

CURRICULUM VITAE

April J. Chambers, PhD
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Biographical

Name: April J. Chambers, PhD

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Research Interests

I am an Assistant Professor (NTS) in the Departments of Health & Human Development and Bioengineering at the University of Pittsburgh with research expertise in the fields of human movement, biomechanics, and injury prevention. I currently serve as the Laboratory Director of the Human Movement and Balance Laboratory. The overall goal of my research is musculoskeletal injury prevention while improving health and human performance. My research interests include biomechanics, human performance, and injury prevention in healthy and diverse populations as well as medical device design and translational research.

Education

- 2015** **Colorado State University**, Fort Collins, Colorado
Certificate: Occupational Ergonomics
- 2007-2011** **University of Pittsburgh**, Pittsburgh, Pennsylvania
Doctor of Philosophy: Bioengineering
Emphasis: Biomechanics
QPA: 3.904
Dissertation: *The Impact of Slip Exposure on Gait*
- 2003-2005** **University of Pittsburgh**, Pittsburgh, Pennsylvania
Master of Science: Bioengineering
Emphasis: Biomechanics
QPA: 3.875
Thesis: *Slip-Related Muscle Activation Patterns of the Stance Leg during Gait*

1999-2003 **University of Pittsburgh**, Pittsburgh, Pennsylvania
Bachelors of Science: Bioengineering
Emphasis: Biomechanics
QPA: 3.79
Academic Honors & Activities
2003 University of Pittsburgh Outstanding Biomechanics Student
2003 Summa Cum Laude
1999-2003 University of Pittsburgh Ambassador Scholar
1999-2003 University Scholar
1999-2003 Honors Engineering Scholar
1999-2003 Golden Key National Honor Society
1999-2003 Engineering & University Dean's List

Positions

2019-Present **Assistant Professor (NTS)**
Department of Health & Human Development, University of Pittsburgh
Department of Bioengineering, University of Pittsburgh
Affiliate Faculty, Human Engineering Research Laboratories
Affiliate Faculty, Healthy Lifestyle Institute

2012-Present **Laboratory Director**
Human Movement and Balance Laboratory
Department of Bioengineering, University of Pittsburgh

2011-2019 **Research Assistant Professor**
Department of Bioengineering, University of Pittsburgh

2011-Present **Senior Scientist, Biomechanics Consultant**
BioEx Consulting (Pittsburgh Biomechanics, LLC)

2005-2011 **Laboratory Manager and Research Coordinator**
Human Movement and Balance Laboratory, University of Pittsburgh

2007-2011 **Graduate Research Assistant**
2003-2005 Human Movement and Balance Laboratory, University of Pittsburgh

2001- 2003 **Research Assistant**
Human Movement and Balance Laboratory, University of Pittsburgh

Professional Affiliations and Certifications

Professional Memberships

2017-Present University of Pittsburgh PQP
2012-Present Human Factors and Ergonomics Society
2012-Present University of Pittsburgh Alumni Association
2012-Present University of Pittsburgh Graduate Faculty
2011-Present American Academy of Orthotists and Prosthetists

2008-2010 Biomedical Engineering Society
2006-Present International Society of Posture and Gait Research
2003-Present American Society of Biomechanics
2000-Present Golden Key National Honor Society

Honors

2017 Mentor of National Science Foundation Graduate Research Fellowship Program Honorable Mention
2016 Mentor of National Science Foundation Graduate Research Fellowship Program Honorable Mention
2013 Mentor of Wells Student Healthcare Entrepreneurship Competition Semi-Finalists
2013 American Society of Biomechanics Journal of Biomechanics Award Semifinalist
2011 American Society of Mechanical Engineers Top 10 Finalist, Best Master's Level Solid Mechanics, Design & Rehabilitation Abstract
2011 American Society of Biomechanics Simulia Computational Biomechanics Award Nominee
2003 University of Pittsburgh Outstanding Biomechanics Student
1999-2003 University of Pittsburgh Ambassador Scholar
1999-2003 University Scholar
1999-2003 Honors Engineering Scholar

Certifications

American Red Cross CPR and AED
American Red Cross First Aid
Collaborative Institutional Training Initiative (CITI)
Conflicts of Interest Curriculum
FHI Research Ethics Training Curriculum
Interacting with Government Employees for Contractors
University of Pittsburgh Active Shooter Training
University of Pittsburgh Diversity Allies Network Training
University of Pittsburgh Institutional Review Board Research and Practice Fundamentals
Research Integrity
Human Subject Research in Biomedical Sciences
HIPAA Researchers Privacy Requirements
Bloodborne Pathogens
Chemical Hygiene
Responsible Conduct of Research For NSF Trainees
Preventing Sexual Harassment
Diversity Workshop
Preventing Employment Discrimination
University of Pittsburgh Radiation Safety Training
VA Pittsburgh Healthcare System
Overview of Good Clinical Practices and Human Subjects Protection
Veterans Affairs Office of Cyber and Information Security Awareness
Veterans Health Administration Data Security
Veterans Health Administration Privacy Policy

Publications

Peer Reviewed Manuscripts

- Redfern M, Chambers AJ, Sparto PJ, Furman J, Jennings JR. (2020). Dual-task Postural Control Using Visual Reaction Time Tasks in Older Adults with Good and Poor Functional Gait Assessment. *Gait and Posture*, under review.
- McCroly JL, Chambers AJ, Daftary A, and Redfern MS. (2020). Torso Kinematics during Gait and Trunk Anthropometry in Pregnant Fallers and Non-fallers. *Gait and Posture*. 76:204-9. <https://doi.org/10.1016/j.gaitpost.2019.11.012>.
- Merrill Z, Chambers AJ, Cham R. (2019). Development and Validation of Body Fat Prediction Models in American Adults. *Obesity Science & Practice*, Nov:1-7; doi.org/10.1002/osp4.392.
- Rekant J, Wiltman S, Chambers AJ. (2019). A Novel Method of Analysis for Prolonged-Standing Data: Accounting for Joint and Muscle Discomfort. *IISE Transactions on Occupational Ergonomics and Human Factors*. 7(2):142-152. doi: 10.1080/24725838.2019.1640810
- Chambers AJ, Haney J, Huppert T, Redfern M. (2019). The Effect of Prolonged Walking on Erector Spinae and Soleus Muscle Oxygenation and Discomfort. *Journal of Sports Science and Medicine*, 18: 337-343.
- Merrill Z, Perra S, Chambers AJ, Cham R. (2019). Age and Body Mass Index Associations with Body Segment Parameters. *Journal of Biomechanics*, 19: 30194-0.
- Chambers AJ, Robertson M, Baker N. (2019). The effect of sit-stand desks on office worker behavioral and health outcomes: A scoping review. *Applied Ergonomics*, 78: 37-53.
- Redfern M, Chambers AJ, Sparto PJ, Furman J, Jennings JR. (2019). Inhibition and Decision-Processing Speed are Associated with Performance on Dynamic Posturography in Older Adults. *Experimental Brain Research*, 237(1):37-45. doi.org/10.1007/s00221-018-5394-0.
- Redfern M, Chambers AJ, Sparto P, Furman J, Jennings JR. (2018). Perceptual Inhibition Associated with Sensory Integration for Balance in Older Adults. *Dementia and Geriatric Cognitive Disorders*, 46(5-6):266-274. doi: 10.1159/000493748.
- Merrill Z, Bova G, Chambers AJ, Cham R. (2017). Effect of Trunk Segment Boundary Definitions on Frontal Plane Segment Inertial Calculations. *Journal of Applied Biomechanics*, Dec 18:1-16. Doi: 10.1123/jab.2016-0319.
- Livengood H, Owens GE, Trout J, Nau A, Cham R, Baker N, Chambers AJ. (2017). Effect of central and peripheral vision occlusion on motor performance during hand coordination tasks. *IISE Transactions on Occupational Ergonomics and Human Factors*. 5(3-4): 148-57. doi.org/10.1080/24725838.2017.1398691.
- Redfern M, Jennings JR, Chambers AJ, Furman J. (2017). Sensory and motoric influences on attention dynamics during standing balance recovery in young and older adults. *Experimental Brain Research*, 235(8): 2523-31. doi: 10.1007/s00221-017-4985-5.
- Merrill Z, Chambers AJ, Cham R. (2017). Arm Reactions in Response to Unexpected Slip- Impact of Aging. *Journal of Biomechanics*, Apr 20. doi: 10.1016/j.jbiomech.2017.04.011.
- O'Connell C, Mahboobin A., Chambers AJ, Cham R. (2016). Effects of slip severity on muscle activation of trailing leg during an unexpected slip. *Journal of Electromyography and Kinesiology*, 28:61-1. doi: 10.1016/j.jelekin.2016.02.007.
- Knewston M, Merrill Z, Cham R, Chambers AJ. (2015). Body Segment Parameters in Normal Weight versus Obese Young Females. *Ingenium: Undergraduate Research at the Swanson School of Engineering*.
- Smith LJ, Trout JM, Sridharan SS, Guyer JR, Owens GE, Chambers AJ, Rosen CA (2015). Comparison of Microsuspension Laryngoscopy Positions: A Randomized, Prospective Study. *The Laryngoscope*, 125(3): 649-54. DOI: 10.1002/lary.24932.
- Chambers AJ, Harchick E, Cham R. (2014). Making slips and falls less slippery. *Industrial Engineer*. 46(8): 54.

