Deanna H. Gates, Ph.D.

Associate Professor, Movement Science, Biomedical Engineering, and Robotics, University of Michigan
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EDUCATION

2005-2009 **Ph.D., Biomedical Engineering**, The University of Texas at Austin
Dissertation: “Changes in the control of movement timing and stability with muscle fatigue”
Committee: Jonathan Dingwell (advisor), H. Grady Rylander, Lisa Griffin, Ronald Barr, and J. Steven Moore

2002-2004 **M.S., Biomedical Engineering**, Boston University
Thesis: “Characterization of ankle function during stair ascent, descent and level walking for ankle prosthetic and orthotic design”, Committee: Paolo Bonato (advisor), Hugh Herr, Jim Collins, and Herbert Voigt

1998-2002 **B.S., Mechanical Engineering**, Minor in Biomedical Engineering, The University of Virginia
Thesis: “Porous Monolithic Sol-gel Columns for Capillary Electrochromatography”, Advisor: Pamela Norris

PROFESSIONAL EXPERIENCE

2023-pres Associate Professor, Dept. of Robotics, by courtesy, University Michigan
2018-pres Associate Professor, Dept. of Biomedical Engineering, by courtesy, University Michigan
2018-pres Associate Professor, Movement Science, School of Kinesiology, University of Michigan
2017-2022 Core Faculty, Robotics Institute, University of Michigan
2013-2018 Assistant Professor, Dept. of Biomedical Engineering, by courtesy, University of Michigan
2012-2018 Assistant Professor, Movement Science, School of Kinesiology, University of Michigan
2011-2012 Site Supervisor, Henry M. Jackson Foundation for Military Medicine, Brooke Army Medical Center, Fort Sam Houston, TX
2010-2012 Research Biomechanist, Center for the Intrepid, Fort Sam Houston, TX
2009-2010 Associate, Exponent Failure Analysis Associates, Phoenix, AZ
2005-2009 Graduate Research Assistant, Nonlinear Biodynamics Laboratory, U. Texas at Austin
2003-2005 Research Assistant, Motion Analysis Laboratory, Spaulding Rehab Hospital, Boston, MA

HONORS AND AWARDS

2022 School of Kinesiology Research Excellence Award, University of Michigan
2019 School of Kinesiology Research Excellence Award, University of Michigan
2018 Nominee, University of Michigan Golden Apple Award
2016 Finalist for Provost's Teaching Innovation Prize, “Scaling up engaged learning using flipped courses with shared learning goals", P. Bodary, S. Broglio, D. Gates, M. Gross, L. Robinson
2013-2015 Interdisciplinary Rehabilitation Engineering (IREK12) Scholar
2010 Best Presentation Award, Society of Automotive Engineers 2010 World Congress
2008-2009 The University of Texas Continuing Doctoral Fellowship
2007-2008 George J. Heur, Jr. Ph.D. Endowed Graduate Fellowship
2007 Best Student Presentation Award, Gait and Clinical Movement Analysis Society 2007 Meeting
2007 Graduate Engineering Council Student Travel Award
2007 Gait and Clinical Movement Analysis Society Travel Award
2006-2007 Student Grant-in-Aid from the American Society of Biomechanics
2006-2007 Temple Foundation Graduate Fellowship
2006 Professional Development Award from The University of Texas at Austin
2006 Women in Engineering Program Travel Scholarship
2005-2006 Agnes T. and Charles Wiebusch Fellowship
2002 Graduated with Distinction, University of Virginia, Charlottesville, VA
1998-2002 Robert C. Byrd Foundation Scholarship

PEER REVIEWED PUBLICATIONS (in reverse chronological order)
[a]Graduate student, [b]Postdoctoral fellow, [c]Undergraduate student, [d] Resident
J: Journal Article, P: Peer-Reviewed Conference Paper, C: Conference Presentation

Available via Google Scholar: *https://scholar.google.com/citations?user=5pEJBM0AAAAJ&hl=en*

Published

J69. Vu, P.P., Vaskov, A.K., Lee, C.[a], Jillala, R.R., Wallace, D.M., Davis, A.J., Kung, T., Kemp, S.W.P., **Gates, D.H.**, Chestek, C.A. and Cederna, P.S. (2023) "Long-term upper-extremity prosthetic control using Regenerative Peripheral Nerve Interfaces" *Journal of Neural Engineering,* 20(2): 026039. https://doi.org/10.1088/1741-2552/accb0c

