., **Higginson, J.S.**, Royer, T.D., and Davis, I.S. "Static and dynamic correlates of the knee adduction moment in healthy knees ranging from normal to varus-aligned." *Clinical Biomechanics* 24 (10): 850-854, 2009. PMC2763946.
40. Kesar, T.M., Perumal, R., Reisman, D.S., Rudolph, K.S., **Higginson, J.S.** and Binder-Macleod, S.A. "Functional electrical stimulation of ankle plantar- and dorsi-flexor muscles: effects on post-stroke gait. *Stroke* 40 (12): 3821-3827, 2009. PMID: 19834018. PMC2827197.
41. Kesar, T.M., Perumal, R., Reisman, D.S., Rudolph, K.S., **Higginson, J.S.** and Binder-Macleod, S.A. "Novel patterns of functional electrical stimulation have an immediate effect on dorsiflexor muscle function during gait for people poststroke." *Physical Therapy* 90 (1): 55-66, 2009. PMID: 19926681. PMC2802826.
42. George-Reichley, D.G. and **Higginson, J.S.** "Potential muscle function during the swing phase of stroke gait." *Journal of Applied Biomechanics* 26 (2): 180-7, 2010. PMID: 20498489.
43. Xiao, M. and **Higginson, J.** "Sensitivity of estimated muscle force in forward simulation of normal walking." *Journal of Applied Biomechanics* 2: 142-149, 2010. PMID: 20498485. PMC2877275.
44. Barrios, J.A., Davis, I.S., **Higginson, J.S.** and Royer, T.D. "Lower extremity walking mechanics of young individuals with asymptomatic varus knee alignment." *Journal of Orthopaedic Research* (11): 1414-1419, 2009. [doi:10.1002/jor.20904](https://doi.org/10.1002/jor.20904)
45. Zeni, Jr., J.A. and **Higginson, J.S.** "Differences in gait parameters between healthy subjects and persons with moderate and severe knee osteoarthritis: a result of altered walking speed?" *Clinical Biomechanics* 24: 372-378, 2009. PMID: 19285768. PMC2715920. <http://dx.doi.org/10.1016/j.clinbiomech.2009.02.001> (Corrigendum: [doi:10.1016/j.clinbiomech.2009.04.001](https://doi.org/10.1016/j.clinbiomech.2009.04.001))
46. Zeni, Jr., J.A. and **Higginson, J.S.** "Dynamic knee joint stiffness in subjects with a progressive increase in severity of knee osteoarthritis". *Clinical Biomechanics* 24: 366-

- 371, 2009. PMID: 19250725. PMC2696188. [doi:10.1016/j.clinbiomech.2009.01.005](https://doi.org/10.1016/j.clinbiomech.2009.01.005)
(Corrigendum: [doi:10.1016/j.clinbiomech.2009.04.002](https://doi.org/10.1016/j.clinbiomech.2009.04.002))
47. Zeni, Jr., J.A., Rudolph, K.S. and **Higginson, J.S.** "Alterations of quadriceps and hamstring coordination in persons with medial compartment knee osteoarthritis". *Journal of Electromyography and Kinesiology* 20(1): 148-54, 2010. PMID: 19223203. PMC2827305. [doi:10.1016/j.jelekin.2008.12.003](https://doi.org/10.1016/j.jelekin.2008.12.003)
48. Xiao, M. and **Higginson, J.** "Muscle function may depend on model selection in forward simulation of normal walking." *J Biomech* 41: 3236-3242, 2008. PMID: 18804767. PMC2586943. <http://dx.doi.org/10.1016/j.jbiomech.2008.08.008>
49. Zifchock, R.A., Davis, I., **Higginson, J.**, Royer, R. "Side-to-side differences in overuse running injury susceptibility: a retrospective study." *Human Movement Science* 27: 888-902, 2008.
50. Crabtree, C.A. and **Higginson, J.S.** "Modeling neuromuscular effects of ankle foot orthoses (AFOs) in computer simulations of gait." *Gait and Posture* 29(1): 65-70, 2009. <http://dx.doi.org/10.1016/j.gaitpost.2008.06.004>
51. Zifchock, R.A., Davis, I., **Higginson, J.**, Royer, R. "The Symmetry Angle: A Novel, Robust Method of Quantifying Asymmetry." *Gait and Posture* 27(4): 622-627, 2008.
52. Zeni Jr., J.A., Richards, J.G. and **Higginson, J.S.** "Two simple methods for determining gait events during treadmill and overground walking using kinematic data." *Gait and Posture* 27(4): 710-714, 2008. PMC2384115.
53. **Higginson, J.S.**, Zajac, F.E., Neptune, R.R., Kautz, S.A. & Delp, S.L. "Muscle contributions to support during gait in an individual with post-stroke hemiparesis." *J Biomech* 39: 1769-1777, 2006.
54. **Higginson, J.S.**, Zajac, F.E., Kautz, S.A., Neptune, R.R., Burgar, C.G. & Delp, S.L. "Effect of equinus foot placement and intrinsic muscle response on knee extension during stance." *Gait and Posture* 23:32-36, 2006.
55. **Higginson, J.S.**, Anderson, F.C. & Neptune, R.R. "Simulated parallel annealing within a neighborhood (SPAN) for optimization of biomechanical systems." *J Biomech* 38: 1938-1942, 2005.
56. Hamel, K.A., Okita, N., **Higginson, J.S.** & Cavanagh, P.R. "Foot clearance during stair descent: effects of age and illumination." *Gait and Posture* 21:135-140, 2005.
57. Cavanagh, P.R. & **Higginson, J.S.** (2002). "What is the Role of Vision During Stair Descent?" In J. Andre, D.A. Owens, & L.O. Harvey, Jr. (Eds.), *Visual perception: the influence of H. W. Leibowitz* (pp. 213-230). Washington, DC: American Psychological Association.
58. Pohl, P.S., **Startzell, J.K.**, Duncan, P.W. & Wallace, D. "Reliability of lower extremity isokinetic strength testing in adults with stroke." *Clinical Rehabilitation* 14(6): 601-607, 2000.

