

CURRICULUM VITAE

James M. Finley, Ph.D.

August 2020

I. BIOGRAPHICAL INFORMATION

PERSONAL INFORMATION:

University Address: Division of Biokinesiology and Physical Therapy
Herman Ostrow School of Dentistry
University of Southern California
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Los Angeles, CA 90033

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EDUCATION AND PROFESSIONAL APPOINTMENTS:

EDUCATION:

2004-2010 Doctorate of Philosophy
Northwestern University, Evanston, IL
Department of Biomedical Engineering (Dr. Eric Perreault and Dr. Yasin Dhaher)
Dissertation Title – Regulation of Feed-Forward and Feedback Contributions to Ankle Stability during Balance Tasks
Funding: NSF Graduate Research Fellowship and a GEM Ph.D. Fellowship

2004-2007 Master of Science
Northwestern University, Evanston, IL
Department of Biomedical Engineering
Thesis Title – Enhanced Inter-joint Reflex Coupling in the Lower Limb of Individuals with Hemiparetic Stroke

2000-2004 Bachelor of Science (Summa Cum Laude)
Florida A&M University, Tallahassee, FL
Department of Mechanical Engineering

POST-GRADUATE TRAINING:

2010-2013 Post-doctoral Fellow, Kennedy Krieger Institute & Johns Hopkins University, Baltimore, MD
Department of Neuroscience (Dr. Amy Bastian)
Funding: NIH T32 HD007414

ACADEMIC APPOINTMENTS:

- 2020 – present Associate Professor of Biokinesiology, Division of Biokinesiology and Physical Therapy, Herman Ostrow School of Dentistry, University of Southern California
- Associate Professor of Biomedical Engineering, Department of Biomedical Engineering, Viterbi School of Engineering, University of Southern California (By Courtesy)
- 2013 – present Assistant Professor of Biokinesiology, Division of Biokinesiology and Physical Therapy, Herman Ostrow School of Dentistry, University of Southern California
- 2017 – present Assistant Professor of Biomedical Engineering, Department of Biomedical Engineering, Viterbi School of Engineering, University of Southern California (By Courtesy)

HONORS, AWARDS, FELLOWSHIPS:

- 2018 Received the Mechanical Engineering Rising Star Alumni Award from the Florida A&M University – Florida State University College of Engineering
- 2017 Received the USC Division of Biokinesiology and Physical Therapy Award for Excellence in Teaching
- 2017 Selected as an American Heart Association Fellow in Training
- 2017 Appointed as a faculty member on an NIH T32 training grant within the USC Neuroscience Graduate Program
- 2015 Interviewed by New Scientist Magazine (<http://bit.ly/1gghnIO>)
- 2009 Received NIBIB/NIH Student Travel Award - IEEE EMBS Conference
- 2008 Awarded a Community Building Grant from Northwestern University
- 2005 Received an NSF Graduate Research Fellowship
- 2004 Received a GEM Ph.D. Fellowship
- 2002 Inducted into Pi Tau Sigma Mechanical Engineering Honor Society
- 2002 Inducted into Tau Beta Pi Engineering Honor Society

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:

- 2015 – present American Society of Neurorehabilitation
- 2015 – present American Heart Association
- 2015 – present American Society of Biomechanics
- 2011 – present Society for the Neural Control of Movement

- 2008 – present Institute for Electrical and Electronics Engineers
- 2006 – present Society for Neuroscience
- 2003 – present Pi Tau Sigma Mechanical Engineering Honor Society
- 2002 – present Tau Beta Pi Engineering Honor Society

II. ADMINISTRATIVE AND SERVICE ACTIVITIES

UNIVERSITY SERVICE:

USC DIVISION OF BIOKINESIOLOGY AND PHYSICAL THERAPY:

- 2020 – present Faculty advisor of the Division of Biokinesiology and Physical Therapy Black Students Affinity Group
- 2019 – present Member of the Division of Biokinesiology and Physical Therapy Faculty Affairs Committee
- 2018 Reviewer for Division of Biokinesiology and Physical Therapy Seed Grants
- 2018 Hosted 26 high school students for one day as a part of the USC Kinesiology: Moving Minds and Bodies through Sports, Medicine, and Health (CORE-195) Summer Program
- 2016 – present Reviewer of applications to the Division of Biokinesiology and Physical Therapy Doctor of Physical Therapy program
- 2015 Co-organized and presented in a faculty forum at the Division of Biokinesiology and Physical Therapy's "Division on the Road" event in Pasadena, CA
- 2015 – present Co-Director of the Computational Motor Control and Learning Journal Club in the Division of Biokinesiology and Physical Therapy
- 2013 – present Member of the Division of Biokinesiology and Physical Therapy Ph.D. Admissions Committee

HERMAN OSTROW SCHOOL OF DENTISTRY OF USC:

- 2014 Poster Judge for the Herman Ostrow School of Dentistry Research Day

KECK SCHOOL OF MEDICINE OF USC:

- 2018 Reviewer for Keck School of Medicine Dean's Pilot Funding Program

USC VITERBI SCHOOL OF ENGINEERING:

- 2017 Served as a Judge for the 21st Grodins Research Symposium in the Department of Biomedical Engineering

UNIVERSITY OF SOUTHERN CALIFORNIA:

2020	Reviewer for USC Collaboration Fund Program
2018 – present	Co-Director, USC Sensorimotor Assessment and Rehabilitation Training in Virtual Reality Center (SMART-VR Center)
2018	Co-Organizer, 1 st Annual USC Virtual Technologies for Health Symposium
2018 – present	Member of the Neuroscience Graduate Program's Diversity Committee
2018	Served as a Judge for the 13 th Annual USC Neuroscience Graduate Program Student Research Symposium
2017 – present	Member of the Neuroscience Graduate Program Executive Committee
2016	Member of the Zumberge Individual Award Review Committee
2014	Member of the CTSI Pilot Grant Technology Review Committee

EDITORIAL ACTIVITIES:

EDITORIAL BOARD:

2019 – present IEEE Transactions in Neural Systems and Rehabilitation Engineering

EDITOR/ASSOCIATE EDITOR/ACADEMIC EDITOR:

Year	Journal (# of Manuscripts Handled)
2020	Associate Editor, IEEE Transactions in Neural Systems and Rehabilitation Engineering (6)
2019	Associate Editor, IEEE Transactions in Neural Systems and Rehabilitation Engineering (2)

SCIENTIFIC REVIEW FOR JOURNALS:

Year	Journal (# Reviewed)
2020	Clinical Biomechanics (1) Gait and Posture (1) IEEE Transactions on Haptics (1) Journal of Neurophysiology (1) Neurorehabilitation and Neural Repair (2)
2019	Experimental Brain Research (1) IEEE Engineering in Medicine and Biology Conference (4) Journal of Applied Biomechanics (1) Journal of Biomechanics (1) Journal of Neuroengineering (1) Journal of Neuroengineering and Rehabilitation (2)

- Journal of Neurologic Physical Therapy (1)
 Neurorehabilitation and Neural Repair (2)
 Robotics and Automation – Letters (1)
 Transaction in Neural System and Rehabilitation Engineering (1)
 Virtual Reality (1)
- 2018 Archives of Physical Medicine and Rehabilitation (1)
 Experimental Brain Research (1)
 Frontiers in Neuroscience (1)
 IEEE Engineering in Medicine and Biology Conference (6)
 IEEE Neural Engineering Conference (5)
 Journal of Experimental Biology (1)
 Journal of Neuroengineering and Rehabilitation (1)
 Journal of Neurophysiology (1)
 Neurorehabilitation and Neural Repair (2)
 Scientific Reports (1)
 Transactions in Neural Systems and Rehabilitation Engineering (1)
- 2017 IEEE Engineering in Medicine and Biology Conference (4)
 Gait and Posture (1)
 Journal of Neurophysiology (1)
 Journal of Physiology (1)
 Neurorehabilitation and Neural Repair (2)
 Neuroscience Letters (1)
 Scientific Reports (1)
- 2016 Gait and Posture (1)
 Human Factors (1)
 IEEE Engineering in Medicine and Biology Conference (8)
 Journal of Applied Biomechanics (1)
 Journal of Biomechanics (1)
 Journal of Neuroengineering and Rehabilitation (1)
 Neurorehabilitation and Neural Repair (1)
 PLOS ONE (1)
 Transactions in Neural Systems and Rehabilitation Engineering (2)
- 2015 Experimental Brain Research (2)
 IEEE Engineering in Medicine and Biology Conference (7)
 Journal of Neuroengineering and Rehabilitation (1)
 Journal of Neurologic Physical Therapy (1)
 Neurorehabilitation and Neural Repair (1)
 PLoS Computational Biology (2)
- 2014 Experimental Brain Research (1)
 Frontiers in Neuroscience (1)
 IEEE Engineering in Medicine and Biology Conference (7)
 IEEE Conference on Healthcare Innovation & Point-of-Care Technologies (1)