J68. Nolasco, L.[a], Silverman, A.K., and **Gates, D.H.** (2023) Transtibial prosthetic alignment has small effects on whole-body angular momentum during functional tasks, *Journal of Biomechanics,* 149: 111485. https://doi.org/10.1016/j.jbiomech.2023.111485

J67. Roche AD, Bailey ZK, Gonzalez M[a], Vu, PP, Chestek, CA, **Gates, DH**, Kemp, SWP, Cederna, PS, Ortiz-Catalan, M., and Aszmann, O.C. (2023) Upper limb prostheses: bridging the sensory gap. *Journal of Hand Surgery (European Volume)*. 48(3):182-190. https://doi.org/10.1177/17531934221131756

J66. Shuman, B.R., Totah, D.[b], **Gates, D.H.**, Gao, F., Ries, A.J., and Russell Esposito, E. (2023) Comparison of five different methodologies for evaluating ankle foot orthosis stiffness, *Journal of NeuroEngineering and Rehabilitation*. 20:11. https://doi.org/10.1186/s12984-023-01126-7

J65. Lee, C.[a], Vaskov, A.K [b], Gonzalez, M.[a], Vu, P.P.[b], Davis, A.J., Cederna, P.S., Chestek, C.A., **Gates, D.H.** (2022) Use of regenerative peripheral nerve interfaces and intramuscular electrodes to improve prosthetic grasp selection: A case study," *Journal of Neural Engineering,* 19: 066010. https://doi.org/10.1088/1741-2552/ac9e1c

J64. Lee, C.[a], Gonzalez, M.[a], Kang, J.[b], and **Gates, D.H.** (2022) Temporal and spatial goal-directed reaching in upper limb prosthesis users, *Experimental Brain Research,* 240: 3011–3021. https://doi.org/10.1007/s00221-022-06476-7

J63. Vaskov, A.K.[a]. Vu, P.[b], North, N., Davis, A., Kung, T., **Gates, D.H.**, Cederna, C., and Chestek, C. (2022) Surgically implanted electrodes enable real-time finger and grasp pattern recognition for prosthetic hands, *IEEE Transactions on Robotics*, 35 (5): 2841-2857. https://doi.org/10.1109/TRO.2022.3170720

J62. Barr, E.A.[d], Ebbs, K., Wensman, J., Gutierrez, A., Rosenblatt, N.J., and **Gates, D.H.** (2022) "A survey of prosthetists' perspectives on adjustable-volume lower-limb prosthetic sockets," *Journal of Prosthetics and Orthotics*, 34 (4): 233-240. https://doi.org/10.1097/JPO.0000000000000376

J61. Gonzalez, M.[a], Bismuth, A.[c], Lee, C.[a], Chestek, C.A., and **Gates, D.H.** (2022) Artificial referred sensation in upper and lower limb prosthesis users: a systematic review," *Journal of Neural Engineering*, 19(5): 051001. https://doi.org/10.1088/1741-2552/ac8c38

J60. Ou, H., **Gates, D.H.**, Johnson, S., Djurdjanovic, D. (2022) "Model-based fusion of surface electromyography with kinematic and kinetic measurements for monitoring of muscle fatigue," *International Journal of Prognostics and Health Management,* 13(2). https://doi.org/10.36001/ijphm.2022.v13i2.3132

J59. Engdahl, S.M.[a], Lee, C.[a], and **Gates, D.H.** (2022) "A comparison of compensatory movements between body-powered and myoelectric prosthesis users during activities of daily living," *Clinical Biomechanics,* 97: 105713. https://doi.org/10.1016/j.clinbiomech.2022.105713

J58. Vu, P.[b], Lu, C.[a], Vaskov, A.K.[a], **Gates, D.H.**, Gillespie, R.B., Kemp, S.W.P., Chestek, C.A., Cederna, P., and Kung, T.A. (2022) "Restoration of proprioceptive and cutaneous sensation using Regenerative

Peripheral Nerve Interfaces (RPNIs) in humans with upper-limb amputations," *Plastic and Reconstructive Surgery*, 149 (6): 1149e-1154e. https://doi.org/10.1097/PRS.0000000000009153

J57. Lee, C.[a], Engdahl, S.M.[a], Riegger, A.[c], Davis, A., Kelly, B.M, and **Gates, D.H.** (2022) "Employment status in individuals with upper limb amputation: A survey of current trends," *Journal of Prosthetics and Orthotics*, 34(2): 79-88. https://doi.org/10.1097/JPO.0000000000000366