- McCroly JL, Chambers AJ, Daftary A, and Redfern MS. (2014). The Pregnant "Waddle": An Evaluation of Torso Kinematics in Pregnancy. *Journal of Biomechanics*, 47: 2964-8. <http://dx.doi.org/10.1016/j.jbiomech.2014.07.009>.
- Chambers AJ, Cham R. (2014). Shoe-floor frictional requirements during gait after experiencing an unexpected slip. *IIE Transactions on Occupational Ergonomics and Human Factors*, 2(1): 15-26. DOI: 10.1080/21577323.2014.908793.
- Chambers AJ, Parise E, McCroly JL, and Cham R. (2014). A comparison of prediction equations for the estimation of body fat in non-obese and obese elderly adults in the United States. *The Journal of Nutrition, Health & Aging*, 18(6): 586-590.
- McCroly JL, Chambers AJ, Daftary A, Redfern MS. (2014). Ground reaction forces during stair locomotion in pregnant fallers and non-fallers. *Clinical Biomechanics*, 29: 143-8. PMID: 24359627.
- Beschorner KE, Albert DL, Chambers AJ, and Redfern MS. (2014). Fluid pressures at the shoe-floor-contaminant interface during slips: effects of tread & implications on slip severity. *Journal of Biomechanics*, 47: 458-63. PMID: 24267270.
- McCroly JL, Chambers AJ, Daftary A, and Redfern MS. (2013). Ground reaction forces during stair locomotion in pregnancy. *Gait and Posture*, 38(4): 684-90. PMID: 23523281.
- Chambers AJ, Pererra S, Cham R (2013). Changes in Walking Characteristics of Young and Older Adults When Anticipating Slippery Floors. *IIE Transactions on Occupational Ergonomics and Human Factors*, 1(3): 166-175. PMID: 21577323.
- Sukits AL, Nebes R, Chambers AJ, Ledgerwood AT, Perera S, Cham R. (2013). Intra-individual variability in gait and in cognitive performance are not related in the elderly. *Aging, Neuropsychology and Cognition*, 21(3): 283–295. PMID: 23755959.
- McCroly JL, Chambers AJ, Daftary A, Redfern MS. (2011). Ground reaction forces during gait in pregnant fallers and non-fallers. *Gait and Posture*, 34: 524-528. PMID: 21820902.
- Chambers AJ, Sukits AL, McCroly JL, Cham R. (2011). Differences in geriatric anthropometric data between DXA-based subject specific estimates and non-age specific traditional regression models. *Journal of Applied Biomechanics*, 27: 197-206. PMID: 21844608.
- McCroly JL, Chambers AJ, Daftary A, Redfern MS. (2010). Dynamic postural stability in pregnant fallers and non-fallers. *British Journal of Obstetrics and Gynecology*, 117: 954–62. PMID: 20536431.
- McCroly JL, Chambers AJ, Daftary A, and Redfern MS. (2010). Dynamic postural stability in advancing pregnancy. *Journal of Biomechanics*, 43: 2434-9. PMID: 20537334.
- Chambers AJ, Sukits AL, McCroly JL, Cham R. (2010). The effect of obesity and gender on body segment parameters in older adults. *Clinical Biomechanics*, 25: 131-6. PMID: 20005028.
- Wyszomierski SA, Chambers AJ, Cham R. (2009). Knee strength capabilities and slip severity. *Journal of Applied Biomechanics*, 25: 140-8. PMID: 19483258.
- Chambers AJ, Cham R (2007). Slip-related muscle activation patterns of the stance leg during gait. *Gait and Posture*, 25: 565-72. PMID: 16876417.
- Moyer BE, Chambers AJ, Redfern MS, Cham R (2006). Gait parameters as predictors of slip severity in young and older adults. *Ergonomics*, 49: 329–43. PMID: 16690563.
- Chambers AJ, Margerum S, Redfern MS, Cham R. (2003). Kinematics of the foot during slips. *Occupational Ergonomics*, 3: 225-34.

Peer Reviewed Conference Proceedings

- Rekant J, Chambers AJ (2020). Comparison of Portable to Laboratory-Based Near Infrared Spectroscopy Sensors for Assessing Muscle Health During Exercise. *Proceedings of the 2020 MidWest Regional American Society of Biomechanics*. Cleveland, OH, September 3-4, 2020, to be submitted
- Rekant J, Riffitts M, Kuciapinski M, Chambers AJ (2020). Comparison of Lower Extremity Kinematics During Gait Between Noraxon MyoMotion and Optical Motion Capture: A Pilot Study. *Proceedings of the 2020 MidWest Regional American Society of Biomechanics*. Cleveland, OH, September 3-4, 2020, to be submitted.

- Wiltman S, Pechtl K, Huppert T, Chambers AJ. (2019). Influence of Flooring on Lower Extremity Blood Oxygenation and Volume during Prolonged Standing. *Proceedings of the 2019 Human Factors and Ergonomics Society*. Seattle, WA, October 28-November 1, 2019.
- Wiltman S, Chambers AJ. (2019). Measuring Medial Compartment Tibiofemoral Gap Distance Due to Prolonged Standing. *Proceedings of the 2019 Regional Meeting of the American Society of Biomechanics*. State College, PA, April 12-13, 2019.
- Ma C, Bao T, Le V, Chambers AJ, Shull P, Zheng Y, Cham R, Sienko K. (2019). A feasibility study for gait training with foot-floor contact angle feedback. *Proceedings of the 2019 ISPGR*. Edinburgh, Scotland, June 30-July 4, 2019.
- Wiltman S, Chambers AJ. (2018). Effect of Standing on Tibiofemoral Gap Distance over Varying Flexion Angles. *Proceedings of the 2018 National Occupational Injury Research Symposium (NOIRS)*. Morgantown, WV, October 17, 2018.
- Wiltman S, Rekant J, Chambers AJ. (2018). A Novel Method for Identifying Weight Distribution Changes during Prolonged Standing. *Proceedings of the 2018 Annual Regional Meeting of the American Society of Biomechanics*. State College, PA, April 20-21, 2018.
- Merrill Z, Chambers AJ, Cham R. (2017). Impact of Age and Body Mass Index on Anthropometry in Working Adults. *Proceedings of the 2017 the Annual Meeting of the Human Factors and Ergonomics Society*. Austin, TX, October 9-13, 2017.
- Wiltman S, Chambers AJ. (2017). Weight Shifting Strategies and Discomfort during Prolonged Standing. *Proceedings of the 2017 the Annual Meeting of the Human Factors and Ergonomics Society*. Austin, TX, October 9-13, 2017.
- Bottorff E, Wiltman S, Chambers AJ. (2017). Effect of knee rotations on articular cartilage compression during knee flexion exercise. *Proceedings of the 2017 the Annual Meeting of the American Society of Biomechanics*. Boulder, Co, August 8-11, 2017.
- Driggers J, McMurtry S, Wiltman S, Chambers AJ. (2017). Validating a novel 3D scanner for measuring leg swelling during prolonged standing. *Proceedings of the 2017 the Annual Meeting of the American Society of Biomechanics*. Boulder, Co, August 8-11, 2017.
- Pechtl K, Chambers AJ, Jennings JD, Redfern MS. (2017). Cognitive and Neuropsychological Differences between Elderly Populations with Good and Poor Balance as Determined by the Functional Gait Assessment. *Proceedings of the 2017 the Annual Meeting of the American Society of Biomechanics*. Boulder, Co, August 8-11, 2017.
- Chambers AJ, Wiltman S. (2017). Time dependency of bilateral weight distribution during prolonged standing. *Proceedings of the 2017 Annual Meeting of the International Society of Posture and Gait Research*. Fort Lauderdale, FL, June 25-29, 2017.
- Chambers AJ, Jennings JD, Sparto PJ, Furman J, Redfern MS. (2017). The impact of visual attention on sensory integration during standing in the elderly. *Proceedings of the 2017 Annual Meeting of the International Society of Posture and Gait Research*. Fort Lauderdale, FL, June 25-29, 2017.
- Bova G, Merrill Z, Cham R, Chambers AJ. (2016). Comparison in Segment Mass Values Determined by the Dual Energy X-Ray Absorptiometry Scan Methods and the Zatsiorsky Anthropometric Table Calculation Method. *Proceedings of the 2016 Annual Meeting of the American Society of Biomechanics*. Raleigh, NC, August 2-5, 2016.
- Guyer, JR, Prinkey JW, Sparto PJ, Jennings JD, Furman J, Redfern MS, Chambers AJ (2015). Development of a Novel Proprioceptive Perturbation During Standing Balance. *Proceedings of the 2015 International Society of Posture and Gait Research*. Seville, Spain, June 28-July 2, 2015.
- Merrill Z, Chambers AJ, Cham R. (2015). Impact of Mass Redistribution on Lower Extremity Biomechanics During Slipping. *Proceedings of the 2015 Annual Meeting of the American Society of Biomechanics*. Columbus, OH, August 5-8, 2015.