- IEEE/RSJ International Conference on Intelligent Robots and Systems (1)
 Journal of Neuroengineering and Rehabilitation (1)
 Journal of Neurophysiology (2)
 Neurorehabilitation and Neural Repair (1)
 PLoS Computational Biology (1)
- 2013 IEEE Engineering in Medicine and Biology Conference (9)
 Journal of Biomechanics (1)
 Journal of Neuroengineering and Rehabilitation (2)
 Journal of Neurologic Physical Therapy (1)
- 2012 IEEE Engineering in Medicine and Biology Conference (8)
 Journal of Neurophysiology (2)
- 2011 IEEE Engineering in Medicine and Biology Conference (7)
 Journal of Neurophysiology (1)
 Transactions in Neural Systems and Rehabilitation Engineering (1)
- 2010 IEEE Engineering in Medicine and Biology Conference (3)
 Journal of Neurophysiology (2)

GRANT REVIEW:

- 2018 National Science Foundation
 Reviewer for the Perception, Action, and Cognition Program
- 2016-2017 National Institutes of Health, Center for Scientific Review
 Early Career Reviewer, MOSS-V (15) SBIR-MRS Special Emphasis Panel
- 2016-2017 Research Foundation Flanders
 Grant Reviewer
- 2014, 2017 National Science Foundation, Division of Behavioral and Cognitive Sciences
 Ad-hoc reviewer for Perception, Action, and Cognition Panel
- 2014 Toronto Rehabilitation Institute
 External pre-reviewer

SERVICE ACTIVITIES IN PROFESSIONAL ORGANIZATIONS:

- 2020 Mentor, American Society of Biomechanics Mentorship Program
- 2020 Guest speaker for the American Neurologic Physical Therapy Balance and Falls Special Interest Group Podcast
- 2020 Associate Editor, IEEE Engineering in Medicine and Biology Conference, Montreal, Canada

2020	Co-Chair of Scientific Program, Dynamic Walking, Pittsburgh, PA
2019 – present	Member of Diversity and Inclusion Committee, National Biomechanics Day
2019	Associate Editor, IEEE Engineering in Medicine and Biology Conference, Berlin, Germany
2018-2019	Member of American Society of Biomechanics Award Committee
2017	Represented the American Society of Biomechanics at the Annual Biomedical Research Conference for Minority Students
2017	Mentor, American Society of Biomechanics Mentorship Program
2017	Chair, Session on Neuromuscular Systems, IEEE Engineering in Medicine and Biology Conference, Jeju Island, Korea
2017	Co-Chair, Session on Human Performance, IEEE Engineering in Medicine and Biology Conference, Jeju Island, Korea
2017	Organizer, Symposium on Energetic Optimization Principles in Motor Control, American Society of Biomechanics Conference, Boulder, CO
2016	Organizer, Symposium on Neuromechanics and Human Locomotor Stability, International Society of Electrophysiology and Kinesiology Conference, Chicago, IL
2016	Organizer, Workshop on Social Networking in Science, Neural Control of Movement Conference, Montego Bay, Jamaica
2010-2015	Research in Review Editorial Team, Neurology Section of the American Physical Therapy Association
2014	Judge, Doctoral Research Competition, World Congress of Biomechanics

COMMUNITY SERVICE ACTIVITIES:

2019	Hosted a group of 34 students from Miramar Campus High School for National Biomechanics Day in collaboration with the Musculoskeletal Biomechanics Research Laboratory
2019	Panelist for USC Brothers Breaking B.R.E.A.D. (Barriers, Regrets, Egos, Animosity, and Doubt) Professional Development workshop for Black Males
2019	Guest speaker on the Life After Stroke Podcast
2017	Speaker for Strokefocus Online Web Series
2017	Volunteered as a guest speaker for Pathway Assessments Program at Ernest S. McBride High School in Long Beach, CA

- 2015 Volunteered as a guest speaker at Ernest S. McBride High School in Long Beach, CA
- 2014 Served as a guest speaker at Centennial High School during the American Physiology Society's Physiology Understanding (PhUn) Week
- 2014 Served as a guest speaker at Compton High School's All Things Science Day

III. SCHOLARLY ACTIVITIES

PUBLICATIONS:

Asterisks indicate direct student or post-doctoral mentee; underline indicates senior author on publication; equal contributions are denoted by §

REFEREED JOURNAL ARTICLES – ORIGINAL RESEARCH:

- 2020 Buurke TJW*, Liu C*, Park S*, den Otter R, **Finley JM**. (*Accepted*). Maintaining sagittal plane balance compromises frontal plane balance during reactive stepping in people post-stroke. *Clinical Biomechanics*.
- 2020 Marin-Pardo O, Laine CM, Rennie M, Ito KL, **Finley JM**, Liew S-L. A virtual reality muscle-computer-interface for neurorehabilitation in chronic stroke: a pilot study. *Sensors (Basel)*. 2020;20(13):E3754.
- 2020 Liu C* and **Finley JM**. Asymmetric gait patterns alter the control of intersegmental coordination in response to perturbations during walking. *PLOS One*. 2020; 15(5):e0224187
- 2019 Rebula J, Schaal S, **Finley JM**, **Righetti L**. A robustness analysis of inverse optimal control of bipedal walking. *IEEE Robotics and Automation Letters*, 4 (4).
- 2019 Kim A*, Schweighofer N, **Finley JM**. Locomotor skill acquisition in virtual reality shows sustained transfer to the real world. *Journal of Neuroengineering and Rehabilitation*, 16(1):113.
- 2019 Sánchez, N*[§], Simha S[§], Donelan JM, **Finley JM**. Taking advantage of external mechanical work to reduce metabolic cost: the mechanics and energetics of split-belt treadmill walking. *Journal of Physiology*, 597:4053-4068.
- 2019 Nozari PP*, **Finley JM**. Development of a platform to evaluate principles of bipedal locomotion using dynamical movement primitives. *Proceedings of International IEEE/EMBS Conference on Neural Engineering, 2019*, pp. 1062-1065.
- 2018 Kim A*, Kretch KS*, Zhou Z*, **Finley JM**. The quality of visual information about the lower extremities influences visuomotor coordination during virtual obstacle negotiation. *Journal of Neurophysiology*, 120:839-847.