J56. Gonzalez, M.[a], Lee, C.[a], Kang, J.[b], Gillespie, B., and **Gates, DH**. (2021) "Getting a grip on the impact of incidental feedback from body-powered and myoelectric prostheses" *IEEE Transactions on Neural Systems and Rehabilitation Engineering,* 1905-1912*.* https://doi.org/10.1109/TNSRE.2021.3111741

J55. Kim, J.[a], Gardinier, E.S.[b], Vempala, V.[a], and **Gates, D.H.** (2021) "The effect of powered ankle prostheses on muscle activity during walking," *Journal of Biomechanics,* 124: 110573. https://doi.org/10.1016/j.jbiomech.2021.110573

J54. **Gates, D.H.**, Engdahl, S.M., and Davis, A. (2021) "Recommendations for the successful implementation of upper limb prosthetic technology," *Hand Clinics* 37 (3): 457-466. https://doi.org/10.1016/j.hcl.2021.05.007.

J53. Totah, D.[a], Menon, M.[c], **Gates, D.H.** and Barton, K. (2021) "Design and evaluation of the SMApp: a Stiffness Measurement Apparatus for Ankle-Foot Orthoses," *Mechatronics,* 77: 102572. https://doi.org/10.1016/j.mechatronics.2021.102572

J52. Totah, D.[a], Barton, K., and **Gates, D.H.** (2021) "The effect of rotational speed on ankle-foot orthosis stiffness," *Journal of Biomechanics,* 123: 110483. https://doi.org/10.1016/j.jbiomech.2021.110483

J51. Nolasco, L.A.[a], Livingston, J.[c], Silverman, A.K. and **Gates, D.H.** (2021) "The ins and outs of dynamic balance during 90-degree turns in people with a unilateral transtibial amputation." *Journal of Biomechanics,* 122: 110438. https://doi.org/10.1016/j.jbiomech.2021.110438

J50. Engdahl, S.M.[a] and **Gates, D.H.** (2021) "Differences in quality of movements made with body-powered and myoelectric prostheses during activities of daily living" *Clinical Biomechanics*, 84: 105311. https://doi.org/10.1016/j.clinbiomech.2021.105311

J49. Kim, J.[a], Wensman, J., Colabianchi, N., and **Gates, D.H.** (2021) "The Influence of powered prostheses on user perspectives, metabolics, and activity: a randomized crossover trial," *Journal of NeuroEngineering and Rehabilitation,* 18, 49. https://doi.org/10.1186/s12984-021-00842-2

J48. Honegger, J.D.[a], Actis, J.A.[a], **Gates, D.H.,** Silverman, A.K., Munson, A.H., and Petrella, A.J. (2020) "Development of a multiscale model of the human lumbar spine for investigation of participant-specific tissue loads during sit-to-stand", *Biomechanics and Modeling in Mechanobiology,* 20: 39–358. https://doi.org/10.1007/s10237-020-01389-2

J47. Engdahl, S.M.[a], Meehan, S., and **Gates, D.H.** (2020) "Differential experiences of embodiment between body-powered and myoelectric prosthesis users" *Scientific Reports,* 10:15471. https://doi.org/10.1038/s41598-020-72470-0

J46. Nolasco, L.[a], Morgenroth, D., Silverman, A.K. and **Gates, D.H.** (2020) "Effects of anterior-posterior shifts in prosthetic alignment on the sit-to-stand movement in people with a unilateral transtibial amputation" *Journal of Biomechanics*, 109: 09926. https://doi.org/10.1016/j.jbiomech.2020.109926

J45. Kim, J.[a], Colabianchi, N., Wensman, J., and **Gates, D.H.** (2020) "Wearable sensors quantify mobility in people with lower limb amputation during daily life," *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 28(6): 1282-1291. https://doi.org/0.1109/TNSRE.2020.2990824

J44. Vu, P.[a], Vaskov, A.[a], Irwin, Z.[a], Henning, T., Leuders, D., Laidlaw, A.T., Davis, A.J., Nu, C.[a], **Gates, D.H.,** Gillespie, R.B., Kemp, S.W, Kung, T.A., Chestek, C.A., Cederna, P.S. (2020) "A regenerative peripheral nerve interface allows real-time control of an artificial hand in upper limb amputees" *Science Translational Medicine,* 12(533): eaay2857. http://doi.org/10.1126/scitranslmed.aay2857