59. **Startzell, J.K.**, Owens, D.A., Mulfinger, L.M., & Cavanagh, P.R. "Stair Negotiation in Older People: A Review". *Journal of the American Geriatrics Society* 48:567-580, 2000.
60. **Startzell, J.K.** & Cavanagh, P.R. "A three-dimensional approach to the calculation of foot clearance during locomotion." *Human Movement Science* 18: 603-611, 1999.
61. Mazzeo, R.S., Cavanagh, P.R., Evans, W.J., Fiatarone, M., Hagberg, J., McAuley, E. & **Startzell, J.K.** "Exercise and Physical Activity for Older Adults." (Position Statement for the American College of Sports Medicine) *Medicine & Science in Sports & Exercise*, 30(6): 992-1008, 1998.
62. Cavanagh, P.R., Mulfinger, L. & **Startzell, J.K.** "Surviving the Stairs." *Biomechanics*. 4(4): 14-20, 1997.

Abstracts

1. Henderson, C.E., Barrance, P.J., Manal, K.T., **Higginson, J.S.** "Altered Medial to Lateral Tibiofemoral Cartilage Loading Environment During Gait May Be Present in Knee Osteoarthritis." American Physical Therapy Association – Combined Section Meeting 2016. (submitted)
2. Wei, D., Poulakakis, I., **Higginson, J.S.** "Human-exoskeleton hybrid model to produce stable gait through inter-limb coordination." American Society of Biomechanics 2015.
3. McGinnis, K.M., Van Der Post, L. **Higginson, J.S.** "Effect of unilateral and bilateral load carriage on gait and trunk orientation in health young adult females." American Society of Biomechanics 2015.
4. Richardson, R.T., Knarr, B.A., **Higginson, J.S.** and Richards, J.G. "Glenohumeral abduction and flexion muscle moment arms: a verification study of a new musculoskeletal model of the shoulder." American Society of Biomechanics 2015.
5. West, T.K., Schenk, M.E., Schnall, D.A., O'Brien, M.E., Groome, M.A., Knarr, B., **Higginson, J.**, Singh, A."Smartboot: An instrumented clinical walking boot for partial weight bearing training." Summer Biomechanics, Bioengineering and Biotransport Conference 2015. (Podium presentation; Design finalist)
6. Henderson, C. and **Higginson, J.** "Quantifying the relationship between joint loading cost of locomotion and walking speed in subjects with moderate knee osteoarthritis." OARSI 2015.
7. Richardson, R.T., Knarr, B.A., **Higginson, J.S.** and Richards, J.G. "Evaluation of glenohumeral muscle moment arms of a new musculoskeletal model of the shoulder and upper extremity." Gait and Clinical Movement Analysis Society 2015.
8. Doolin, M., **Higginson, J.**, and Knarr, B. "Evaluation of multiple training paradigms when using biofeedback for learning partial weight bearing." Gait and Clinical Movement Analysis Society 2015.
9. Henderson, C. and **Higginson, J.** "Effect of knee excursion on opensim estimated knee joint contact force in subjects with moderated knee osteoarthritis." Gait and Clinical Movement Analysis Society 2015. (Podium presentation)

10. Arch, E.S., Erol, O., Bortz, C., Madden, C., Galbraith, M., Rossi, A., Lewis, J., **Higginson, J.S.**, Buckley, J.M., Horne, J. "Development of a quantitative k-level classification method." American Academy of Orthotists and Prosthetists 2015. (Podium presentation)
11. **Higginson, J.S.** and Kheilar, R. "Using simulation to understand changes in post-stroke muscle function due to robotic exoskeleton training." World Congress of Biomechanics 2014. (Invited submission; Podium presentation)
12. Knarr, B.A. and **Higginson, J.S.** "Subject-Specific Parameters and the Prediction of Knee Joint Contact Force Using Musculoskeletal Modeling." World Congress of Biomechanics 2014. (Invited submission; Podium presentation)
13. Kheilar, R. and **Higginson, J.S.** "Effect of BWSTT of hemiparetic patients on plantar flexors function." Gait and Clinical Movement Analysis Society 2014.
14. Seymour, K., Kamerdze, M., Higginson, C., **Higginson, J.** "Kinetic and kinematic changes due to dual-tasking in healthy older adults." Gait and Clinical Movement Analysis Society 2014.
15. Seymour, K., Kamerdze, M., Higginson, C., **Higginson, J.** "Using kinetic and kinematic parameters to explain changes in gait due to cognitive tasks in healthy young adults." Gait and Clinical Movement Analysis Society 2014.
16. Kao, P-C., Seymour, K., Kamerdze, M., Higginson, C., **Higginson, J.** "Walking stability during cognitive tasks in healthy adults." World Congress of Biomechanics 2014.
17. Srivastava, S., Kao, P-C., Reisman, D.S., Scholz, J.P., **Higginson, J.S.** "Footpath variability during swing phase of gait following stroke." Neural Control of Movement 2014.
18. Bucha, A., and **Higginson, J.** "The trade-off between hip flexors and ankle plantar flexors due to age and speed." Gait and Clinical Movement Analysis Society 2014. (Podium presentation)
19. Ramsay, J.W., Buchanan, T.S., **Higginson, J.S.** "Changes in post-stroke muscle architecture compared to health adults." World Congress of Biomechanics 2014.
20. Ramsay, J.W., Buchanan, T.S., **Higginson, J.S.** "Is hip muscle atrophy inhibited for fast post-stroke walkers?" Gait and Clinical Movement Analysis Society 2014.
21. Srivastava, S., Kao, P-C., Scholz, J.P., **Higginson, J.S.** "Coordination of muscles to control the foot position during over-ground walking in healthy elderly and stroke survivors." World Congress of Biomechanics 2014.
22. Srivastava, S., Kao, P-C., Agrawal, S.K., Scholz, J., **Higginson, J.S.** "Robot-aided assist-as-needed gait training vs. body weight supported treadmill training post-stroke." Gait and Clinical Movement Analysis Society 2014.
23. Suydam, S., Kokkeni, E., **Higginson, J.S.**, Buchanan, T.S. "Comparing the variability of normal walking to crouch gait within healthy subjects." Gait and Clinical Movement Analysis Society 2014. (Podium presentation)
24. Ramsay, J.W., Buchanan, T.S., **Higginson, J.S.** "Using forward simulations to predict sagittal kinematics during FastFES". American Society of Biomechanics 2013.