- O'Connell, Chambers AJ, Mahboobin A, Cham R. (2015). Role of Multi-Sensory Integration Relevant for Balance in Slip Recovery. *Proceedings of the 2015 Annual Meeting of the American Society of Biomechanics*. Columbus, OH, August 5-8, 2015.
- Merrill Z, Knewston ME, Cham R, Chambers AJ. (2015). Effect of Increased Body Mass Index on Body Segment Parameters in Males. *Proceedings of the 2015 Annual Meeting of the American Society of Biomechanics*. Columbus, OH, August 5-8, 2015.
- Knewston ME, Merrill Z, Cham R, Chambers AJ. (2015). Effect of Age on Body Segment Parameters in Normal Weight Females. *Proceedings of the 2015 Annual Meeting of the American Society of Biomechanics*. Columbus, OH, August 5-8, 2015.
- Chambers AJ, Jennings JD, Sparto PJ, Furman J, Redfern MS (2015). Controlling perceptual interference and balance in older adults: How does cognitive function relate to balance performance at different ages? *Proceedings of the 2015 International Society of Posture and Gait Research*. Seville, Spain, June 28-July 2, 2015.
- McCrary JL, Chambers AJ, Daftary A, Redfern MS (2015). Torso kinematics during stair descent in pregnancy. *Proceedings of the 2015 Annual Meeting of the American College of Sports Medicine*. San Diego, CA, May 26-30, 2015.
- Knewston ME, Merrill Z, Cham R, Chambers AJ (2014). Body Segment Parameters in Normal Weight Versus Obese Young Females. *Proceedings of the 2014 Biomedical Engineering Society*. San Antonio, TX, October 22-25, 2014.
- Smith LJ, Trout JM, Sridharan SS, Guyer JR, Owens GE, Chambers AJ, Rosen CA (2014). Comparison of Microsuspension Laryngoscopy Positions: A Randomized, Prospective Study. *Proceedings of the 2014 The Fall Voice Conference*. San Antonio, TX, October 23-25, 2014.
- LeGrand R, O'Connell, C, Chambers AJ, Mahboobin A, Cham R (2014). Effects of Visual Fields on Standing Balance. *University of Pittsburgh Science 2014*. Pittsburgh, PA, October 2, 2014.
- Knewston ME, Merrill Z, Cham R, Chambers AJ (2014). Body Segment Parameters in Normal Weight Versus Obese Young Females. *University of Pittsburgh Science 2014*. Pittsburgh, PA, October 2, 2014.
- Chambers AJ, Owens GE, Trout J, Livengood H, Baker N, Nau A, Cham R. (2014). Effect of Vision Loss on Performance of Standard Peg Tests. *Proceedings of the 2014 Annual Meeting of the World Congress of Biomechanics*. Boston, NE, July 6-11, 2014.
- Owens, GE, Livengood H, Chambers AJ, Trout JM, Baker, N, Nau A, Cham R. (2014). Effect of Vision Loss on Performance of Standard Peg Tests. *Annual Rehabilitation Institute Research Day*. Pittsburgh, PA, June, 2014.
- Smith LJ, Trout JM, Sridharan SS, Guyer JR, Owens GE, Chambers AJ, Rosen CA (2014). Comparison of Microsuspension Laryngoscopy Positions: A Randomized, Prospective Study. *Proceedings of the 2014 Annual Meeting of the American Laryngological Association*. Las Vegas, NV, May 14-15, 2014.
- Runhaar J, Trout JM, Chambers AJ, Bierma-Zeinstra SMA, Tashman S. (2014). OARSI Scholarship: Knee kinematics during gait in obese and normal-weight women using high-speed biplane radiography. *Proceedings of the 2014 Annual Meeting of the Osteoarthritis Research Society International*. Paris, France, April 24-27, 2014.
- Haney J, Redfern MS, Huppert T, Chambers AJ. (2014). The effect of flooring on soleus muscle oxygenation during long-term standing using near infrared spectroscopy. *Proceedings of the Midwest American Society of Biomechanics Regional Conference*, Akron, OH, March 3-4, 2014.
- Guyer JR, Owens GE, Trout JM, Smith LJ, Rosen CA, Chambers AJ. (2013). Ergonomic Analysis of Microlaryngoscopy Using Surface Electromyography. *University of Pittsburgh Science 2013*. Pittsburgh, PA, October 2-4, 2013.
- Owens, GE, Trout JM, Baker, N, Chambers, AJ. (2013). Effect of Vision Loss on Performance of Standard Peg Tests. *University of Pittsburgh Science 2013*. Pittsburgh, PA, October 2-4, 2013.

- McCrorry JL, Chambers AJ, Daftary A, Redfern MS. (2013). Within-subject variability of step width and trunk kinematics during gait in pregnant fallers and non-fallers. *Proceedings of the 2013 Annual Meeting of the American College of Sports Medicine*. Indianapolis, IN, May 28-June 1, 2013.
- Haney J, Redfern MS, Huppert T, Chambers AJ. (2013). Effects of Prolonged Standing on Oxygen Saturation in the Soleus and Erector Spinae Muscles of the Lower Back Using Near Infrared Spectroscopy. *Proceedings of the 2013 Annual Meeting of the American Society of Biomechanics*. Omaha, NE, September 4-8, 2013.
**Semifinalist for the Journal of Biomechanics Award.*
- O'Connell C, Cham R, and Chambers AJ. (2013). Comparison of Knee Kinematics in Older Adults with Unilateral Transfemoral Amputation During Baseline Walking and Ramp Descent. *Proceedings of the 2013 Annual Meeting of the American Society of Biomechanics*. Omaha, NE, September 4-8, 2013.
- Luther A, Chambers A, and Cham R. (2013). Kinematic Analysis of Foot Clearance During Stair Ambulation in Older Adult Unilateral Transfemoral Amputees." *Proceedings of the 2013 Annual Meeting of the American Society of Biomechanics*. Omaha, NE, September 4-8, 2013.
- Merrill Z, Sandrian P, Cham R, and Chambers AJ. (2013). Young Adults Have Higher Arm Elevation Than Older Adults During Unexpected Slips. *Proceedings of the 2013 Annual Meeting of the American Society of Biomechanics*. Omaha, NE, September 4-8, 2013.
- Albert D, Ledgerwood A, Chambers A, Redfern M, and Beschorner K. (2013). Effect of Shoe Tread Depth on Foot Slipping Kinematics. *Proceedings of the 2013 Annual Meeting of the American Society of Biomechanics*. Omaha, NE, September 4-8, 2013.
- Kolling A, Montgomery J, McCrorry JL, Cham R, and Chambers AJ. (2013). Impact of Obesity on Anthropometric Predictors of Body Fat in Older Adults. *Proceedings of the 2013 Annual Meeting of the American Society of Biomechanics*. Omaha, NE, September 4-8, 2013.
- Siviy C, Luther A, Chambers A, and Cham R. (2013). Development of a Geometric Model to Determine Inertial Parameters in Amputees. *Proceedings of the 2013 Annual Meeting of the American Society of Biomechanics*. Omaha, NE, September 4-8, 2013.
- Siviy CJ, Luther AJ, Chambers AJ, Cham R. (2013). Development of a Geometric Model to Determine Inertial Parameters in Elderly Amputees. 7th Annual Research Day on Aging, Pittsburgh, PA, April 2013.
- Luther A, Chambers AJ, Cham R. (2013). Kinematic Analysis of Foot Clearance During Stair Ambulation in Older Adult Unilateral Transfemoral Amputees. 7th Annual Research Day on Aging, Pittsburgh, PA, April 2013.
- Gorman S, Quinn L, Sklar S, Smith H, Chambers AJ, Hirschman A, Johnson J. (2013). Diagnostic Tool for Dysphagia. *Proceedings of the 2013 Rice University Beyond Traditional Borders Design Competition*. Houston, TX, April 4-6, 2013.
- Chambers AJ, Redfern MR. (2012). Application of Near-infrared Spectroscopy in Human Factors and Ergonomics. *Proceedings of the 2012 Human Factors and Ergonomics Society*. Boston, MA, October 22-26.
- Lopez J, Haney J, Chambers AJ. (2012). The Effect of Vision Loss on the Time to Complete Upper Extremity Peg Tasks. *Proceedings of the 2012 Biomedical Engineering Society*. Atlanta, GA, October 24-27.
- Parise E, Chambers AJ, McCrorry JL, Cham R. (2012). The Impact of Obesity of Predicting Body Fat Percentage in Older Women. *Proceedings of the 2012 Biomedical Engineering Society*. Atlanta, GA, October 24-27.
- McCrorry JL, Chambers AJ, Daftary A, Redfern MS. (2012). Torso kinematics during gait differ between pregnant fallers and non-fallers. *Proceedings of the 2012 Annual Meeting of the American Society of Biomechanics*. Gainesville, FL, August 15-18.