- 2018 Sánchez N*, **Finley JM**. Individual differences in locomotor function predict the capacity to reduce asymmetry and modify the energetic cost of walking post-stroke. *Neurorehabilitation and Neural Repair*, 32:701-713.
- 2018 Liu C*, Macedo LD*, **Finley JM**. Conservation of reactive stabilization strategies in the presence of step length asymmetries during walking. *Frontiers in Human Neuroscience*, 12, 251.
- 2018 Havens KL, Mukherjee T*, **Finley JM**. Analysis of biases in dynamic margins of stability introduced by the use of simplified center of mass estimates during walking and turning. *Gait and Posture*, 59, 162-167.
- 2017 Sánchez N*, Park S*, **Finley JM**. Evidence of energetic optimization during adaptation differs for metabolic, mechanical, and perceptual estimates of energetic cost. *Scientific Reports*, 7(1):7682.
- 2017 Kim A*, Darakjian N*, **Finley JM**. Walking in fully immersive virtual environments: a feasibility test for older adults and individuals with Parkinson's disease. *Journal of Neuroengineering and Rehabilitation*, 14, 16.
- 2017 **Finley JM**, Bastian AJ. Associations between foot placement asymmetries and metabolic cost of transport in hemiparetic gait. *Neurorehabilitation and Neural Repair*, 31, 168-177.
- 2017 Kim A*, Zhou Z*, Kretch K*, **Finley JM**. Manipulating the fidelity of lower extremity visual feedback to identify obstacle negotiation strategies in immersive virtual reality. *Proceedings of Annual International Conference of the IEEE Engineering in Medicine and Biology Society, 2017*, pp. 4491-4494.
- 2017 Park S*, **Finley JM**. Characterizing dynamic balance during adaptive locomotor learning. *Proceedings of Annual International Conference of the IEEE Engineering in Medicine and Biology Society, 2017*, pp. 50-53.
- 2016 Nagamori A, Valero-Cuevas F[§], **Finley JM**[§]. Unilateral eccentric contraction of the plantarflexors leads to bilateral alterations in leg dexterity. *Frontiers in Physiology*, 7, 582.
- 2016 Marjaninejad A*, **Finley JM**. A model-based exploration of the role of pattern generating circuits during locomotor adaptation. *Proceedings of Annual International Conference of the IEEE Engineering in Medicine and Biology Society, 2016*, pp. 21-24.
- 2015 **Finley JM**, Long A, Bastian AJ, Torres-Oviedo G. Spatial and temporal control contribute to step length asymmetry during split-belt adaptation and hemiparetic gait. *Neurorehabilitation and Neural Repair*, 29, 786-795.

- 2015 Smith BA, Trujillo-Priego I, Lane CJ, **Finley JM**, Horak F. Daily quantity of infant leg movement: wearable sensor algorithm and relationship to walking onset. *Sensors*, *15*, 19006-19020.
- 2015 Long AW, **Finley JM**, Bastian AJ. A marching-walking hybrid induces step length adaptation and transfers to natural walking. *Journal of Neurophysiology*, *113*, 3905-3914.
- 2015 Porterfield JH, Sindhurakar A, **Finley JM**, Bradley NS. Drift during overground locomotion in newly hatched chicks varies with light exposure during embryogenesis. *Developmental Psychobiology*, *57*, 459-469.
- 2014 **Finley JM**, Statton MS, Bastian AJ. A novel optic flow pattern speeds split-belt locomotor adaptation. *Journal of Neurophysiology*, *111*, 969-976.
- 2013 **Finley JM**, Dhaher YY, Perreault EJ. Acceleration-dependence and task-specific modulation of short- and medium-latency reflexes in the ankle extensors. *Physiological Reports*, *1*(3), 2013, e00051.
- 2013 Trumbower RD[§], **Finley JM**[§], Shemmell J, Honeycutt CF, Perreault EJ. Bilateral impairments in task-dependent modulation of the long-latency stretch reflex following stroke. *Clinical Neurophysiology*, *124*, 1373-1380.
- 2013 **Finley JM**, Bastian AJ, Gottschall JS. Learning to be Economical: Metabolic cost of walking tracks motor adaptation. *Journal of Physiology*, *591*, 1081-1095.
- 2012 **Finley JM**, Dhaher YY, Perreault EJ. Contributions of feed-forward and feedback strategies at the human ankle during control of unstable loads. *Experimental Brain Research*, *217*, 53-66.
- 2009 **Finley JM**, Dhaher YY, Perreault EJ. Regulation of feed-forward and feedback strategies at the human ankle during balance control. *Proceedings of Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual Conference, 2009*, 7265-7268.
- 2008 **Finley JM**, Perreault EJ, Dhaher YY. Stretch reflex coupling between the hip and knee: Implications for impaired gait following stroke. *Experimental Brain Research*, *131*, 305-319.

EDITORIAL MATERIAL IN PEER-REVIEWED JOURNALS:

- 2017 **Finley JM**. Splitting the difference: New insights into distinguishing features of human versus feline models of adaptive locomotor control. *Journal of Physiology*, 595(17):5723-5724.

PEER-REVIEWED JOURNAL ARTICLES – IN PROGRESS:

Park S*, **Finley JM**. (*In Revision*). Manual stabilization reveals a transient role for balance control during locomotor adaptation.

Sanchez N, Simha S, Donelan JM, **Finley JM**. (*In Review*). Using asymmetry to your advantage: Learning to acquire and accept external assistance during prolonged split-belt walking.

Finley JM, Gotsis M, Lymouridis V, Jain S*, Kim A*, Fisher BE. (*In Review*). Design and Development of a Virtual Reality-based Mobility Training Game for People with Parkinson's disease.

Park S*, Liu C*, Sanchez N, Tilson JK, Mulroy SJ, **Finley JM**. (*In Review*). Using biofeedback to reduce spatiotemporal asymmetry impairs dynamic balance in people post-stroke.

Monaghan AS, **Finley JM**, Mehta SH, Peterson DS. (*In Review*). Improvement and Retention of Dual-Task Reactive Stepping in People with Parkinson's Disease and Age-Matched Controls

NEWS RELEASES:

- 2020 "A trio of faculty members explore how VR can help combat neurological diseases," USC News, Available as of 8/4/20: <https://news.usc.edu/173412/neurological-diseases-vr-virtual-reality-alzheimers-parkinsons-stroke-usc-research/>
- 2019 "USC Clinical Researcher Gives Online and Social Media Study Recruitment a Try — and it Changes Everything," USC Clinical and Translational Sciences Institute News. Available as of 12/17/19: <https://sc-ctsi.org/news/usc-clinical-researcher-gives-online-and-social-media-study-recruitment-a-try-and-it-changes-everything>
- 2019 "Virtual Reality Game by Engineering Students May Help Parkinson's Patients with Walking," Parkinson's News Today. Available as of 8/8/2019: <https://parkinsonsnewstoday.com/2019/08/08/virtual-reality-game-by-usc-engineering-students-aims-at-walking-skills-in-parkinsons-patients/>
- 2019 "USC develops virtual reality application for Parkinson's physiotherapy," Parkinson.Fit. Available as of 8/2/2019: <https://parkinson.fit/usc-develops-virtual-reality-application-for-parkinsons-physiotherapy/>

- 2019 "VR game allows Parkinson's patients to move and feel in virtual worlds," USC Viterbi School of Engineering News. Available as of 8/1/2019: <https://viterbischool.usc.edu/news/2019/08/vr-game-allows-parkinsons-patients-to-move-and-feel-in-virtual-worlds/>
- 2019 "Virtual reality research team earns USC collaboration fund grant," USC Division of Biokinesiology and Physical Therapy News. Available as of 6/20/2019: <https://pt.usc.edu/2019/06/20/virtual-reality-research-team-earns-usc-collaboration-fund-grant/>
- 2018 "A real showcase for virtual technologies", USC Division of Biokinesiology and Physical Therapy News. Available as of 10/02/2018: <https://pt.usc.edu/2018/10/03/a-real-showcase-for-virtual-technologies/>
- 2018 "Getting stroke survivors back on their feet", USC News. Available as of 09/28/2018: <https://news.usc.edu/149340/getting-stroke-survivors-back-on-their-feet/>
- 2018 "USC professor shines as rising star of mechanical engineering alumni", FAMU-FSU College of Engineering News. Available as of 05/14/2018: <https://www.eng.famu.fsu.edu/news/j-finley>
- 2017 "A potential new way for physical therapists to treat stroke survivors", USC News. Available as of 01/05/2017: <https://news.usc.edu/114345/a-potential-new-way-for-physical-therapists-to-treat-stroke-survivors/>
- 2016 "VR based rehab system has promising impact on Parkinson's", VR Fitness Insider. Available as of 10/03/2016: <https://www.vrfitnessinsider.com/vr-based-rehab-parkinsons/>
- 2016 "Virtual reality-based rehab system could one day help people with Parkinson's", USC News. Available as of 09/26/2016: <https://news.usc.edu/108150/virtual-reality-based-rehab-system-could-one-day-help-people-with-parkinsons-disease/>
- 2016 "Running is always blind", Nautilus Magazine. Available as of 07/07/2016: <http://nautil.us/issue/38/noise/running-is-always-blind>
- 2013 "New lab director to study locomotion of stroke survivors", USC News. Available as of 10/17/2013: <https://news.usc.edu/56448/new-lab-director-to-study-locomotion-of-stroke-survivors/>

MAJOR PUBLIC PRESENTATIONS:

INVITED, INTERNATIONAL

- 2020 **Finley JM.** Human Locomotor Learning: From Adaptation to Rehabilitation. Groningen Lecture in Movement Sciences at the University of Groningen in Groningen, The Netherlands.