25. Wessel, M.A., Ramsay, J.W., Suydam, S.M., Buchanan, T.S., **Higginson, J.S.** "Muscle architectural changes of the post-stroke tibialis anterior." American Society of Biomechanics 2013.
26. Kao, P-C., Dingwell, J.B., **Higginson, J.S.**, Binder-Macleod, S. "Walking instability following stroke can be revealed by dynamic stability analyses." Gait and Clinical Movement Analysis Society 2013. (Podium presentation)
27. Richardson, R.T., Richards, J.G., **Higginson, J.S.** "Knee osteoarthritis results in kinematic and kinetic interlimb asymmetry during gait." Gait and Clinical Movement Analysis Society 2013. (Podium presentation)
28. Knarr, B.A., Reisman, D.S., Binder-Macleod, S.A., **Higginson, J.S.** "Changes in model-predicted muscle activation with subject-specific parameters for individuals post-stroke." Computer Methods in Biomechanics and Biomedical Engineering 2013. (Podium presentation)
29. Brandis, C.E., Awad, L.N., Hsiao, H., Marion, M.S., Kesar, T.M., Knarr, B.A., **Higginson, J.S.**, Binder-Macleod, S.A. "The effects of fatigue on post-stroke muscle force production and center of mass acceleration: a musculoskeletal simulation analysis." Computer Methods in Biomechanics and Biomedical Engineering 2013. (Podium presentation)
30. Buckley, J.M., **Higginson, J.S.**, Bucha, A.C., Khandha, A., Elliott, D., Buchanan, T. "Research-Focused Undergraduate Laboratory Exercises in Biomechanics." 2013 ASME Summer Bioengineering Conference.
31. Needle, A.R., Baumeister, J., Schubert, M., Reinecke, K., **Higginson, J.S.**, Swanik, C.B. "Instrumented anterior mobilization of the ankle joint increases contralateral somatosensory cortex activation in healthy subjects." National Athletic Trainers Association Conference. 2013.
32. Stanhope, V., Knarr, B. and **Higginson, J.**, Comparison of frontal plane compensatory strategies between ambulation categories in individuals post-stroke. Biomedical Engineering Society 2012.
33. Van der Post, L.M., Collins, A.T. and **Higginson, J.S.**, "Gender Differences in the Relationship between Hamstrings and Quadriceps Strength and KOOS Score in Knee OA Patients." Biomedical Engineering Society 2012.
34. Lenz, A.L. and **Higginson, J.S.** "Lower extremity coordination patterns in post-stroke gait based on self-selected walking speed classification." Gait and Clinical Movement Analysis Society 2013. (Podium presentation)
35. Pineault, K.G., Ramsay, J.W. and **Higginson, J.S.** "Quadriceps muscle geometry differs between healthy individuals and those with post-stroke hemiparesis." 2012 Northeast Bioengineering Conference. (Podium presentation)
36. Knarr, B.A. and **Higginson, J.S.**, "The ability of a residual reduction algorithm to account for handrail use during gait analysis." ASME 2012 Summer Bioengineering Conference.
37. Schrank, E.S., Razzook, A., Takahashi, K., Tierney, J., Gillespie Jr., J.W., Hitch, L., Wallace, K., Moore, R., **Higginson, J.S.**, and Stanhope, S.J. "A predictable and repeatable method to rapidly manufacture function-customized passive-dynamic ankle foot orthoses." ASME 2012 Summer Bioengineering Conference. (Podium presentation)