- Chambers AJ, Cham R. (2012). Changes in Spatiotemporal Gait Characteristics When Anticipating Slippery Floors in Young and Older Adults. *Proceedings of the 2012 Annual Meeting of the American Society of Biomechanics*. Gainesville, FL, August 15-18.
- Parise E, Chambers AJ, McCrory JL, Cham R. (2012). The Impact of Obesity of Predicting Body Fat Percentage in Older Men. *Proceedings of the 2012 Annual Meeting of the American Society of Biomechanics*. Gainesville, FL, August 15-18.
- Sukits AL, Ledgerwood AT, Haney JM, Chambers AJ, Cham R, Aizenstein HJ, Nebes RD. (2012). Effects of Fractional Anisotropy in the Corpus Callosum as Determined by Diffusion Tensor Imaging on Temporal Variability in Older Adults. *Proceedings of the 2012 Annual Meeting of the American Society of Biomechanics*. Gainesville, FL, August 15-18.
- McCrory JL, Chambers AJ, Daftary A, Redfern MS. (2012). The effect of pregnancy on torso kinematics during gait. (*Abstract 2968*) *Medicine and Science in Sports and Exercise*. 44(5): S574.
- Parise E, Chambers AJ, McCrory JL, Cham R. (2012). The Impact of Obesity of Predicting Body Fat Percentage in Older Adults. *2012 The Aging Institute of UPMC: Celebrating Research on Aging: Building Collaborations for the Future*. Pittsburgh, PA, April 24.
- Sukits AL, Ledgerwood AT, Haney JM, Chambers AJ, Cham R, Aizenstein HJ, Nebes RD. (2012). Effects of Fractional Anisotropy in the Corpus Callosum as Determined by Diffusion Tensor Imaging on Temporal Variability in Older Adults. *2012 The Aging Institute of UPMC: Celebrating Research on Aging: Building Collaborations for the Future*. Pittsburgh, PA, April 24.
- Parise E, Moore S, Beluk N, Chambers AJ, Huppert T, Redfern MS. (2011). Development of Near Infrared Spectroscopy for use in evaluating long term standing and walking fatigue. *University of Pittsburgh Science 2011*. Pittsburgh, PA, October 6-7.
- Chambers AJ, Cham R, Mahboobin A. (2011). Insights into the role of proactive strategies in postural responses to slips using gait simulations. *Proceedings of the 2011 American Society of Biomechanics*. Long Beach, CA, August 10-13. *Simulia Computational Biomechanics Award Nominee.
- McCrory JL, Chambers AJ, Daftary A, and Redfern MS. (2011). Ground reaction forces during stair ascent in pregnant fallers and non-fallers. *Proceedings of the 2011 American Society of Biomechanics*. Long Beach, CA, August 10-13.
- McCrory JL, Chambers AJ, Daftary A, and Redfern MS. (2011). The effect of pregnancy on ground reaction forces during stair locomotion. *Medicine and Science in Sports and Exercise*. 43: S110.
- Sukits AL, Chambers AJ, Perera S, Cham R. (2011). Developing Population-Specific Predictive Regression Equations For Body Segment Parameters. *Proceedings of the ASME 2011 Summer Bioengineering Conference*. Farmington, PA, June 22-25. *Top 10 Finalist for Best Master's Level Solid Mechanics, Design and Rehabilitation Abstract
- Chambers AJ, Cham R, Mahboobin A. (2011). Insights into the role of proactive strategies in postural responses to slips using gait simulations. *2011 The Aging Institute of UPMC: Celebrating Research on Aging: Building Collaborations for the Future*. Pittsburgh, PA, April 19.
- McCrory JL, Chambers AJ, Daftary A, Redfern MS. (2010). The effect of pregnancy on ground reaction forces during walking. *Proceedings of the 2010 meeting of the American College of Sports Medicine*. Baltimore, MD, June 2-5.
- Sukits AL, Chambers AJ, Cham R, Nebes RD. (2010). The effect of a subject-specific dual-task on standing balance. *Proceedings of the 2010 American Society of Biomechanics*. Providence, RI, August 19-21.
- McCrory JL, Chambers AJ, Daftary A, Redfern MS. (2010). The effect of pregnancy on ground reaction forces during gait. *Medicine and Science in Sports and Exercise*. 42: S193.
- McCrory JL, Chambers AJ, Daftary A, Redfern MS. (2009). The effect of pregnancy on ground reaction forces during walking. *Proceedings of the 2009 Mid-Atlantic Chapter of the American College of Sports Medicine*. Harrisburg, PA, November 6-7.

- Enders LA, Berger K, Chambers AJ, Redfern R, McCrory JL. (2009). Biomechanical evidence of waddling during pregnancy. *Proceedings of the 2009 Biomedical Engineering Society*. Pittsburgh, PA, October 7-10.
- Chambers AJ, Sukits AL, McCrory JL, Cham R. (2009). The effects of gender and obesity on trunk inertial parameters in old and elderly adults. *Proceedings of the 2009 Biomedical Engineering Society*. Pittsburgh, PA, October 7-10.
- O'Loughlin M, Timcho EA, Chambers AJ, Cham R. (2009). Repeatability of unexpected slips. *Proceedings of the 2009 Biomedical Engineering Society*. Pittsburgh, PA, October 7-10.
- Timcho EA, Chambers AJ, Cham R. (2009). Recovery gait following an unexpected slip in young and old adults. *Proceedings of the 2009 Biomedical Engineering Society*. Pittsburgh, PA, October 7-10.
- McCrory JL, Chambers AJ, Daftary A, and Redfern MS. (2009). Dynamic postural stability in pregnant fallers, non-fallers, and non-pregnant controls. *Proceedings of the 2009 American Society of Biomechanics*. University Park, PA, August 26-29.
- Sukits AL, Montgomery JD, Kong PW, Hostler D, Suyama J, Cham R, Chambers AJ. (2009). Fatigue effects on slip risk while wearing fire-protective equipment. *Proceedings of the 2009 American Society of Biomechanics*. University Park, PA, August 26-29.
- Timcho EA, Chambers AJ, Cham R. Recovery gait following an unexpected slip. (2009). *Proceedings of the 2009 American Society of Biomechanics*. University Park, PA, August 26-29.
- Gil AB, Sparto PJ, Chambers AJ, Cham R, Fitzgerald GK. (2009). Relationship between physical function and stiffened pattern of movement during gait in patients with knee osteoarthritis. *Proceedings of the 2009 International Society of Posture and Gait Research*. Bologna, Italy, June 21-25.
- Sukits AL, Chambers AJ, McCrory JL, Cham R. (2008). Head and trunk anthropometric parameters in the elderly. *Proceedings of the 2008 Biomedical Engineering Society*. St. Louis, MO, October 2-4.
- O'Loughlin M, Chambers AJ, Bohnen NI, Cham R. (2008). Striatal dopaminergic denervation and peak slip velocity during gait. *Proceedings of the 2008 Biomedical Engineering Society*. St. Louis, MO, October 2-4.
- Chambers AJ, McCrory JL, Sukits AL, Cham R. (2008). Anthropometric parameters in the elderly: a dxa-based study. *Proceedings of the 2008 North American Congress on Biomechanics*. Ann Arbor, MI, August 5-9.
- Chambers AJ, ChamR. (2007). The impact of anticipating slippery floors on spatial and temporal variability during gait. *Proceedings of the 2007 International Society of Posture and Gait Research*. Burlington, VT, July 14-July 19.
- McNeal A, Chambers AJ, Cham R, Bohnen NI. (2006). Aging-related dopamine denervation in the basal ganglia and balance in sway-referenced visual environments. *Proceedings of the 2006 American Society Biomechanics*. Blacksburg, VA, September 6-9.
- Wyszomierski S, Chambers AJ, Cham R. (2006). Knee strength and slip severity in young and older Adults. *Proceedings of the 2006 American Society Biomechanics*. Blacksburg, VA, September 6-9.
- Chambers AJ and Cham R. (2005). Anticipation of slippery floors: muscle onsets and co-contraction of the stance leg. *Proceedings of the 2005 American Society Biomechanics*. Cleveland, OH, July 31-August 5.
- Moyer BE, Chambers AJ, Redfern MS, and Cham R. (2004). Initial condition variables and age group as determinates of slip severity. *Proceedings of the 2004 American Society Biomechanics*. Portland, OR, September 9-11.
- Chambers AJ, Bieryla K, Cham R. (2003). Slip anticipation effects on hip/knee kinematics part 2: gait on glycerol contaminated floors. *Proceedings of the 2003 American Society Biomechanics*. Toledo, OH, September 25-28.

Bieryla K, Chambers AJ, Cham R. (2003). Slip anticipation effects on hip/knee kinematics part 1: gait on dry floors. *Proceedings of the 2003 American Society Biomechanics*. Toledo, OH, September 25-28.

Book Chapters

Chambers AJ, Beschorner K. (2020) "Biomechanics of gait, slips, and falls on level walkways, stairs, and ramps" (Book Chapter) In *Human Factors Approach to Understanding and Reducing the Risk of Falls*. Ed. K. Nemire. Taylor & Francis: CRC Press. In publication.