- 2020 **Finley JM.** Human Locomotor Learning: From Adaptation to Rehabilitation. Radboudumc in Nijmegen, The Netherlands.
- 2019 **Finley JM.** Give and take: learning to use asymmetry to reduce energy cost during walking. ISB/ASB in Calgary, Canada.
- 2019 **Finley JM.** The costs and benefits of asymmetry during healthy and pathological gait. Society for Experimental Biology in Seville, Spain.
- 2019 **Finley JM,** Kim A, Fisher BE, Lympouridis V, Gotsis M. Development of low-cost virtual reality applications to assess sensorimotor function and improve real-world mobility. International Society for Posture and Gait Research World Congress in Edinburgh, Scotland.
- 2016 **Finley JM.** Neural control of locomotion. 3rd Annual European Computational Motor Control Summer School, in Montpellier, France.
- 2016 **Finley JM.** Modulation of adaptive locomotor learning through manipulation of optic flow. 17th Annual International Multisensory Research Forum, in Suzhou, China.
- 2015 **Finley JM.** Adaptive locomotor control: principles and applications. Laboratoire Informatique Robotique Microelectronique Montpellier (LIRMM), in Montpellier, France.
- 2014 **Finley JM.** Seminar and tutorial on neuromechanics. 1st Annual European Computational Motor Control Summer School, in Montpellier, France.
- 2009 **Finley JM,** Dhaher YY, Perreault EJ. Probing the role of feed-forward and feedback control during a balance task. Noise, Time Delay, and Balance Control Workshop in Banff, Alberta.

INVITED, NATIONAL

- 2019 **Finley, JM.** Neuromechanical principles of locomotor learning in healthy and pathological gait. University of Delaware Biomechanics and Movement Science Seminar in Newark, DE.
- 2019 **Finley JM.** Neuromechanics of locomotor learning in healthy and pathological gait. Johns Hopkins University & Kennedy Krieger Institute in Baltimore, MD.
- 2018 **Finley JM.** Toward an understanding of optimization principles in post-stroke gait. Penn State University, Interdepartmental Action Club in State College, PA.
- 2018 **Finley JM.** Understanding the neuromechanics of locomotor learning in healthy and pathological gait. Penn State University, Department of Kinesiology in State College, PA.

- 2018 **Finley JM.** Neuromechanical principles of locomotor learning in real and virtual environments. University of Florida, Department of Biomedical Engineering in Gainesville, FL.
- 2018 **Finley JM.** Neuromechanical principles of locomotor learning in real and virtual environments. University of Texas, Austin, Department of Biomedical Engineering in Austin, TX.
- 2017 **Finley JM.** Neuromechanical principles of locomotor learning in real and virtual environments. Arizona State University, School of Biological and Health System Engineering, in Tempe, AZ.
- 2017 **Finley JM.** The cost of asymmetry during healthy and pathological gait. Orange County Stroke Rehabilitation Network Continuing Education Workshop, Chapman University in Orange, CA.
- 2014 **Finley JM.** Energetic consequences of asymmetry: applications to locomotor control post-stroke. Movement and Rehabilitation Sciences Research Symposium, Northwestern University in Chicago, IL.
- 2014 **Finley JM.** Uncovering control principles of human walking using locomotor adaptation. School of Applied Physiology, Georgia Institute of Technology in Atlanta, GA.
- 2014 **Finley JM.** Elucidating principles of sensorimotor learning using locomotor adaptation. Department of Mechanical and Aerospace Engineering, University of California, Irvine in Irvine, CA.

INVITED, LOCAL

- 2019 **Finley JM.** Development of Low-Cost VR Tools to Assess Sensorimotor Function and Improve Mobility. *USC Neuroplasticity and Brain Repair Retreat* at the UCLA Lake Arrowhead Conference Center in Lake Arrowhead, CA.
- 2019 **Finley JM.** Multimodal approaches to enhance mobility in people post-stroke. American Heart Association Executive Leadership Committee Meeting in Los Angeles, CA.
- 2018 **Finley JM.** Design and development of virtual reality interventions for locomotion. USC Virtual Technologies for Health Symposium in Los Angeles, CA.
- 2018 **Finley JM.** Neuromechanical principles of locomotor learning in real and virtual environments. University of Southern California, Neuroscience Graduate Program Annual Retreat in Simi Valley, CA.
- 2017 **Finley JM.** Novel approaches for exploring principles of locomotor skill learning. USC Brain Repair and Neuroplasticity Retreat, in Lake Arrowhead, CA.

- 2016 **Finley JM.** Neuromechanics of skilled locomotion. American Society for Biomedical Engineering Research Symposium, in Los Angeles, CA.
- 2016 **Finley JM.** Neuromechanical principles for improving skilled locomotion. Huntington Medical Research Institutes, in Pasadena, CA.
- 2013 **Finley JM.** Walk this way: adaptive control of walking reveals principles of locomotor learning. Seminar Series on Engineering Neuroscience & Health, University of Southern California in Los Angeles, CA.
- 2013 **Finley JM, Bastian AJ.** Identifying the principles of locomotor learning to advance gait rehabilitation. Department of Neurology, Johns Hopkins University in Baltimore, MD.
- 2013 **Finley JM, Bastian AJ.** Identifying the principles of locomotor learning to advance gait rehabilitation. Adventist Rehabilitation Hospital of Maryland's 3rd Annual Stroke Symposium in Gaithersburg, MD.
- 2012 **Finley JM, Statton MS, Bastian AJ.** Modifying locomotor adaptation with optic flow. University of Maryland in College Park, MD.
- 2012 **Finley JM, Jayaram G.** Motor adaptation: an introduction to the history, concepts, and state of the art in the field. Human Oral Function and Swallowing Laboratory, Johns Hopkins University in Baltimore, MD.

REFEREED, INTERNATIONAL

- 2019 Park S*, Liu C*, Sanchez N*, Tilson JK, Mulroy SJ, **Finley JM.** Impact of Modifying Spatiotemporal Asymmetry on Dynamic Balance during Walking Post-Stroke. *ISB/ASB* in Calgary, Canada.
- 2019 Liu C*, Park S*, Sanchez N*, Tilson JK, Mulroy SJ, **Finley JM.** Asymmetries in the Reactive Control of Angular Momentum during Post-stroke Gait. *ISB/ASB* in Calgary, Canada.
- 2019 Sanchez N*, Simha S, Donelan JM, and **Finley JM.** Is more better? Evaluating the role of experience in energy optimization during split-belt adaptation. Dynamic Walking in Canmore, Canada.
- 2018 **Finley JM, Sanchez N*.** Simultaneous dimensionality reduction and regression to draw inference in gait analysis: an application to understanding gait asymmetry post-stroke. World Congress of Biomechanics in Dublin, Ireland.
- 2018 Liu C*, **Finley JM.** Assessing the effects of spatiotemporal asymmetry on intersegmental coordination elicited by slip-like perturbations during walking. World Congress of Biomechanics in Dublin, Ireland.