38. Lenz, A.L. and **Higginson, J.S.** "Plantarflexor muscles in post-stroke gait increase activation symmetry with speed in musculoskeletal modeling." Gait and Clinical Movement Analysis Society 2012.
39. Higginson, C.I., Lenz, A.L. and **Higginson, J.S.** "The impact of walking on thinking: preliminary results from a dual task walking study." International Neuropsychological Society 2012.
40. Schrank, E.S., **Higginson, J.S.**, and Stanhope, S.J. "Compensatory muscle control strategies when walking with a customized PD-AFO". American Society of Biomechanics 2011.
41. Crowell, H.P., Davis, I.S., Higginson, J.S., Manal, K., and Wang, L. "Combining musculoskeletal modeling and optimization to estimate muscle forces at the ankle." American Society of Biomechanics 2011. (Podium presentation)
42. Knarr, B.A., Ramsay, J., Buchanan, T.S., Binder-Macleod, S.A. and **Higginson, J.S.** "Quantification of atrophy and activation failure in the plantarflexors post-stroke." American Society of Biomechanics 2011.
43. Gopalakrishnan, A. and **Higginson, J.** "Cost function with physiological relevance minimizes knee contact forces in osteoarthritis gait." American Society of Biomechanics 2011. (Withdrawn)
44. Ramsay, J.W., Buchanan, T.S., and **Higginson, J.S.** "EMG-driven muscle activations tune post-stroke computed muscle control simulations." American Society of Biomechanics 2011.
45. Richardson, T. and **Higginson, J.S.** "Knee osteoarthritis results in asymmetric joint moment distribution during gait." American Society of Biomechanics 2011. (Podium presentation)
46. Lenz, A.L., Higginson, C.I. and **Higginson, J.S.** "Altered walking performance during simultaneous cognitive tasks." American Society of Biomechanics 2011.
47. Thomas, S.J., Swanik, C.B., Kaminski, T.W., Swanik, K.A., **Higginson, J.S.**, Nazarian, L. and Bartolozzi, A.R. "Humeral retroversion and its association with posterior capsule thickness in collegiate baseball players." National Association of Athletic Trainers 2011.
48. Henderson C, Kubinski A, **Higginson J.** "The relationship between the knee adduction moment and distribution of cartilage contact area in the tibiofemoral joint in healthy older adults and subjects with moderate knee osteoarthritis" World Congress on Osteoarthritis. 2010.
49. Hakansson, N.A., Kesar, T., Reisman, D. Binder-Macleod, S. and Higginson, J.S. "Effects of FastFES gait training on mechanical recovery in post-stroke gait." International Functional Electrical Stimulation Society. Vienna, Austria, 2010. (Podium presentation)
50. Ramsay, J.W., Buchanan, T.S., Barrance, P.J. and **Higginson, J.** "Gastrocnemius atrophies preferentially in post-stroke plantarflexors." American Society of Biomechanics. Providence, RI, 2010.

51. Olchowski, D.G., Buchanan, T.S. and **Higginson, J.S.** "Using subject-specific muscle parameters to compare muscle forces between an EMG-driven and OpenSim musculoskeletal model." American Society of Biomechanics. Providence, RI, 2010.
52. Zahradka, N., Reisman, D. and **Higginson, J.** "Effects of handrail use on healthy treadmill walking." American Society of Biomechanics. Providence, RI, 2010.
53. Gopalakrishnan, A., Hakansson, N. and **Higginson, J.** "Incorporating velocity characteristics into cost functions does not alter optimal muscle forces in normal walking." American Society of Biomechanics. Providence, RI, 2010.
54. Hakansson, N.A., Kesar, T.M., Reisman, D.S, Binder-Macleod, S.A. and **Higginson, J.** "Mechanical recovery influenced by dorsiflexor not plantarflexor stimulation in post-stroke gait." American Society of Biomechanics. Providence, RI, 2010. (Podium presentation)
55. Knarr, B.A., Kesar, T.M., Helm, E., Reisman, D.S, Binder-Macleod, S.A. and **Higginson, J.S.** "Simulation detects changes in muscle activation in post-stroke gait after a functional electrical stimulation intervention." American Society of Biomechanics. Providence, RI, 2010.
56. Knarr, B.A. and **Higginson, J.S.** "Muscle compensation strategies with plantarflexor and dorsiflexor activation impairment." Gait and Clinical Movement Analysis Society. Miami, FL, 2010.
57. Knarr, B.A., Zeni, J. and **Higginson, J.S.** "Comparison of electromyography and joint moment as indicators of co-contraction." Gait and Clinical Movement Analysis Society. Miami, FL, 2010.
58. Hakansson, N. and **Higginson, J.** "Differences in muscle energetic contributions between walking at self-selected and very slow speeds." Workshop on Multi-scale Muscle Mechanics. Woods Hole, MA, 2009.
59. Kesar, T., Perumal, R., Reisman, D., Rudolph, K., **Higginson, J.** and Binder-Macleod, S. "Interactions between plantar- and dorsi-flexor functional electrical stimulation: effects on post-stroke gait." Society for Neuroscience. Chicago, IL, 2009.
60. Zeni, J.A. Jr. and **Higginson, J.S.** "Difference in gait parameters between healthy subjects and persons with moderate and severe knee osteoarthritis: a result of altered walking speed?" World Congress on Osteoarthritis. Montreal, Quebec, Canada, 2009.
61. Richards, C., Zeni, J. and **Higginson, J.** "Two methods to determine muscle forces and joint contact force: comparison to experimental muscle activity." American Society of Biomechanics. State College, PA, 2009.
62. Shah, S., Novotny, J. and **Higginson, J.** "Effect of selective muscle weakness on range of motion of glenohumeral joint." American Society of Biomechanics. State College, PA, 2009. (Podium presentation)
63. Kubinski, A. and **Higginson, J.** "Kinetics of a weighted challenge in individuals with knee osteoarthritis." American Society of Biomechanics. State College, PA, 2009.