Invited Seminars and Presentations

- 2020 Hosick P, Barone-Gibbs B, Chambers AJ. If sitting is the new smoking, can standing be the Nicorette fix? *Mid-Atlantic Regional Chapter - American College of Sports Medicine Annual Meeting*, November 6-7, 2020.
- 2019 Chambers AJ. Biomechanics in Exercise Science and Beyond. *Fox Chapel Area High School: Intro to Sport and Exercise Science*, December 9, 2019.
- 2019 Chambers AJ. Describing biomechanics and clinical presentation of movement in obese adults with different levels of physical activity engagement. *Pitt Healthy Lifestyle Institute Research Summit*, December 6, 2019.
- 2019 Chambers AJ. Developing worker-centric recommendations for sit/stand duration: Determining the feasibility of using weight shifts as a marker of discomfort. *Office Ergonomics Research Committee, Human Factors and Ergonomics Society Meeting*, October 27, 2019.
- 2018 Chambers AJ. A Biomechanical Approach to Health and Wellbeing. *University of Pittsburgh School of Education*, February 7, 2019.
- 2018 Chambers AJ. Utilizing wearable NIRS sensors to enhance the understanding of varying levels of physical activity on vascular muscle health. *Pitt Healthy Lifestyle Institute Research Summit*, December 7, 2018.
- 2018 Chambers AJ. Developing worker-centric recommendations for sit/stand duration: Determining the feasibility of using weight shifts as a marker of discomfort. *Office Ergonomics Research Committee, Human Factors and Ergonomics Society Meeting*, September 30, 2018.
- 2017 Chambers AJ. Diversity Orientation. *University of Pittsburgh, School of Medicine*, August 17, 2017.
- 2016 Chambers AJ. Injury Prevention at The Human Movement and Balance Lab. *University of Pittsburgh, Department of Physical Medicine and Rehabilitation, Panther Rehab Grand Rounds*, August 17, 2016.
- 2015 Chambers AJ. Slip, Trip, and Fall Risks in Disease Populations. *University of Pittsburgh Department of Health and Physical Activity Chronic Disease and Case Studies*. Pittsburgh, PA, April 16.
- 2014 Chambers AJ. *University of Pittsburgh SWE High School Engineering Day Panel*. Pittsburgh, PA, November 7.
- 2014 Smith LJ, Trout JM, Sridharan SS, Guyer JR, Owens GE, Chambers AJ, Rosen CA. Comparison of Microsuspension Laryngology Positions: A Randomized, Prospective Study. *The Fall Voice Conference*. San Antonio, TX, October 23-25.
- 2014 Chambers AJ. Injury Prevention at the University of Pittsburgh. *US Department of Veterans Affairs: GRECC/MIRECC*. VA Pittsburgh, PA, September 12.
- 2014 Chambers AJ, Owens GE, Trout J, Livengood H, Baker N, Nau A, Cham R. (2014). Effect of Vision Loss on Performance of Standard Peg Tests. *World Congress of Biomechanics*. Boston, NE, July 8, 2014.
- 2014 Chambers AJ. Slip, Trip, and Fall Prevention. *NASA: Kennedy Space Center for the Center Director's Executive Safety Forum*. Kennedy Space Center, FL, May 20.

- 2013 Chambers AJ. Injury Prevention at the Human Movement and Balance Laboratory: Slips, Amputees & Long Term Standing. *University of Wisconsin Milwaukee Department of Bioengineering Graduate Seminar*. Milwaukee, WI, Nov 21-22.
- 2013 McCrory JL, Chambers AJ, Daftary A, Redfern MS. Within-subject variability of step width and trunk kinematics during gait in pregnant fallers and non-fallers. *Proceedings of the 2013 Annual Meeting of the American College of Sports Medicine*. Indianapolis, IN, May 29-June, 1.
- 2012 Mehta R, Maikala R, Ferguson S, Parasuraman R, Redfern MR, Chambers AJ. Application of Near-infrared Spectroscopy in Human Factors and Ergonomics, A Panel Discussion. *Proceedings of the 2012 Human Factors and Ergonomics Society*. Boston, MA, October 22-26.
- 2012 Chambers AJ, Cham R. Changes in Spatiotemporal Gait Characteristics When Anticipating Slippery Floors in Young and Older Adults. *Proceedings of the 2012 Annual Meeting of the American Society of Biomechanics*. Gainesville, FL, August 15-18.
- 2012 Sukits AL, Ledgerwood AT, Haney JM, Chambers AJ, Cham R, Aizenstein HJ, Nebes RD. Effects of Fractional Anisotropy in the Corpus Callosum as Determined by Diffusion Tensor Imaging on Temporal Variability in Older Adults. *Proceedings of the 2012 Annual Meeting of the American Society of Biomechanics*. Gainesville, FL, August 15-18.
- 2012 McCrory JL, Chambers AJ, Daftary A, Redfern MS. The effect of pregnancy on torso kinematics during gait. *Proceedings of the 2012 Annual Meeting of the American College of Sports Medicine*. San Francisco, CA, May 29-June, 2.
- 2012 Chambers AJ. Injury Prevention at the Human Movement and Balance Lab. *University of Pittsburgh Department of Bioengineering Graduate Seminar*. Pittsburgh, PA, March 22.
- 2012 Chambers AJ. The Impact of Slip Exposure on Gait. *National Institute for Occupational Safety and Health Office of Mine Safety and Health Research*. Pittsburgh, PA, February 7.
- 2012 Chambers AJ, Burdett R. Comparative Effectiveness of Microprocessor and Nonmicroprocessor Prosthetic Knees. *Centers for Medicare & Medicaid Services*. Washington, DC, December 1.
- 2011 Chambers AJ. A Research Overview. *University of Pittsburgh Swanson School of Engineering Visiting Committee*. Pittsburgh, PA, October 20.

Research

Funded:

Grant Title: Predicting slips during ladder climbing: novel methods for assessing shoe-rung friction

Role in Project: Co-Investigator

Years Inclusive: 9/1/20 – 8/31/24

Source: NIOSH R01OH011799 – Total direct costs \$1,247,773

Grant Title: Developing worker-centric recommendations for sit/stand duration: Determining the feasibility of using weight shifts as a marker of discomfort

Role in Project: Principle Investigator

Years Inclusive: 5/1/20 – 8/31/21

Source: OERC - Total direct costs \$25,000

Grant Title: Describing biomechanics and clinical presentation of movement in obese adults with different levels of physical activity engagement

Role in Project: Principle Investigator

Years Inclusive: 1/1/20 – 1/1/21

Source: University of Pittsburgh Healthy Lifestyle Institute - Total direct costs \$20,000

Project Title: Restoring Proprioception to Improve Balance and Gait in Lower-Limb Amputees
Role in Project: Co-Sponsor
Years Inclusive: 5/1/19 - 5/1/22
Source: NIH F30 HD098794-01 – Total direct costs \$133,572

Grant Title: MOVISU-FIT: Mobile Wearable System for Real Time Visual Feedback and Gait Training
Role in Project: Co-Investigator
Years Inclusive: 7/1/19 – 7/1/20
Source: Pitt SEED Project - Total direct costs \$50,000

Completed:
Project Title: Armstrong Flooring during Prolonged Walking
Role in Project: Primary Investigator
Years Inclusive: 2019
Source: CRA

Grant Title: In-vivo Changes in the Lower Extremity Joints and Muscles during Prolonged Standing
Role in Project: Principal Investigator
Years Inclusive: 9/1/15 - 8/31/19
Source: NIOSH K01OH010759-01- Total direct costs \$323,856

Grant Title: MOVISU-FIT: Mobile Wearable System for Real Time Visual Feedback and Gait Training
Role in Project: Co-Investigator
Years Inclusive: 7/1/18 – 7/1/19
Source: University of Pittsburgh Center for Medical Innovation - Total direct costs \$25,000

Grant Title: Utilizing wearable NIRS sensors to enhance the understanding of varying levels of physical activity on vascular muscle health
Role in Project: Principle Investigator
Years Inclusive: 7/1/18 – 7/1/19
Source: University of Pittsburgh Healthy Lifestyle Institute - Total direct costs \$20,000

Grant Title: Development of a hyperspectral FM-NIRS device for muscle physiology
Role in Project: Co-Investigator
Years Inclusive: 6/1/16 - 3/31/18
Source: NIH R03EB020078-01A – Total direct costs \$154,000

Grant Title: Postural Control in the Elderly: The Role of Attention
Role in Project: Co-Investigator
Years Inclusive: 9/1/14 - 3/31/16
Source: NIA R01AG014116- Total direct costs \$310,575

Grant Title: Neural mechanisms of community mobility in older adults
Role in Project: Consultant
Years Inclusive: 9/1/14 - 9/1/17
Source: NIH/NCATS KL2 TR000146 – \$75,000

Project Title: Concussion Impact Force Reduction

Role in Project: Primary Investigator
Years Inclusive: 2014 – 2015
Source: Biosport Athletechs

Grant Title: Obesity and Body Segment Parameters in Working Adults
Role in Project: Co-Investigator
Years Inclusive: 9/1/13 - 9/1/17
Source: NIOSH R01OH010106-01A2 - Total direct costs \$584,678