- 2017 Kim A*, Zhou Z*, Kretch K*, **Finley JM**. Manipulating the fidelity of lower extremity visual feedback to identify obstacle negotiation strategies in immersive virtual reality. Conf Proc IEEE Eng Med Biol Soc 1: 4491-4494.
- 2017 Park S*, **Finley JM**. Characterizing dynamic balance during adaptive locomotor learning. Conf Proc IEEE Eng Med Biol Soc 1: 50-53.
- 2017 **Finley JM**, Liu C*, Sanchez N*. Mapping the Influence of Spatiotemporal Asymmetries on Energetic Cost and Reactive Balance during Walking. Conference on Dynamic Walking in Mariehamn, Finland.

REFEREED, NATIONAL

- 2019 Liew SL, **Finley JM**, Lohse KR. Reliability and reproducibility in neurorehabilitation research. American Society for Neurorehabilitation Research in Chicago, IL.
- 2019 Awad L, **Finley JM**, Kesar T, Lewek M, Thompson LV. Treating gait asymmetry after stroke: basic and clinical research insights. American Physical Therapy Association Combined Sections Meeting in Washington, D.C.
- 2018 Sanchez N*, Simha S, Donelan JM, **Finley JM**. Exploiting asymmetry to gain assistance during split-belt treadmill walking. Advances in Motor Learning & Motor Control Meeting in San Diego, CA.
- 2018 **Finley JM**, Sanchez N*, Simha S, Donelan JM. Experimental analysis and model-based predictions of work minimizing strategies for split-belt walking. Dynamic Walking in Pensacola, FL.
- 2017 **Finley JM**. Energetic consequences of asymmetry in healthy and hemiparetic gait. American Society of Biomechanics, in Boulder, CO.
- 2016 Marjaninejad A*, **Finley JM**. A model-based exploration of the role of pattern generating circuits during locomotor adaptation. IEEE Engineering in Medicine and Biology Conference in Orlando, FL.
- 2016 **Finley JM**. Cortical correlates of adaptive locomotion. Neuromechanics Symposium at the International Society of Electromyography and Kinesiology Meeting, in Chicago, IL.
- 2015 **Finley JM**, Park S*. Temporal interactions between stability and energetics during human locomotor learning. Conference on Dynamic Walking in Columbus, OH.
- 2014 **Finley JM**. Adaptive control of dynamic stability during human locomotion. IEEE Engineering in Medicine and Biology Conference in Chicago, IL.
- 2011 **Finley JM**, **Bastian AJ**, **Gottschall JS**. Learning to be efficient: split-belt walking adaptation reduces metabolic cost. Society for the Neural Control of Movement in San Juan, Puerto Rico.

- 2009 **Finley JM**, Dhafer YY, Perreault EJ. Regulation of feed-forward and feedback strategies at the human ankle during balance control. IEEE EMBC in Minneapolis, MN.
- 2008 Trumbower RD, **Finley JM**, Shemmell J, Perreault EJ. Altered reflex modulation to changes in mechanical environment following stroke. American Society for Biomechanics in Ann Arbor, MI.
- 2007 **Finley JM**, Perreault EJ, Dhafer YY. Enhanced inter-joint reflex coupling may contribute to impaired coordination in hemiparetic stroke. American Society of Biomechanics in Palo Alto, CA.

REFEREED, LOCAL

- 2011 **Finley JM**, Bastian AJ, Gottschall JS. Learning to be efficient: split-belt locomotor adaptation reduces metabolic cost. Sensorimotor Research Day at Johns Hopkins University in Baltimore, MD.
- 2007 **Finley JM**, Perreault EJ, Dhafer YY. Enhanced inter-joint reflex coupling in hemiparetic stroke. Northwestern University Black Graduate Student Association Annual Research Conference in Evanston, IL.

PUBLISHED ABSTRACTS:

- 2019 Kim A* and **Finley JM**. Influence of environmental context on locomotor skill learning in virtual reality in people with Parkinson's disease. International Society for Posture and Gait Research in Edinburgh, Scotland.
- 2019 Sanchez N*, Simha SN, Donelan JM, **Finley JM**. Prolonged exposure to split-belt walking promotes energetic optimization during locomotor adaptation. Society for Neuroscience Annual Meeting in Chicago, IL.
- 2019 Liu C*, Park S*, Sanchez N*, Tilson JK, Mulroy SJ, **Finley JM**. Altering spatiotemporal asymmetry influences the reactive control of balance during walking in people post-stroke. Society for Neuroscience Annual Meeting in Chicago, IL.
- 2019 Park S*, Liu C*, Sanchez N*, Tilson JK, Mulroy SJ, **Finley JM**. Impact of modifying spatiotemporal asymmetry on frontal plane whole-body angular momentum during walking post-stroke. Society for Neuroscience Annual Meeting in Chicago, IL.
- 2019 Nozari PP*, **Finley JM**. Evaluating optimization principles in bipedal locomotion using dynamical movement primitives. Society for Neuroscience Annual Meeting in Chicago, IL.
- 2019 Gerasimenko Y, Sayenko D, Sanchez N*, **Finley JM**, Edgerton VR. Transcutaneous spinal cord stimulation facilitates stepping performance in stroke patients. Society for Neuroscience Annual Meeting in Chicago, IL.

- 2019 **Finley JM**, Sanchez N*, Gerasimenko Y, Sayenko D, Edgerton VR. Transcutaneous spinal stimulation modulates overground walking performance in individuals post-stroke. Society for Neuroscience Annual Meeting in Chicago, IL.
- 2018 Sanchez N*, **Finley JM**. Combined dimensionality reduction and regression to identify correlates of step length asymmetry post-stroke. Neural Control of Movement Annual Meeting in Santa Fe, NM.
- 2017 **Finley JM**, Trejo L*, Sanchez N*. The capacity to voluntarily modify asymmetry and reduce metabolic cost in people post-stroke depends on the direction of baseline asymmetry. Society for Neuroscience Annual Meeting in Washington, D.C.
- 2017 Kim A*, **Finley JM**. Learning and generalization of locomotor skills acquired during a virtual obstacle negotiation task. Society for Neuroscience Annual Meeting in Washington, D.C.
- 2017 Park S*, **Finley JM**. Regulation of whole-body angular momentum during adaptive locomotor learning. Society for Neuroscience Annual Meeting in Washington, D.C.
- 2017 Liu C* **Finley JM**. Modulation of step length asymmetry affects reactive control of balance. American Society of Biomechanics in Boulder, CO.
- 2017 Sanchez N*, **Finley JM**. Explicit Modification of Step Length Asymmetry Transfers to Over-Ground Walking Post-Stroke. American Society of Biomechanics in Boulder, CO.
- 2017 Havens K, Mukherjee T*, **Finley JM**. Errors in margins of stability associated with the use of simplified body models during walking and turning. American Society of Biomechanics in Boulder, CO.
- 2016 Marjaninejad A*, Valero-Cuevas F, **Finley JM**. Abilities and limitations of coupled-oscillator CPG models to adapt to dynamic perturbations during simulated bipedal locomotion. Society for Neuroscience in San Diego, CA.
- 2016 Sanchez N*, Park S*, **Finley JM**. Perceptual, physiological and neuromechanical correlates of effort associated with step length manipulations during split-belt walking. Society for Neuroscience in San Diego, CA.
- 2016 Sanchez N*, Park S*, **Finley JM**. Symmetry is not always optimal: mapping the metabolic cost landscape of walking on a split-belt treadmill. Neural Control of Movement in Montego Bay, Jamaica.
- 2016 Park S*, Sanchez N*, **Finley JM**. Modifying adaptive locomotor learning using body weight support. Neural Control of Movement in Montego Bay, Jamaica.