64. Kesar, T., Perumal, R., Reisman, D., Rudolph, K., **Higginson, J.** and Binder-Macleod, S. "Effects of novel physiological-based functional electrical stimulation patterns on post-stroke gait." American Society of Biomechanics. State College, PA, 2009. (Podium presentation)
65. Roewer, B. Henderson, C., Reisman, D. & **Higginson, J.** "Effect of walking speed on mechanical recovery and internal work after stroke." Gait and Clinical Movement Analysis Society. Denver, CO, 2009. (Podium presentation)
66. Hamner, S.R., John, C.T., **Higginson, J.S.** & Delp, S.L. "Muscle contributions to propulsion and support during running." Gait and Clinical Movement Analysis Society. Denver, CO, 2009. (Podium presentation)
67. Kubinski, A.J. & **Higginson, J.S.** "Kinetics and kinematics of a weighted challenge in individuals with knee osteoarthritis." Orthopaedic Research Society. Las Vegas, NV, 2009.
68. Henderson, C.E., Barrance, P.J. & **Higginson, J.S.** "Quantification of knee joint contact area using weight-bearing MRI for subjects with osteoarthritis." Orthopaedic Research Society. Las Vegas, NV, 2009.
69. Xiao, M. & **Higginson, J.** "Effects of asymmetric ankle plantarflexor recruitment on post-stroke walking: a 3D simulation study." North American Congress on Biomechanics. Ann Arbor, MI, 2008.
70. Hamner, S.R., John, C. T., Anderson, F.C., **Higginson, J.S.**, Delp, S.L. "Reducing residual forces and moments in a three-dimensional simulation of running." North American Congress on Biomechanics. Ann Arbor, MI, 2008.
71. Xiao, M. & **Higginson, J.** "Muscle force differences of quadriceps in different walking simulations." Gait and Clinical Movement Analysis Society 13th Annual Meeting. Richmond, VA, 2008. (Podium presentation)
72. **Higginson, J.** & Richards, C. "Why use subject-specific simulations of normal gait?" Gait and Clinical Movement Analysis Society 13th Annual Meeting. Richmond, VA, 2008. (Podium presentation)
73. John, C. T., Anderson, F.C., Guendelman, E., **Higginson, J.S.**, Delp, S.L. "3D Muscle-Driven Simulations of Walking at Multiple Speeds." Biomedical Computation at Stanford. Stanford, CA, 2007. (Podium presentation.)
74. Zeni, Jr., J.A. and **Higginson, J.S.** "Estimation of knee joint compression force in subjects with medial compartment knee osteoarthritis." NorthEast Regional IDEA Meeting. Burlington, VT, 2007.
75. Kesar, T., Perumal, R., Reisman, D.R., Rudolph, K.S., Farquhar, W., **Higginson, J.S.** and Binder-Macleod, S.A. "Plantar- and dorsi-flexor FES in conjunction with fast treadmill training: effects on post-stroke walking patterns." 12th Annual Conference of the International FES Society. Philadelphia, PA, 2007. (Podium presentation.)

76. Zeni, Jr., J.A. and **Higginson, J.S.** "Estimation of knee joint compression force in subjects with medial compartment knee osteoarthritis." Annual Meeting of the American Society of Biomechanics. Stanford, CA, 2007.
77. Xiao, M. and **Higginson, J.** "Simulation study of walking patterns with knee osteoarthritis using OpenSim". 2007 Annual Meeting of the American Society of Biomechanics. Stanford, CA, 2007.
78. John, C.T., Anderson, F.C., Guendelman, E., **Higginson, J.S.** and Delp, S.L. "3D long-duration simulations of multiple speeds of walking". 2007 Annual Meeting of the American Society of Biomechanics. Stanford, CA, 2007. (Podium presentation.)
79. **Higginson, J.**, Kesar, T., Perumal, R. and Binder-Macleod, S. "Simulation-guided stimulation for paretic ankle muscles during stroke gait." ASME 2007 Summer Bioengineering Conference. Keystone, CO, 2007. (Podium presentation.)
80. Xiao, M. and **Higginson, J.** "Comparison of Muscle Function in 2D and 3D Walking Simulation." ASME 2007 Summer Bioengineering Conference. Keystone, CO, 2007. (Podium presentation.)
81. Zeni, Jr., J. and **Higginson, J.** "Influence Of Walking Speed And Severity Of Knee Osteoarthritis On Medial Compartment Loading. ASME 2007 Summer Bioengineering Conference. Keystone, CO, 2007.
82. Zeni, Jr., J. and **Higginson, J.** "Influence of speed on kinetics and coordination in knee osteoarthritis." 2007 NorthEast American Society of Biomechanics Conference. College Park, MD, 2007.
83. Crabtree, C.A. and **Higginson, J.S.** "Neuromuscular control is altered in simulated gait with ankle foot orthosis (AFO)." Annual Meeting of the American Society of Biomechanics. Blacksburg, VA, 2006.
84. Zeni, J. and **Higginson, J.** "Familiarization to walking on a split-belt treadmill: kinetics, kinematics and spatio-temporal parameters". Annual Meeting of the American Society of Biomechanics. Blacksburg, VA, 2006.
85. Zeni, J. and **Higginson, J.** "Kinetic and kinematic gait changes and trends of familiarization with walking on a split belt treadmill". 1st Biennial National IDeA Symposium of Biomedical Research Excellence (NISBRE), Washington, DC, 2006.
86. Crabtree, C.A. and **Higginson, J.S.** "Characterization of muscle power outputs as a result of wearing polypropylene ankle foot orthoses (AFOs) using 2-D musculoskeletal gait simulations. " 60th Annual Eastern Colleges Science Conference. Philadelphia, PA, 2006.
87. **Higginson, J.S.**, Zajac, F.E., Neptune, R.R., Kautz, S.A. & Delp, S.L. "Reduced plantarflexor contributions to support in post-stroke hemiparetic gait." XXth Congress of the International Society of Biomechanics. Cleveland, OH, 2005. (Podium presentation).
88. **Higginson, J.S.**, Zajac, F.E., Neptune, R.R., Kautz, S.A. & Delp, S.L. "Differences in muscle contributions to support in slow gait." Gait and Clinical Movement Analysis Society 10th Annual Meeting. Portland, OR, 2005. (Podium presentation.)