Grant Title: Universal Thyroplank for Medialization Thyroplasty
Role in Project: Principal Investigator
Years Inclusive: 7/1/13 - 7/1/14
Source: University of Pittsburgh Center for Medical Innovation - Total direct costs \$20,000

Grant Title: Knee kinematics during gait measured in obese individuals using high-speed biplane radiography
Role in Project: Principle Investigator (University of Pittsburgh)
Years Inclusive: 2013 - 2015
Source: Osteoarthritis Research Society (OARSI) Scholarship (J. Runhaar Awardee)

Grant Title: Comparative Effectiveness between Microprocessor Controlled and Non-microprocessor Controlled Prosthetic Knees
Role in Project: Principal Investigator
Years Inclusive: 5/1/12 - 5/1/14
Source: American Orthotics and Prosthetics Association - Total direct costs \$25,000

Project Title: The Effect of Flooring on Long Term Standing and Walking Fatigue
Role in Project: Principal Investigator
Years Inclusive: 2011 – 2014
Source Nora Flooring

Grant Title: Effects of a Community Based Exercise Program in Adults with Severe Burns
Role in Project: Co-Investigator
Years Inclusive: 4/10 – 10/14
Source: NIH - NCT01184547

Grant Title: Modeling shoe-floor interface properties to predict slips and falls
Role in Project: Co-Investigator
Years Inclusive: 12/1/2009 – 11/30/2012
Source: NIOSH R01OH008986 - Total direct costs \$250,000

Technology Disclosures and Patents

- 2017 Universal BIO-Thyroplank for Medialization Thyroplasty, Patent Number: 9,675,446
- 2015 Endoscopic Simulation, Provisional Patent Filed.
- 2014 Prosthetic Implant for Medialization Thyroplasty, Patent Awarded. Pitt Ref No. : 02807
- 2014 Endoscope Case, Provisional Patent Filed.
- 2013 Sharps Depot, "An automated sharps counter for saving time, safely". Provisional Patent Filed. Pitt Ref No. : 03101
- 2013 Incentive Oral Exercise Device for the Treatment of Dysphagia, Provisional Patent Filed.

Selected Consulting

- 2013 - Present Bio-Ex Consulting (Pittsburgh Biomechanics, LLC)
Senior Scientist
- 2011 – 2012 National Institute for Occupational Safety and Health Office of Mine Safety and Health Research
'Development and Evaluation of an Ergonomics Audit for Mitigating Ergonomics Deficiencies in Mining – Inclination Study'

Professional Activities

Contributions to Teaching

HPA 2384: Movement Science in Health and Physical Activity, University of Pittsburgh
Required course for Master's students in the department of health and physical activity. This course examines human movement across the lifespan (youth, adults, older adults), health conditions, and exercise-related activities. Student will learn how to assess movement patterns and how to apply this knowledge to prevention, treatment, and rehabilitation situations. This course will be a combination of classroom and laboratory experiences.

Served as Instructor (2019-Present). Developed new graduate course for the department of Health and Physical Activity. Designed multiple hands on laboratories and projects to allow graduate students to learn through experience with real-world applications.

HPA 1011: Applied Human Anatomy, University of Pittsburgh
Required course for undergraduate students in the department of health and physical activity. This is a non-laboratory lecture discussion course in which all body systems are investigated. Primary emphasis is placed on the skeletal, articular, muscular, cardiovascular and nervous systems. In addition, the basic mechanical principles underlying human movement and an understanding of human structure are used to analyze movement and physical skills.

Served as Instructor (2019-Present). Redevelopment of course structure to accommodate a one day a week night section.

HPA 1012: Applied Human Anatomy Laboratory, University of Pittsburgh
Required course for undergraduate students in the department of health and physical activity. Laboratory based course to accompany HPA 1011.

Served as Instructor (2019-Present).

BIOENG 1630: Biomechanics 1: Mechanical Principles of Biological Systems, University of Pittsburgh
Biomechanics 1 is a first course in undergraduate biomechanics that applies and builds on the concepts of statics, dynamics and mechanics of materials as applied to human activities and tissues. After briefly reviewing equilibrium concepts and free body diagrams as applied to the human body, principles from kinetics are used to develop dynamic descriptions of human motion. Finally, engineering concepts employed in description of the fundamental strength of materials are applied to biological tissues. After completion of the course, students should be able to describe the general characteristics and material properties for tissue and organs studied in the course, analyze the forces at the skeletal joint for various static and dynamic

human activities, state and use the concepts of balance and stability in describing human motion, and compute the stresses and strains in biological tissues, given loading conditions and material properties.

Served as Instructor (2013-Present). Introduced split section course structure to accommodate larger course enrollment and redesigned statics and dynamics portion by developing four new laboratory components into the course.

HPA 1044: Biomechanics, University of Pittsburgh

Required course for undergraduate students in the department of health and physical activity. Provides studies to develop knowledge of biomechanical concepts and principles. Includes experiences to develop proficiency in the diagnosis of motor performance errors. Also places emphasis on applications of biomechanics in making curriculum and instruction decisions in physical education programs.

Served as Instructor (2015-Present). Developed new undergraduate course for the department of Health and Physical Activity. Designed multiple hands on laboratories and capstone final project to allow students to perform a biomechanical analysis on a real-world application.

HPA 1033: Human Physiology, University of Pittsburgh

Required course for undergraduate students in the department of health and physical activity. Develops knowledge of the functions of the human body. Covers the major systems (e.g., Circulatory, digestive, endocrine, excretory, nervous, reproductive, thermoregulatory). Introduces key concepts for understanding the physiological basis of human performance in sport, dance, and exercise.

Served as Instructor (2018-2019). Designed several hands on laboratories to aid in students understanding of physiological concepts.

HPA 2387: Media and Technology in Health and Physical Activity, University of Pittsburgh

Required course for graduate students in the department of health and physical activity. This course address the application of media and technology in health and physical activity program implementation. Examples include the application of video, audio, online programming, etc. Students will have opportunities to uses the various technologies across various applications related to health and physical activity programming.

Served as Guest Lecturer (2020). Designed new online content and active learning module to aid in students understanding of wearable technologies.

HPA 1996: Clinical Internship, University of Pittsburgh

Required course for undergraduate students in athletic training, exercise science and teacher education. Supervised clinical experience for the B.S. Degree student. The student is placed in a clinical setting appropriate to his/her degree interests and career goals and must complete a minimum of 25 hours of clinical work per credit hour. Supervision is provided by both a cooperating clinical supervisor and the university clinical advisor.

Served as Faculty Mentor (2016-Present).

HPA 1998: Directed Research, University of Pittsburgh

Required course for undergraduate students in athletic training, exercise science and teacher education. The student proposes and carries out an independent study project under the direction and supervision of an appropriate member of the faculty.

Served as Faculty Mentor (2015-Present).

MEMS 1097: Special Projects, University of Pittsburgh

Investigation and research embodying testing, original design, or research on an approved subject; or an individual course of study guided by an approved departmental faculty member.

Served as Faculty Mentor (2015). Ryan LeGrand, Mechanical Engineering: 'Testing Rig Design and Evaluation of Concussion Reduction Technology'

BIOENG 3095: Graduate Projects, University of Pittsburgh

Individual study program under guidance of faculty member.

Served as Faculty Mentor (2018). Ryan Byrne, Mechanical Engineering: 'The Impact of Obesity on Motion Capture Accuracy in Determining Knee Kinematics'
(2020) Julie Rekant

BIOENG 1160, 1161: Bioengineering Design 1, 2, University of Pittsburgh

Bioengineering Design 1 & 2, is a mentored opportunity for the student to synthesize and extend skills and knowledge acquired during the undergraduate education experience in design (or redesign) of a biomedical product or equivalent. Students are exposed to key facets of the medical product design process and the unique regulatory requirements for biomedical products. Student teams select a design project, conduct a market/reimbursement analysis, apply design process methodology, maintain a design history file, and create a prototype product.

Erica Brunngraber, Elizabeth Gilson, Yanpei Ali, Mike Cunningham, Andrew George, Wilton Snead (2013): 'An Ergonomic, Compactable, Axillary Crutch Substitute'

Holly Whitelam, Jenna Hanner, Michael Griffin, Molly Finn, Rebecca Miller, Dhanu Thiyagarajan (2014): 'Redesign of Knee Brace For Third World Countries'

Served as Faculty Mentor (2016, 2017, 2019, 2020).

HPA 3377: Chronic Disease Case Studies, University of Pittsburgh

This course integrates selected elements of the knowledge base in the areas of exercise science, graded exercise testing electrocardiography, pharmacology and exercise prescription in order to develop an effective and realistic therapeutic plan for individuals who have coronary disease or are at risk for its development. The principal learning experiences for the course center on the development, interpretation and presentation of cardiovascular case studies for intervention.

Served as Guest Lecturer (2015-2018). Developed new lecture material for the department of Health and Physical Activity relating chronic disease case studies to injury prevention.