- 2016 **Finley JM**, Dorakjian N*, and A. Kim*. (). Assessing the feasibility of using an immersive virtual reality interface for skilled locomotor training in individuals with Parkinson's disease. Rehabilitation Research at NIH: Moving the Field Forward in Bethesda, MD.
- 2016 Kim A*, Dorakjian N*, **Finley JM**. Immersive virtual reality: A feasibility test for individuals with Parkinson's disease. APTA Combined Sections Meeting in Anaheim, CA.
- 2015 **Finley JM**, Valette R, Perrey S. Modulating cortical activity during human locomotion using optic flow. Movement and Rehabilitation Sciences Research Symposium, Northwestern University in Chicago, IL.
- 2015 Nagamori A, **Finley JM**, Valero-Cuevas FJ. The ability to dynamically regulate instabilities with the leg is susceptible to repetitive eccentric contractions. American Society for Biomechanics in Columbus, OH.
- 2015 **Finley JM**, Park S*. Coordinated modulation of dynamic stability and metabolic cost during split-belt adaptation. Neural Control of Movement in Charleston, SC.
- 2015 Mukherjee T* **Finley JM**. A comparison of techniques to quantify dynamic margins of stability during gait. USC School of Dentistry Research Day in Los Angeles, CA.
- 2015 Kim A*, Dorakjian N*, **Finley JM**. Immersive virtual reality: A feasibility test for individuals with Parkinson's disease. USC School of Dentistry Research Day in Los Angeles, CA.
- 2015 Nagamori A, Lawrence EL, **Finley JM**, Valero-Cuevas FJ. Eccentric contractions impede the ability of the leg to regulate dynamic instabilities. Neural Control of Movement in Charleston, SC.
- 2014 Lawrence EL, Nagamori A, Valero-Cuevas FJ, **Finley JM**. Prolonged Immobilization and Unloading Leads to Profound and Long-Lasting Changes in Spinal Excitability. Society for Neuroscience in Washington, D.C.
- 2014 Martinez CA, Bacon H, **Finley JM**, Schweighofer N, Winstein CJ. Can inertial sensors characterize treatment-induced skill acquisition in chronic stroke? Society for Neuroscience in Washington, D.C.
- 2014 **Finley JM**, Long A, Bastian AJ, Torres-Oviedo G. Spatial and Temporal Control Contribute to Step Length Asymmetry during Split-Belt Adaptation and Hemiparetic Gait. World Congress of Biomechanics in Boston, MA.
- 2013 **Finley JM**, Bastian AJ. How dysfunctional is gait asymmetry? Associations between metabolic cost and asymmetries in post-stroke walking. Society for Neuroscience in San Diego, CA.

- 2013 Long A, **Finley JM**, Bastian AJ. A marching-walking hybrid induces adaptation of step symmetry on a treadmill. Society for Neuroscience in San Diego, CA.
- 2013 **Finley JM**, Bastian AJ. Identifying the Principles Underlying the Motor Learning of New Walking Patterns. Summer School on Neurorehabilitation in Elche, Spain.
- 2012 **Finley JM**, Statton MA, Bastian AJ. A Novel Optic Flow Pattern Can Speed Locomotor Learning. Society for Neuroscience in New Orleans, LA.
- 2011 Jayaram G, **Finley JM**, Bastian AJ, Celnik P. Modulating Spinal Excitability with Direct Current Stimulation. Society for Neuroscience in Washington, D.C.
- 2011 Torres-Oviedo G, Bastian AJ, **Finley JM**. Motor Learning of Space and Time to Control Symmetry in Split-Belt Walking. Society for the Neural Control of Movement in San Juan, Puerto Rico.
- 2009 **Finley JM**, Dhaher YY, Perreault EJ. Acceleration Dependence and Task-Specific Modulation of the Soleus Long Latency Stretch Reflex. Society for Neuroscience in Chicago, IL.
- 2008 Trumbower RD, **Finley JM**, Shemmell J, Perreault EJ. Reduced Regulation of Long-Latency Stretch Responses Following Stroke. Society for Neuroscience in Washington, D.C.
- 2006 **Finley JM**, Perreault EJ, Dhaher YY. Heteronymous Reflex Contributions to Circumduction in Stroke. Society for Neuroscience in Atlanta, GA.

GRANTS AND/OR CONTRACTS AWARDED:

EXTERNAL GRANTS (FEDERAL/CORPORATE/FOUNDATION FUNDING):

Principal Investigator:

08/2018 – 05/2022 **National Institute of Child Health and Human Development (NIH/NICHD)**
Award: R01 HD091184
Title: Toward a mechanistic understanding of optimization principles underlying hemiparetic gait
Role: Principal Investigator
Percentage of Effort: 17%
Funding: Direct Costs: \$923,500 (Total Costs: \$1,523,774)
Overall Aims: This project seeks to identify how walking impairments in stroke survivors contribute to mobility deficits through the use of behavioral observations and computational models.

- 09/2016 – 08/2019 **National Institute of Child Health and Human Development (NIH/NICHD) (No Cost Extension)**
Award: R21 HD088342-01
Title: Design and development of a mixed reality system for skilled locomotor training in individuals with Parkinson's disease
Role: Principal Investigator
Percent of Effort: 17%
Funding: Direct Costs: \$275,000 (Total Costs: \$453,750)
Overall Aims: The primary objective of this project was to develop and test a virtual-reality-based training system that allows individuals with PD to practice all the advanced walking skills necessary for independence in the community.
- 07/2016 – 06/2018 **American Heart Association Innovative Research Grant (No Cost Extension)**
Award: 17IRG33420045
Title: Transcutaneous electrical stimulation for locomotor ability post-stroke (TESLA-Stroke)
Role: Principal Investigator
Percent of Effort: 10%
Funding: Direct Costs: \$138,645 (Total Costs: \$150,000)
Overall Aims: The goal of this grant was to study the use of non-invasive, transcutaneous electrical spinal stimulation to improve stroke survivors' walking ability.

Project Principal Investigator:

- 10/2013 – 09/2015 **National Institute of Child Health and Human Development (NIH/NICHD)**
Award: K12 HD073945
Parent Grant Title: Engineering Career Development Center in Movement and Rehabilitation Sciences
Project Title: Elucidating interactions between energetics and stability during human locomotor learning
Role: Project PI (Parent Grant PIs: J. Dewald and D. Reinkensmeyer)
Percent of Effort: 75%
Funding: Direct Costs: \$250,000 (Total Costs: \$270,000)
Overall Aims: The goal of this project was to determine how balance and metabolic energy use interact to influence the learning of new walking patterns.

Sponsor:

- 07/2018 – 06/2019 **Link Foundation**
Award: Fellowship in Modeling, Simulation, and Training

Title: Using immersive virtual reality to assess context-dependency of locomotor skill learning in people with Parkinson's disease
Role: Sponsor (PI: A. Kim, MS)
Funding: Direct Costs: \$29,000 (Total Costs: \$29,000)
Overall Aims: The goal of this project was to assess the influence of Parkinson's disease on locomotor skill learning using immersive virtual reality.

07/2016 – 06/2018 **American Heart Association**
Award: Postdoctoral Fellowship
Title: Is asymmetry optimal? Characterization of individual differences in the metabolic cost of asymmetry post-stroke
Role: Sponsor (PI: N. Sánchez, PhD)
Funding: Direct Costs: \$98,950 (Total Costs: \$98,950)
Overall Aims: The primary objective of this project was to understand how short-term, biofeedback-based interventions aimed at improving walking symmetry affects the energy cost of walking in people post-stroke.

INTERNAL GRANTS (UNIVERSITY FUNDING):

Principal Investigator:

07/2020 – 06/2021 **USC Office of Undergraduate Programs**
Award: Undergraduate Research Associates Program
Title: USC SMART-VR Rehabilitation XR - Lab Rotations for Undergraduates
Role: Co-Principal Investigator
Funding: \$2,000
Overall Aims: The purpose of this project is to support undergraduate research assistants who will participate in clinical feasibility assessments of virtual reality applications for rehabilitation.

06/2019-05/2020 **Southern California Clinical and Translational Science Institute (SC CTSI)**
Award: SC CTSI Voucher
Title: Pragmatic Usability Evaluation of the iMOVE-PD Training System
Role: Principal Investigator
Funding: Total Costs: \$3,000
Overall Aims: The overall aim of this project was to evaluate the usability of the iMOVE-PD virtual reality mobility training system with physical therapists and their patients with Parkinson's disease.