89. **Higginson, J.S.**, Zajac, F.E., Kautz, S.A., Neptune, R.R., Delp, S.L., & Burgar, C.G. "Can intrinsic mechanics of equinus result in knee extension?" Gait and Clinical Movement Analysis Society 8th Annual Meeting. Wilmington, DE, 2003. (Podium presentation.)
90. **Higginson, J.S.**, Neptune, R.R., Zajac, F.E., & Kautz, S.A. "How does soleus strength affect gait characteristics?" Biomedical Computation at Stanford 2001 Symposium Proceedings, Stanford, CA, 2001.
91. Cavanagh, P.R., Christina, K.A., Milner, C.E., Okita, N., Piazza, S.J. & **Higginson, J.S.** "MARey: A Package of Motion Analysis Routines for Three Dimensional Segmental and Joint Dynamics in MATLAB." XVIIIth Congress of the International Society of Biomechanics, Zurich, Switzerland, 2001.
92. Pohl, P.S., **Startzell, J.K.**, Duncan, P.W. & Wallace, D. "Reliability of lower extremity isokinetic strength testing in adults with stroke." American Physical Therapy Association Combined Sections Meeting, New Orleans, LA, 2000.
93. **Startzell, J.K.** & Cavanagh, P.R. "A Three Dimensional Approach to the Calculation of Foot Clearance During Locomotion." Proceedings of the Fifth International Symposium on the 3-D Analysis of Human Movement. Chattanooga, TN, 1998. (Podium presentation.)
94. **Startzell, J.K.**, Sommer, H.J., Lemmon, D.R. & Cavanagh, P.R. "A Website for Teaching Fundamental 3D Kinematic Analysis." Proceedings of the Twenty-First Annual Meeting of the American Society of Biomechanics, Clemson, SC, 1997.
(<http://www.biomechanics.psu.edu/tutorials/kinematics.html>)

University Research Conferences

1. Richardson, R.T., Knarr, B.A., **Higginson, J.S.**, Richards, J.G. "Evaluation of glenohumeral muscle moment arms of a new musculoskeletal model of the shoulder." CBER Research Day. Newark, DE 2015.
2. McGinnis, K.M., Van Der Post, L. **Higginson, J.S.** "Effect of unilateral and bilateral load carriage on gait and trunk orientation in health young adult females." CBER Research Day. Newark, DE 2015.
3. Wei, D., Poulakakis, I., **Higginson, J.S.** "Human-exoskeleton hybrid model to produce stable gait through inter-limb coordination." CBER Research Day. Newark, DE 2015.
4. Ebrahimi, A., Knarr, B.A., Stanhope, S.J., **Higginson, J.S.** "Plantarflexor muscle moments during body weight supported walking." CBER Research Day. Newark, DE 2015.
5. Hsiao, H., Knarr, B.A., **Higginson, J.S.**, Binder-Macleod, S.A. "The relative contribution of trailing limb angle and ankle moment to changes in propulsive force during walking in individuals poststroke." CBER Research Day. Newark, DE 2015.

6. Nicholson, M., **Higginson, J.S.**, Knarr, B. "Biofeedback modality: is audio or visual a more effective method?" Undergraduate Research & Service Celebratory Symposium. Newark, DE, 2014.
7. Doolin, M., **Higginson, J.S.**, Knarr, B. "Evaluation of multiple training paradigms when using biofeedback for learning partial weight bearing." Undergraduate Research & Service Celebratory Symposium. Newark, DE, 2014.
8. Kheilar, R., **Higginson, J.S.** "Changes in muscle contribution to support and propulsion post gait-retraining in stroke victims." CBER Research Day. Newark, DE 2014.
9. Bucha, A., **Higginson, J.** "The trade-off between hip flexors and ankle plantar flexors due to age and speed." CBER Research Day. Newark, DE 2014.
10. Ramsay, J., Buchanan, T., **Higginson, J.** "Changes in functional roles of post-stroke hip muscles between household and community ambulators." CBER Research Day. Newark, DE 2014.
11. Ramsay, J., Buchanan, T., **Higginson, J.** "A hybrid EMG-driven computed muscle control method to estimate hip muscle function in healthy controls." CBER Research Day. Newark, DE 2014.
12. Seymour, K., Kamerdze, M., Higginson, C., **Higginson, J.** "Kinetic and kinematic changes in gait due to dual-tasking." CBER Research Day. Newark, DE 2014.
13. Kao, PC, Seymour, K., Kamerdze, M., Higginson, C., **Higginson, J.** "Dynamic stability during dual-task treadmill walking in healthy adults." CBER Research Day. Newark, DE 2014. (Podium presentation)
14. Hsiao, HY, Knarr, B.A., **Higginson, J.S.**, Binder-Macleod, S.A. "A biomechanical-based model for predicting propulsive forces during able-bodied gait." CBER Research Day. Newark, DE 2014. (Podium presentation)
15. Adeleye, R.A., Bonor, J.C., Nohe, A.G., **Higginson, J.S.** "The effects of bone cell supernatant on non-inflammatory breast cancer migration within the bone (in-vitro)" CBER Research Day. Newark, DE 2013.
16. Seymour, K., **Higginson, J.**, Knarr, B. "Effect of handrail use on gait patterns in young healthy subjects." CBER Research Day. Newark, DE 2013.
17. Ramsay, J.W., Buchanan, T.S., **Higginson, J.S.** "Predicting sagittal kinematics of dorsiflexor FES using forward dynamic simulations." CBER Research Day. Newark, DE 2013.
18. Knarr, B.A., **Higginson, J.S.**, "Change in knee contact force due to model kinematics processing." CBER Research Day. Newark, DE 2013.
19. Kheilar, R., Knarr, B.A., **Higginson, J.S.**, "Muscle driven forward dynamic simulation of maximal vertical jumping in three dimensions." CBER Research Day. Newark, DE 2013.
20. Richardson, R.T., Thomas, K.F., Knarr, B.A., **Higginson, J.S.** "Assessment of musculoskeletal models of the upper extremity." CBER Research Day. Newark, DE 2013.