ME 450: Mechanical Engineering Capstone Design and Manufacturing, University of Michigan

The educational goal of this capstone design and manufacturing experience is to give each student a deep understanding of how to approach open ended challenges *by process*, and to learn how to creatively catalyze, synthesize, and apply the seemingly fragmented engineering knowledge he/she has acquired at UM to the design & manufacturing of real mechanical systems.

Served as an Intellectual Co-Sponsor and Faculty Mentor (2013-2014).

OT 2101: Human Movement Analysis, University of Pittsburgh

Course examines the biomechanical components of human performance. Functional interrelationships between the musculoskeletal and articular systems are examined for normal and abnormal movement.

Served as Guest Lecturer and Laboratory Instructor (2014-2017). Developed new lecture material for the department of Occupational Therapy relating biomechanics to human movement analysis, highlighting technology.

EXPH 364: Kinesiology, West Virginia University

Anatomical, mechanical, and musculoskeletal study of the human body as the instrument for efficient performance of motor activities. (Laboratory work included.)

Served as Guest Lecturer and Laboratory Instructor (2014). Developed this new lecture material for the department of Kinesiology at West Virginia University demonstrating kinesiology and biomechanics concepts during locomotion.

BIOENG 3999: Ph.D. Dissertation

Dissertation research credits under guidance of faculty member.

Served as Faculty Mentor (2011-Present).

BIOENG 3997: Research, PhD

Research credits under guidance of faculty member.

Served as Faculty Mentor (2011-Present).

BIOENG 2999: M.S. Thesis

Master's thesis research credits under guidance of faculty member.

Served as Faculty Mentor (2011-Present).

BIOENG 1002: Intramural Internship, University of Pittsburgh

Students employ practical experience, gained from mentored research in an academic environment that includes project planning, design of experiments, and analysis of results to develop professional quality oral presentation skills. Emphasis is placed on critical analysis of research projects, development of technical abstract writing skills, and development of professional quality visual aids that accompany oral presentations. The course culminates with an oral presentation at a technical symposium.

Served as Faculty Mentor and Project Mentor (2011-2019).

Bridget Wagner, Bioengineering, Intramural Internship (2019): 'Weight Shifting during Prolonged Standing'

John Driggers, Bioengineering, Intramural Internship (2018): 'Development of a 3D Scanner for Lower Leg Volume Measurements'

Elizabeth Bottorff, Bioengineering, Intramural Internship (2017): 'Impact of Knee Angle on Cartilage Deformation'

Molly Knewston, Bioengineering, Intramural Internship (2014): 'Body Segment Parameters in Normal Weight Versus Obese Young Females'

Iman Benbourenane, Bioengineering, Intramural Internship (2014): 'Nasal Endoscopy Simulator'

Joanie Guyer, Bioengineering, Intramural Internship (2013): 'Ergonomic Analysis of Microlaryngoscopy using Surface Electromyography'

Christopher Sivi, Bioengineering, Intramural Internship (2013): 'Estimation of Body Segment Parameters in Unilateral Transfemoral Amputees'

Devon Albert, Bioengineering, Intramural Internship (2013): 'Characterization of Foot Movements During Slips'

Rebecca Gerth, Bioengineering, Intramural Internship (2012): 'The Effect of Warning on Slip Severity'

Sean Moore, Bioengineering, Intramural Internship (2011): 'Evaluation of NIRS as a Qualitative Fatigue Assessment'

BIOENG 1631: Biomechanics 2: Introduction to Biodynamics and Biosolid Mechanics, University of Pittsburgh

Modern biomechanics is an increasingly diverse field that encompasses the mechanics of the whole body, all the way down to the cellular and molecular levels. Students are introduced to fundamental concepts and techniques of biodynamics and biosolid mechanics which provide the basis for Biomechanics 3 and 4. General approaches used in mechanics are introduced throughout the semester and applied in several laboratories.

Served as Guest Lecturer, Teaching Assistant (2008-2019).

BIOENG 1632: Biomechanics 3: Biodynamics of Movement, University of Pittsburgh

Biodynamics, the area of focus in Biomechanics 3, is the study of large-scale movements in biologic systems. As such, the course focuses on the analysis of human movement, which is used in clinical and research settings to understand how various pathologies impact movement and how interventions can be implemented to aid those affected by movement disorders. We cover the fundamentals of biomechanics of human movement using mechanical modeling techniques. The major focus is kinematic analyses in three dimensions using matrix techniques. Some fundamentals of kinetics are covered as well, 2D and 3D inverse dynamics.

Served as Guest Lecturer, Laboratory Instructor (2005-2014).

BIOENG 1150: Bioengineering Methods & Applications, University of Pittsburgh

Bioengineering Methods & Applications uses laboratory experiences to illustrate principles taught in several bioengineering core classes. In addition to being exposed to particular laboratory skills for each of the experimental modules in the course, students are expected to practice previously developed skills in technical writing, creating tables and graphs, data analysis, and statistics to create professional quality laboratory reports that document each module.

Served as Laboratory Instructor, Teaching Assistant for biomechanics module (2003-2012).

BIOENG 2061 / IE 2061: Ergonomics and Occupational Biomechanics, University of Pittsburgh
Fundamentals of ergonomics as applied to the industrial workplace. Specific topics include: occupational biomechanics, anthropometry, work physiology, cumulative trauma disorders and slip and fall prevention applied to the organization and physical design of the workstation. Effects of hand tool design on workers, and analysis of manual material handling jobs.

Served as Guest Lecturer, Teaching Assistant, Laboratory Instructor (2003-2008).

BIOENG 2721: Human Movement Biomechanics, University of Pittsburgh
This course focuses on methods of analyzing human movement. The major focus will be on measurement and analysis of whole body movement. Engineering techniques will be used including 3-D rigid body kinematics and inverse dynamics using matrix algebra techniques. The goals of this course are: 1) to understand computational methods of kinematics analysis using multi-link systems and be able to implement these methods in the analysis of human movement. 2) To be able to implement inverse dynamics to estimate forces and torques on joints during movement. 3) To learn the fundamentals of surface electromyography and its use in the analysis of human movement.

Served as Guest Lecturer, Laboratory Instructor (2006-2008, 2012).

Mentoring Graduate Students

2019-Present Health and Physical Activity Graduate Academic Advisor

2018-Present Dissertation Chair

Julie Rekant, Bioengineering / Physical Therapy

'Biomechanics of movement and markers of musculoskeletal impairment in adults with obesity and different levels of physical activity'

2018-Present Dissertation Committee

Bailey Peterson, Bioengineering / Physical Therapy

'Restoring Proprioception to Improve Balance and Gait in Lower-Limb Amputees'

2015-2020 Dissertation Chair

Stephanie Wiltman, Bioengineering

'Using Objective Methods to Measure the Underlying Mechanisms of Discomfort during Prolonged Standing'

2015-2020 Dissertation Consultant

Krista Kutina, Rehabilitation Science and Technology

'Development and Efficacy of a Mobile Real Time Visual Feedback System for Gait Retraining after Lower Extremity Limb Loss'

2012-2019 Dissertation Committee

Zachary Merrill, Bioengineering

'Impact of Age and Obesity on Anthropometry'

2012-2014 Master's Thesis Chair

Justin Haney, Bioengineering

'Effect of Flooring on Lower Extremity Discomfort and Fatigue during Long-Term Standing/Walking: Evaluation of Muscle Oxygenation as an Objective Measure of Fatigue using Near Infrared Spectroscopy'

2011-2013 Master's Thesis Co-Chair
Allison Luther, Bioengineering
'Effect of Prosthetic Knee Type on Tripping Risk in Older Adult Amputees'

2011-2013 Dissertation Committee
Jon Akins, Bioengineering
'Development and evaluation of instrumented soccer equipment to collect ankle joint kinematics in the field'

Mentoring Undergraduate Students

2020 Madeline Kuciapinski, Health and Physical Activity
University of Pittsburgh, Health and Physical Activity Internship (2020)

2020 George Ruddy, Health and Physical Activity

2020 Louise Thompson, Health and Physical Activity

2019 Jimmy Reagan, Health and Physical Activity

2019 Brandon Betts, Health and Physical Activity

2013-2019 Bioengineering Undergraduate Academic Advisor

2019 Connor Wurst, Industrial Engineering

2019 Gregory Strouse, Health and Physical Activity

2019 Kevin Smith, Health and Physical Activity

2019 Megan Tripp, Health and Physical Activity

2018-2019 Bridget Wagner, Bioengineering
Intramural Internship (2018): Weight Shifts during Standing

2018 Sydney Cavarallo, Health and Physical Activity

2018 Racheal Harrison, Health and Physical Activity

2018 Alicia Myers, Health and Physical Activity

2017 Laurel Saunders, Health and Physical Activity

2017 Justin Jaquette, Health and Physical Activity

2017 Shea McMurtry, Health and Physical Activity
University of Pittsburgh, Health and Physical Activity Internship (2017)

2016-2018 Elizabeth Bottorff, Bioengineering
Intramural Internship (2016): Impact of Knee Angle on Cartilage Deformation

2016-2018 John Driggers, Bioengineering
Intramural Internship (2017): Three Dimensional Scanning of Leg Swelling