07/2018 – 06/2019 **Southern California Clinical and Translational Science Institute (SC CTSI)**
Award: Clinical and Community Research Pilot Award

Title: Clinical and behavioral assessment of fall risk during walking in people post-stroke

Role: Principal Investigator

Funding: Total Costs: \$40,000

Overall Aims: The aims of this pilot study are to: 1) establish the validity of an objective biomechanical assessment of fall risk that directly measures a patient's ability to recover from a loss of balance; 2) determine which patient-specific physical and psychological factors are associated with measures of fall risk; and 3) determine if shifting a patient's walking pattern toward the typical pattern observed in healthy individuals leads to improvements in balance.

11/2017 – 10/2018

USC Division of Biokinesiology and Physical Therapy

Award: Faculty Seed Grant

Title: USC SensoriMotor Assessment and Rehabilitation Training in Virtual Reality Center (USC SMART-VR Center)

Role: Principal Investigator

Funding: Total Costs: \$15,000

Overall Aims: The aims during the first year of this Center were to develop an infrastructure to facilitate cross-campus collaborations, speed the development of health-related VR prototypes, and host the first university-wide symposium for Virtual Technologies for Health.

09/2015 – 08/2016

USC James H. Zumberge Faculty Research and Innovation Fund

Award: Individual Research Award

Title: Elucidation of the neuromechanical factors underlying the adaptive control of locomotion

Role: Principal Investigator

Funding: Total Costs: \$30,000

Overall Aims: The primary objective of this project was to combine biomechanical simulations and novel functional neuroimaging approaches to elucidate the mechanisms underlying adaptive locomotor learning.

09/2015 – 08/2016

USC Office of Undergraduate Programs

Award: Undergraduate Research Associates Program

Title: Development of a virtual reality training system to improve skilled walking ability in stroke survivors and individuals with Parkinson's disease

Role: Principal Investigator

Funding: \$3,200

Overall Aims: This project supported two undergraduate researchers who assisted with the development of a virtual reality-based training system to train walking, turning while walking, obstacle avoidance, and dual-tasking ability in individuals with Parkinson's disease.

Co-Principal Investigator:

- 09/2019 – 08/2022 **USC Research Collaboration Fund Award**
Title: USC SensoriMotor Assessment and Rehabilitation Training in Virtual Reality Center (USC SMART-VR Center)
Role: Co-Principal Investigator
Funding: Total Costs: \$90,000
Overall Aims: The mission of this interdisciplinary center of excellence is to harness cutting-edge advances in virtual reality to improve motor and cognitive function across multiple clinical populations (e.g., stroke, Alzheimer's disease, Parkinson's disease).
- 09/2019 – 08/2022 **USC Research Collaboration Fund Award**
Title: Metaplasticity and megaplasticity: Changing the brain from synapse to community
Role: Co-Principal Investigator
Funding: Total Costs: \$90,000
Overall Aims: The objective of this project is to establish collaboration and cross-talk between the fields of science and the arts spanning the Keck School of Medicine and the Dornsife College of Letters Arts and Sciences to gain novel perspectives towards understanding mechanisms of neuroplasticity critical for developing brain resilience in aging and disease.

IV. TEACHING AND MENTORING ACTIVITIES

COURSES DEVELOPED AND/OR PRESENTED:

University Courses Developed:

- 2015 – present **BKN 553: Experimental Methods for the Analysis of Human Movement**
 University of Southern California, Los Angeles, CA
 Division of Biokinesiology and Physical Therapy

University Courses Presented:

- 2018 – present **USC Neuroscience Graduate Program Programming Boot Camp**
 Co-Director
- 2018, 2019 **CSCI 548: Augmented, Virtual, and Mixed Reality**
 Lecture on Virtual Reality for Mobility Rehabilitation in Parkinson's disease
 USC Viterbi School of Engineering
- 2018 **Guided Readings on Central and Peripheral Sources of Fatigue in People Post-Stroke with Lindsey Trejo**
 University of Southern California, Los Angeles, CA

- Division of Biokinesiology and Physical Therapy
- 2017 – present **PT 583: Emerging Topics in Physical Therapy**
Lecture on Technological Advances for Neurological Rehabilitation
Division of Biokinesiology and Physical Therapy
- 2017 – present **NSCI 525: Advanced Overview of Neurosciences II**
Lecture on the Neural Control of Locomotion
USC Neuroscience Graduate Program
- 2017 **Guided Readings on the Role of Supplementary Motor Area in
Generating Anticipatory Postural Adjustments with Alaa Albishi**
University of Southern California, Los Angeles, CA
Division of Biokinesiology and Physical Therapy
- 2016 **IML 543: Transdisciplinary Media Design Practicum**
Lecture on the Neurobehavioral Basis of Locomotion
USC School of Cinematic Arts
- 2015 & 2016 **BME 414: Rehabilitation Engineering**
Lecture on Locomotor Control and Rehabilitation
USC Viterbi School of Engineering
- 2014 – present **BKN 550: Neurobehavioral Basis of Movement**
University of Southern California, Los Angeles, CA
Division of Biokinesiology and Physical Therapy
- 2014 **Guided Readings on Computational Principles of Motor Control
with Michael Rowley**
University of Southern California, Los Angeles, CA
Division of Biokinesiology and Physical Therapy
- 2014 **Guided Readings on Principles of Motor Learning with Ming-Shen
Chan**
University of Southern California, Los Angeles, CA
Division of Biokinesiology and Physical Therapy
- 2014 **Guided Readings on Applications of Virtual Reality for Gait
Rehabilitation with Tatri Mukerjee**
University of Southern California, Los Angeles, CA
Division of Biokinesiology and Physical Therapy
- 2009 **Teaching Assistant, Quantitative Experimentation and Design**
Northwestern University, Evanston, IL
Department of Biomedical Engineering

2008 **Instructor, Calculus II**
Northwestern University EXCEL Program, Evanston, IL

Workshops and Tutorials:

2019 BKN Survival Series Seminar on Scientific Communication
Division of Biokinesiology and Physical Therapy

2017 BKN Survival Series Seminar on Promoting Research Online
Division of Biokinesiology and Physical Therapy

2016 Workshop on Social Media for Scientists
Neural Control of Movement Conference in Montego Bay, Jamaica.

2016 Tutorial on Computational Models of Locomotion
European Computational Motor Control Summer School, Montpellier,
France

2014 & 2015 Tutorial on Neuromechanics
European Computational Motor Control Summer School, Montpellier,
France

2014 BKN Survival Series Seminar on Strategies for Searching the Scientific
Literature
University of Southern California, Los Angeles, CA
Division of Biokinesiology and Physical Therapy

GRADUATE STUDENTS AND POST-DOCTORAL SCHOLARS MENTORED:

Post-doctoral Scholars

2019 – present **Russell Johnson, Ph.D.** (Division of Biokinesiology and Physical
Therapy, USC)

2015 – 2019 **Natalia Sanchez, Ph.D.**
Current Position: Assistant Professor, Division of Biokinesiology and
Physical Therapy, University of Southern California
Awards:

- SC CTSI Mentored Career Development in Clinical and Translational
Science Award (2019 – 2022)
- Neural Control of Movement Diversity Travel Award (2018)
- American Heart Association Postdoctoral Fellowship (2016 – 2018)

Doctoral Students

2020 – present **Catherine Yunis*** (Department of Biomedical Engineering, USC)

*Co-advised by Dr. Heather Culbertson (Department of Computer Science, USC)

- 2020 – present **Ryan Novotny** (Neuroscience Graduate Program, USC)
- 2019 – present **Shreya Jain** (Division of Biokinesiology and Physical Therapy, USC)
- 2017 – present **Pouria Nozari** (Department of Biomedical Engineering, USC)
- 2016 – present **Aram Kim** (Division of Biokinesiology and Physical Therapy, USC)
Awards
- Link Foundation Modeling, Simulation, and Training Fellowship (2018-2019)
 - USC Division of Biokinesiology and Physical Therapy Travel Award (2018)
 - Progress in Clinical Motor Control Conference Travel Award (2018)
 - 1st place in the Biokinesiology Poster Competition during the School of Dentistry Research Day (2018)
 - 2nd place in the VRSC Student Festival Hackathon (2018)
- 2016 – present **Chang Liu** (Department of Biomedical Engineering, USC)
Awards:
- Runner-up for the ASME Bioengineering Division PhD Level Student Paper Competition for the World Congress of Biomechanics (2018)
 - Winner of the De Luca Foundation Student Travel Award for the World Congress of Biomechanics (2018)
- 2014 – 2019 **Sungwoo Park** (Division of Biokinesiology and Physical Therapy, USC)
Subsequent Position: Post-doctoral Fellow, Engineering and Applied Sciences, Harvard University, Cambridge, MA