21. Needle, A.R., Schubert, M., Reinecke, K., Baumeister, J., **Higginson, J.S.**, Swanik, C.B. "Ligamentous loading of the ankle increases contralateral somatosensory cortex activity in healthy subjects." CBER Research Day. Newark, DE 2013.
22. Wessel, M.A., Ramsay, J.W., Suydam, S.M., Buchanan, T.S., **Higginson, J.S.** "Muscle architectural changes of the post-stroke tibialis anterior." CBER Research Day. Newark, DE 2013.
23. Stanhope, V., Knarr, B., **Higginson, J.** "Investigation of factors associated with self-selected walking speed in individuals post-stroke." CBER Research Day. Newark, DE 2013.
24. Knarr, B.A., Zeni, Jr., J.A. and **Higginson, J.S.** "Change in knee contact force with experimental and simulated change in body weight." CBER Research Day. Newark, DE, 2012.
25. Richardson, R.T. and **Higginson, J.S.** "Knee osteoarthritis results in kinematic and kinetic interlimb asymmetry during gait." CBER Research Day. Newark, DE, 2012.
26. van der Post, L.M., Collins, A.T. and **Higginson, J.S.** "Relationship between hamstring and quadriceps strength and KOOS scores in patients with knee osteoarthritis." CBER Research Day. Newark, DE, 2012.
27. Richardson, T. and **Higginson, J.S.** "Knee osteoarthritis results in asymmetric joint moment distribution during gait." CBER Research Day. Newark, DE, 2011.
28. Ramsay, J.W., Buchanan, T.S., and **Higginson, J.S.** "Hip flexors do not exhibit marked atrophy between limbs in post-stroke subjects." CBER Research Day. Newark, DE, 2011.
29. Knarr, B.A., Ramsay, J., Buchanan, T.S., Binder-Macleod, S.A. and **Higginson, J.S.** "Quantification of atrophy and activation failure in the plantarflexors post-stroke." CBER Research Day. Newark, DE, 2011.
30. Schrank, E.S., **Higginson, J.S.**, and Stanhope, S.J. "Compensatory muscle control strategies when walking with a customized PD-AFO". CBER Research Day. Newark, DE, 2011.
31. Lenz, A.L., Higginson, C.I. and **Higginson, J.S.** "Altered walking performance during simultaneous cognitive tasks." CBER Research Day. Newark, DE, 2011.
32. Zahradka, N. and **Higginson, J.S.** "Gait kinetics are affected by the use of handrails." CBER Research Day. Newark, DE, 2010.
33. Olchowski, D.G., Buchanan, T.S., and **Higginson, J.S.** "EMG-driven and OpenSim subject-specific models: a comparison of muscle forces." CBER Research Day. Newark, DE, 2010.
34. Hakansson, N.A. and **Higginson, J.S.** "Is muscle timing related to muscle force-length and force-velocity relationships in recumbent pedaling?" CBER Research Day. Newark, DE, 2010.
35. Knarr, B.A., Kesar, T.M., Helm, E.E., Reisman, D.S., Binder-Macleod, S.A. and **Higginson, J.S.** "Evaluation of muscle control strategy changes in post-stroke gait after

- a functional electrical stimulation using musculoskeletal simulations." CBER Research Day. Newark, DE, 2010.
36. Kubinski, A.J. and **Higginson, J.S.** "Strategies during weighted walking between healthy, older adults and adults with knee osteoarthritis." CBER Research Day. Newark, DE, 2010.
 37. Henderson, C.E., Kubinski, A.J., and **Higginson, J.S.** "Estimated mechanical stress in subjects with moderate knee osteoarthritis and healthy controls." CBER Research Day. Newark, DE, 2010.
 38. Ramsay, J.W., Buchanan, T.S., and **Higginson, J.S.** "Atrophy of post-stroke plantarflexors." CBER Research Day. Newark, DE, 2010.
 39. Hakansson, N. and **Higginson, J.** "Differences in muscle energetic contributions between walking at self-selected and very slow speeds." CBER Research Day. Newark, DE, 2009.
 40. Xiao, M. and **Higginson, J.** "Computer simulation of post-stroke hemiparetic walking." CBER Research Day. Newark, DE, 2009. (Podium presentation)
 41. Henderson, C. and **Higginson, J.** "Articular cartilage contact area changes with increasing knee flexion in subjects with moderate knee osteoarthritis: appearance of two subgroups." CBER Research Day. Newark, DE, 2009.
 42. Richards, C. and **Higginson, J.** "Comparison of knee contact force between subjects with varying OA severities." CBER Research Day. Newark, DE, 2009.
 43. Kubinski, A. and **Higginson, J.** "Spatiotemporal parameters for individuals with knee osteoarthritis during a weighted walking challenge." CBER Research Day. Newark, DE, 2009.
 44. Roewer, B. and **Higginson, J.** "Frontal plane internal work decreases and remains symmetrical after stroke." CBER Research Day. Newark, DE, 2009.
 45. Shah, S. Novotny, J. and **Higginson, J.** "Study on effect of selective muscle weakness on range of motion of upper extremity." CBER Research Day. Newark, DE, 2009.
 46. Zeni, Jr. J.A. and **Higginson, J.S.** "Dynamic knee joint stiffness in subjects with knee osteoarthritis." CBER Research Day. Newark, DE, 2008. (Podium presentation.)
 47. Shah, S., Novotny, J. and **Higginson, J.S.** "The effect of selective muscle stiffness on shoulder function." CBER Research Day. Newark, DE, 2008. (Podium presentation.)
 48. Kubinski, A., Zeni, J. and **Higginson, J.S.** "Compensations to a weighted walking challenge among varying osteoarthritis severities." CBER Research Day. Newark, DE, 2008.
 49. Roewer, B., Henderson, C. and **Higginson, J.S.** "Effects of walking speed on mechanical recovery in healthy and stroke population." CBER Research Day. Newark, DE, 2008.