2016-2018 Jonah Wisch, Health and Physical Activity

2016 Mikayla Chryst, Health and Physical Activity

2016-2017 Rushil Shah, Industrial Engineering

2015-2018 Ken Pechtl, Rehabilitation Sciences

2014-2016 Mitch Clough, Bioengineering

2015 Kaitlin Herzog, Health and Physical Activity
University of Pittsburgh, Health and Physical Activity Internship (2015)

2015 Audrey Shannon, Health and Physical Activity

2015 Max McCloskey, Health and Physical Activity

2014-2015 Ryan LeGrand, Mechanical Engineering
University of Pittsburgh, Swanson School of Engineering Summer Research Experience for Undergraduates (2014)

2014-2015 Molly Knewston, Bioengineering
University of Pittsburgh, Bioengineering Summer Research Experience for Undergraduates (2014)

2014-2015 Iman Benbourenane, Bioengineering
Pre PHD Summer Research Experience (2014)

2013-2014 Rehan Poonawala, Harsh Pardasani, Benjamin Burmeister, Haroon Zuberi
University of Michigan, Mechanical Engineering Capstone Design Project (2013-2014): 'Safe Gait Trainer'

2013-2015 Joanie Guyer, Bioengineering
University of Pittsburgh, Swanson School of Engineering Summer Research Experience for Undergraduates (2013): 'Ergonomically Favorable Postures for Laryngeal Microsurgery'
Intramural Internship (2013): 'Ergonomic Analysis of Microlaryngoscopy using Surface Electromyography'

2013-2014 Grace Owens, Bioengineering

2013-2014 Raymond Van Horn, Bioengineering

2012 Rebecca Gerth, Bioengineering
Intramural Internship (2012): The effect of slippery surface warnings on slip severity.

2012 Julia Lopez, Bioengineering UMBC
Pre PHD Summer Research Experience (2012): 'The Effect of Vision Loss on the Time to Complete Upper Extremity Peg Tasks'

2012-2014 Devon Albert, Bioengineering

2011-2013 Rebecca Girth, Bioengineering
Intramural Internship (2012): 'The Effect of Warning on Slip Severity'

2011-2013 Zach Merrill, Bioengineering

2011-2012 Erica Parise, Bioengineering

2011-2012 Sean Moore, Bioengineering
Intramural Internship (2011): 'Evaluation of NIRS as a Qualitative Fatigue Assessment'

2011-2012 Cameron Jones, Bioengineering

2011-2012 Aaron Ledgerwood, Bioengineering

2011-2012 Justin Haney, Bioengineering

2011-2013 Suyesh Acharya, Bioengineering, **Winner of the George Washington Prize*

2011-2014 Christopher Sivi, Bioengineering
Intramural Internship (2012): 'Anthropometric Model for Amputee Prosthetic Components'

2011-2013 Alicia Kolling, Bioengineering

Additional Mentoring Projects

2018-2019 Visiting Research Scholar, Alon Shocat, ORT Braude College, Karmiel, Israel.

2016-Present University of Pittsburgh Design Hub. 'Ergonomic Surgical Chair Design'.

2012-2016 University of Pittsburgh Engineers for Sustainable Medical Devices. Joshua Gyory, Greta Brecheisen. 'Redesign of a Portable ENT Scope Case'.

2012-2015 University of Pittsburgh Engineers for Sustainable Medical Devices. Shannon Gorman, Lindsey Quinn, Steven Sklar, Hannah Smith. 'Diagnostic Tool for Dysphagia'.
**2013 Wells Student Healthcare Entrepreneurship Competition Semi-Finalist*

2012-2013 University of Pittsburgh Bioengineering Senior Design. Erica Brunngraber, Elizabeth Gilson, Yanpei Ali, Mike Cunningham, Andrew George, Wilton Snead. 'An Ergonomic, Compactable, Axillary Crutch Substitute'.

Professional Service

Manuscript Reviews

Aging, Neuropsychology and Cognition	International Journal of Industrial Ergonomics
Annals of Biomedical Engineering	International Journal of Kinesiology in Higher Education
Annals of Nutrition and Metabolism	Journal of Applied Biomechanics
Annals of Work Exposures and Health	Journal of Biomechanical Engineering
Applied Ergonomics	Journal of Biomechanics
Applied Physiology, Nutrition and Metabolism	Journal of Electromyography and Kinesiology
Assistive Technology	Journal of Mechanics in Medicine and Biology
Clinical Biomechanics	Journal of NeuroEngineering and Rehabilitation
Ergonomics	Journal of Pregnancy
Gait and Posture	Journal of Vestibular Research
Human Factors	Movement Disorders
IEEE Transactions on Biomedical Engineering	Medical Engineering & Physics
IIE Transactions on Occupational Ergonomics and Human Factors	Sports Biomechanics
IISE Transactions on Occupational Ergonomics and Human Factors	Tribology Letters

Conference Service

2018	American Society of Biomechanics Program Committee
2015	American Society of Biomechanics Obesity and Falls Session Chair
2014	World Conference of Biomechanics Abstract Reviewer
2013	American Society of Biomechanics Program Co-Chair
2013	American Society of Biomechanics Falls Session Chair
2013	Human Factors and Ergonomics Society Abstract Reviewer
2012-Present	American Society of Biomechanics Abstract Reviewer
2012	American Society of Biomechanics Gait Session Chair

Grant Proposal Reviews

2015-Present	University of Pittsburgh Competitive Medical Research Fund (CMRF) Reviewer
2013-14	University of Pittsburgh Center for Medical Innovation Pre-Proposal Reviewer
2013-14	University of Pittsburgh Center for Medical Innovation Full Proposal Reviewer

Professional Service Activities

2020-Present	University of Pittsburgh Mighty Strong HPA Faculty Sponsor
2020	NAESC Engineering Leadership Summit Tours
2020-Present	University of Pittsburgh Steel City Squash Biomechanics Experience
2020	University of Pittsburgh Pink Panther Program
2019-Present	Fox Chapel Area High School "Intro to Sport and Exercise Science"
2019-Present	Society of Women Engineers Outreach
2018	American Society of Biomechanics Program Committee
2018	University of Pittsburgh Engineering Office of Diversity Discover Graduate Program
2017	University of Pittsburgh Medical School Orientation Diversity Workshop Panel
2017	Center for Faculty Excellence Professional Development Workshop
2014	University of Pittsburgh SWE High School Engineering Day Panel
2014-Present	University of Pittsburgh STEM Fields DiscoverU Tours

2013 American Society of Biomechanics Program Co-Chair
 2013 University of Pittsburgh Investing Now Lecture & Tours
 2013 Pohang University of Science and Technology Delegation Visit
 2013 University of Pittsburgh 'E-week' Judge
 2012 University of Pittsburgh School of Public Health Diversity Tours
 2012, 2014 University of Pittsburgh Pre PHD Summer Research Experience
 2010-Present University of Pittsburgh Faculty & Staff In Service to Community
 2010-2011 University of Pittsburgh Chancellor's School Recruiting
 2010 Carnegie Mellon-University of Pittsburgh Summer Program in Neural Computation
 2005-Present Pitt EXCEL Program
 2005-2010 University of Pittsburgh, School of Engineering, Critical and Analytical Reasoning
 Enrichment (CARE) Program
 2005-2012 The Pennsylvania Governor's Schools of Excellence
 2005-Present University of Pittsburgh Society of Women Engineers SWEep Over Program
 2005-Present University of Pittsburgh Bioengineering Research Experience for Undergraduates

Professional Skills

Research Skills

Accelerometry
 Anthropometric Measuring Devices
 Balance System (NeuroCom Equitest, OVAR)
 Dual Energy X-Ray Absorptiometry (Hologic)
 Dynamic Stereo X-Ray (Custom)
 Electromyography (Noraxon, Delsys, Myomuscle)
 Foot Switch Systems (Biopac, GaitRite, Custom)
 Force Platforms (Bertec, AMTI, Kistler)
 Gait Analysis Software (Natural Point, Optotrak, Vicon Workstation, Vicon Nexus)
 Galvanic Vestibular Stimulation
 Heart Rate & Skin Conductance Monitor (Biolog)
 Motion Capture (Flock of Birds, Motion Analysis, Natural Point, Optotrak, Polhemus, Vicon Workstation, Vicon Nexus, Noraxon Myomotion)
 Near-Infrared Spectroscopy (Imagent, Invos, Humon, Moxy)
 Safety Harness Apparatus (Load Cell, Tilt Sensor, Trolley & Belay, Solo-step)
 Slip Testing (English Slip Meter)
 Strength and Rehabilitation (Biodex, Custom)
 Three Dimensional Printing
 Virtual Reality Cave (MVRC)

Computer Skills

3DSSPP	JMP	Panopto
AutoCAD	LabView	Procite
Axum/S-PLUS	Mathcad	ProEngineer
Blackboard	Matlab	ProMechanica
C++	Mathmatica	SAS
Canvas	Microsoft Office	SIMM
Complete Anatomy	Microsoft Teams	Solid Works
EndNote	Mimics	SPSS
Hologic	OpenSim	Stata

Visual Basic

Visual Studio

Zoom