Neurologic Physical Therapy Residents

- 2014 – 2015 **Nora Darakjian, DPT** (Division of Biokinesiology and Physical Therapy, USC)
Subsequent Position: Instructor of Clinical Physical Therapy, University of Southern California, Los Angeles, CA

Visiting Scholars

- 2019 **Tom Buurke** (Human Movement Sciences, University of Groningen)

DPT Student Researchers

- 2016 – 2017 **Kari Kretch, Ph.D.** (Division of Biokinesiology and Physical Therapy, USC)
Awards
- Helen Hislop Scholarship in Support of Vision & Excellence in Physical Therapy (2017)

Master's Students

- 2017 – 2018 **Lindsey Trejo** (Division of Biokinesiology and Physical Therapy, USC)
Subsequent Position: Ph.D. Student, Bioengineering Program, Georgia Institute of Technology, Atlanta, GA
- 2014 – 2016 **Aram Kim** (Division of Biokinesiology and Physical Therapy, USC)
Subsequent Position: Ph.D. Student, Division of Biokinesiology and Physical Therapy, University of Southern California, Los Angeles, CA
- 2014 – 2015 **Tatri Mukherjee** (Division of Biokinesiology and Physical Therapy, USC)
Subsequent Position: Physical Therapist, Health South Rehabilitation Hospital, Midland, TX

Undergraduate Researchers

- 2018 – 2019 **Camille Grandjean** (Department of Biomedical Engineering, USC)
- 2018 – 2019 **Noah Tristan** (Department of Biomedical Engineering, USC)
- 2018 **Sam Kushell** (Department of Computer Science, USC)
Subsequent Position: Undergraduate Student in Game Design, University of Southern California, Los Angeles, CA
- 2017 – 2018 **Nathan Lim** (Department of Computer Science, USC)
Subsequent Position: Game Developer, Niantic, Inc., Los Angeles, CA
- 2015 – 2017 **Zixuan Zhou** (Department of Aerospace and Mechanical Engineering)
Subsequent Position: Master of Science in Mechanical Engineering at Stanford University, Palo Alto, CA
Awards
- Recipient of Interdisciplinary Award at USC's Undergraduate Research Symposium (2016)
- 2016 **Lucas de Macêdo Pinheiro** (Control & Automation Engineering, Universidade de Brasilia)
Subsequent Position: Bachelor of Science in Control & Automation

Engineering, Universidade de Brasilia, Brasília, Brazil

- 2014 **Marco Lopez** (Division of Biokinesiology and Physical Therapy, USC)
Subsequent Position: Doctor of Physical Therapy Student, Division of Biokinesiology and Physical Therapy, University of Southern California, Los Angeles, CA
Awards
- USC Physical Therapy Multicultural Leadership Alliance Scholarship (2014)

Committee Member

Current

- 2020 – present **Malcolm Jones** (Division of Biokinesiology and Physical Therapy)
Advisor: Todd Schroeder
- 2019 – present **Julia Juliano** (Neuroscience Graduate Program)
Advisor: Sook-Lei Liew
Guidance Committee Chair
Member of Comprehensive Exam Committee (2019)
- 2019 – present **David Ortiz** (Division of Biokinesiology and Physical Therapy)
Advisor: Kornelia Kulig
- 2019 – present **Sara Almansouri** (Division of Biokinesiology and Physical Therapy)
Advisor: Susan Sigward
Member of Qualifying Exam Committee (2019)
- 2019 – present **Ali Marjaninejad** (Department of Biomedical Engineering)
Advisor: Francisco Valero-Cuevas
Member of Qualifying Exam Committee (2019)
- 2018 – present **Ise Flores** (Neuroscience Graduate Program)
Advisor: Michael Jakowec
Guidance Committee Chair
Member of Comprehensive Exam Committee (2019)
- 2017 – present **Jonathan Lee** (Division of Biokinesiology and Physical Therapy)
Advisor: Christopher Powers
Member of Qualifying Exam Committee (2017-2018)

Past

- 2017 – 2020 **Giovanni Sutanto** (Department of Computer Science)
Advisor: Gaurav Sukhatme
Member of Qualifying Exam Committee (2018)
Member of Dissertation Committee (2020)

- 2017 – 2020 **Akira Nagamori** (Division of Biokinesiology and Physical Therapy)
 Advisor: Francisco Valero-Cuevas
 Member of Qualifying Exam Committee (2018)
 Member of Dissertation Committee (2020)
- 2017 – 2019 **Alaa Albishi** (Division of Biokinesiology and Physical Therapy)
 Advisor: Beth Fisher
 Member of Qualifying Exam Committee (2017)
 Member of Dissertation Committee (2019)
- 2018 **Victor Barradas** (Department of Biomedical Engineering)
 Advisor: Nicolas Schweighofer
 Member of Qualifying Exam Committee (2018)
 PhD granted in 2019
- 2018 **Harry Su** (Department of Computer Science)
 Advisor: Stefan Schaal
 Member of Qualifying Exam Committee (2018)
 Member of Dissertation Committee (2018)
- 2017 – 2018 **Sean Mason** (Department of Computer Science)
 Advisor: Stefan Schaal
 Member of Qualifying Exam Committee (2017)
 Member of Dissertation Committee (2018)
- 2017 **Nick Rotella** (Department of Computer Science)
 Advisor: Stefan Schaal
 Member of Dissertation Committee (2017)
- 2016 – 2018 **Michael Rowley** (Division of Biokinesiology and Physical Therapy)
 Advisor: Kornelia Kulig
 Member of Qualifying Exam Committee (2016)
 Member of Dissertation Committee (2018)
- 2016 – 2018 **Ming-Shen Chan** (Division of Biokinesiology and Physical Therapy)
 Advisor: Susan Sigward
 Member of Qualifying Exam Committee (2016)
 Member of Dissertation Committee (2018)
- 2016 **Sujin Kim** (Division of Biokinesiology and Physical Therapy)
 Advisor: Nicolas Schweighofer
 Member of Dissertation Committee (2016)
- 2016 **Franziska Meier** (Department of Computer Science)
 Advisor: Stefan Schaal
 Member of Dissertation Committee (2016)
- 2015 – 2016 **Emily Lawrence** (Department of Biomedical Engineering)
 Advisor: Francisco Valero-Cuevas
 Member of Qualifying Exam Committee (2015)
 Member of Dissertation Committee (2016)
- 2014 – 2017 **Yu-Chen Chung** (Division of Biokinesiology and Physical Therapy)

Advisor: Beth Fisher
Member of Qualifying Exam Committee (2014)
Member of Dissertation Committee (2017)

2014 – 2016 **Nahyeon Ko** (Division of Biokinesiology and Physical Therapy)
Advisor: Francisco Valero-Cuevas
Member of Qualifying Exam Committee (2014)
Member of Dissertation Committee (2016)

DPT Students Mentored

2019 – present **Keairez Coleman, Michael Chung**
DPT Faculty Mentorship Program

2018 – present **Emily Coleman, Shannon Colleton**
DPT Faculty Mentorship Program

2017 – present **Christopher Floyd, Daniel Fox**
DPT Faculty Mentorship Program

2016 – 2019 **Katia Correa, Andrew Cole**
DPT Faculty Mentorship Program

2015 – 2018 **Kaylie Deng, Hieu Do**
DPT Faculty Mentorship Program

2014 – 2017 **Abbie Bell**
DPT Faculty Mentorship Program