50. Henderson, C. and **Higginson, J.S.** "Walking kinematics due to induced limp on a split-belt treadmill." CBER Research Day. Newark, DE, 2008.
51. Xiao, M., Kesar, T. and **Higginson, J.S.** "FES would induce predicted muscle excitation change in post-stroke walking." CBER Research Day. Newark, DE, 2008.
52. George-Reichley, D. and **Higginson, J.S.** "An induced acceleration analysis of the effect of hip flexion angle perturbations on the role of hip abductor muscles during the swing phase of gait." CBER Research Day. Newark, DE, 2007.
53. Zeni, Jr., J.A. and **Higginson, J.S.** "Estimation of knee joint compression force in subjects with medial compartment knee osteoarthritis." CBER Research Day. Newark, DE, 2007.
54. Xiao, M., Richards, C. and **Higginson, J.S.** "The simulation of normal and pathological gait using OpenSim." CBER Research Day. Newark, DE, 2007.
55. Richards, C.J. and **Higginson, J.S.** "The effect of treadmill speed on walking kinematics and kinetics." University of Delaware Research Foundation Poster Session. Newark, DE, 2006.
56. Grabczewski, K. and **Higginson, J.** "Kinematic comparison of overground versus treadmill walking." Science and Engineering Scholars Program, University of Delaware, 2006.
57. Burnim, K. and **Higginson, J.** "Analysis of ankle-foot orthosis on gait performance." Science and Engineering Scholars Program, University of Delaware, 2006.
58. Richards, C. and **Higginson, J.** "The effect of speed on walking kinematics." Science and Engineering Scholars Program, University of Delaware, 2006.
59. Zeni, J. and **Higginson, J.** "Familiarization to walking on a split-belt treadmill: kinetics, kinematics and spatio-temporal parameters." CBER Research Day. Newark, DE, 2006.
60. Crabtree, C. and **Higginson, J.** "Characterization of muscle power outputs as a result of wearing polypropylene ankle foot orthoses (AFOs) using 2-D musculoskeletal gait simulations." CBER Research Day. Newark, DE, 2006.

Invited Seminars

1. World Congress of Biomechanics. *Gait modification*. Boston, MA. July 6-11, 2014.
2. World Congress of Biomechanics. *Subject- and patient-specific musculoskeletal modeling*. Boston, MA. July 6-11, 2014.
3. *Using musculoskeletal simulations to understand post-stroke compensatory strategies*. Vanderbilt University. September 16, 2013.
4. *HHMS Summer Career Panel*. Participant. University of Delaware. July 20, 2011.

5. *Perry Initiative*. Invited speaker. Wilmington, DE (August 6, 2011). Philadelphia, PA (November 17, 2011). Newark, DE (August 25, 2012)
6. *Biomedical Engineering Research*. Delaware Rehabilitation Institute Launch. University of Delaware. February 24, 2011.
7. *Neuromuscular Biomechanics Laboratory*. Neuroscience Interest Group. University of Delaware. January 31, 2011.
8. *Biomechanics of osteoarthritis: quantifying cartilage compression and joint loads*. Department of Mechanical Engineering. Temple University. March 26, 2010.
9. *Using simulations to predict muscle impairments in post-stroke gait*. International Union of Theoretical and Applied Mechanics Symposium. Leuven, Belgium. September 13-15, 2010.
10. *Biomechanics of osteoarthritis: quantifying joint loads and solute transport (CBER research overview, with Liyun Wang)*. Academy of Lifelong Learning, University of Delaware. October 1, 2009.
11. *Biomechanics of Osteoarthritis: Analyzing knee forces and functions*. 4th Alumni Career Celebration, University of Delaware. April 25, 2008.
12. *Speed, asymmetry and muscle coordination during walking*. Simbios Seminar, Stanford University (Stanford, CA). February 28, 2007.
13. *Muscle coordination during walking: the emerging role of simulation and stimulation in post-stroke gait*. Stotz Seminar Series, Marquette University (Milwaukee, Wisconsin). December 8, 2006.
14. *Muscle coordination during walking: the emerging role of simulation and stimulation in post-stroke gait*. NMBL Lab Meeting (D. Thelen), University of Wisconsin at Madison (Madison, Wisconsin). December 7, 2006.
15. *Speed, asymmetry and muscle coordination during walking*. Biomechanics and Movement Science Seminar Series, University of Delaware. November 17, 2006.
16. *Muscle-actuated simulations of slow and post-stroke hemiparetic gait*. Biomechanics and Movement Science Seminar Series, University of Delaware. November 19, 2004.

Complete list of my published work in PubMed:

<http://www.ncbi.nlm.nih.gov/pubmed/?term=Higginson+JS+or+Startzell+JK>

Impact of my publications based on citations identified by Google Scholar:

http://scholar.google.com/citations?hl=en&user=wSISOY4AAAAJ&view_op=list_works