J43. Wagner, K.[a], Nolasco, L.[a], Morgenroth, D., **Gates, D.H.,** and Silverman, A.K. (2020) "Effect of lower-limb prosthetic alignment on muscle activity during sit-to-stand" *Journal of Electromyography and Kinesiology*. 51: 102398. https://doi.org/10.1016/j.jelekin.2020.102398

J42. Gonzalez, M.[a], **Gates, D.H.**, and Rosenblatt, N. (2020) "The impact of obesity on gait stability in older adults" *Journal of Biomechanics*, 100: 109585. https://doi.org/10.1016/j.jbiomech.2019.109585

J41. Zheng, J.[d], Davis, A. Kalpajikan, C., Larraga, M.[c], Chestek, C. and **Gates, D.H.** (2019) "Priorities for the design and control of upper limb prostheses: A focus group study" *Disability and Health* 12(4): 706-711. https://doi.org/10.1016/j.dhjo.2019.03.009

J40. Engdahl, S.M.[a] and **Gates, D.H.** (2019) "Reliability of upper limb movement quality metrics during everyday tasks" *Gait & Posture* 71: 253-260. https://doi.org/10.1016/j.gaitpost.2019.04.023.

J39. Nolasco, L.[a], Silverman, A.K., and **Gates, D.H.** (2019) "Whole body and segment angular momentum during 90-degree turns" *Gait & Posture.* 70: 12-19. https://doi.org/10.1016/j.gaitpost.2019.02.003

J38. Totah, D.[a], Menon, M.[c], Jones-Hershinow, C.[a], Barton, K., and **Gates, D.H.** (2019) "The impact of ankle-foot orthosis stiffness on gait: A systematic literature review" *Gait & Posture* 69: 101-111. https://doi.org/10.1016/j.gaitpost.2019.01.020

J37. Kang, J.[b], Gonzalez, M.[a], Gillespie, R.B., and **Gates, D.H.** (2019) "A haptic object to quantify the effect of feedback modality on prosthetic grasping" *IEEE Robotics and Automation Letters* 4(2): 1101-1108. https://doi.org/10.1109/LRA.2019.2894388

J36. Lapointe, A.[a], Nolasco, L.[a], Sosnowski, A.[c], Andrews, E.[c], Martini, D.N.[a], Palmieri-Smith, R., **Gates, D.H**., and Broglio, S.P. (2018) "Kinematic differences during a jump cut maneuver in people with and without a concussion history" *International Journal of Psychophysiology* 132 (Pt A): 93-98. https://doi.org/10.1016/j.ijpsycho.2017.08.003

J35. Ingraham, K.[a], Choi, H.[b], Gardinier, E.S.[b], Remy, C.D. and **Gates, D.H.** (2018) "Choosing appropriate prosthetic ankle power to reduce the energetic cost of individuals with transtibial amputation" *Scientific Reports* 8: 15303. http://doi.org/10.1038/s41598-018-33569-7

[Began Associate Professor Position at University of Michigan – Fall 2018]

J34. Cowley, J.C.[a] and **Gates, D.H.** (2018) "Influence of remote pain on movement control and muscle endurance during repetitive movements" *Experimental Brain Research* 236(8): 2309-2319. https://doi.org/10.1007/s00221-018-5303-6

J33. Actis, J.A.[a], Nolasco, L.[a], **Gates, D.H.,** and Silverman, A.K. (2018) "Lumbar loads and trunk kinematics in people with a transtibial amputation during sit-to-stand" *Journal of Biomechanics* 69(1): 1-9. http://dx.doi.org/10.1016/j.jbiomech.2017.12.030

J32. Actis, J.A.[a], Honegger, J.D.[a], **Gates, D.H.**, Petrella, A., Nolasco, L.[a] and Silverman, A.K. (2018) "Validation of lumbar spine loading from a musculoskeletal model including the lower limbs and spine" *Journal of* Biomechanics 68: 107-114. http://dx.doi.org/10.1016/j.jbiomech.2017.12.001

J31. Gardinier, E.S.[b], Wensman, J., Kelly, B.M. and **Gates, D.H.** (2018) "A controlled clinical trial of a clinically-tuned powered ankle prosthesis in people with transtibial amputation" *Clinical Rehabilitation* 32(3): 319-329. https://doi.org/10.1177/0269215517723054

J30. Totah, D.[a], Ojeda, L., Johnson, D.D., **Gates, D.H**., Mower Provost, E., and Barton, K. (2018) "Low – back electromyography (EMG) data-driven load classification for lifting tasks" *PloS ONE* 13(2): e0192938. https://doi.org/10.1371/journal.pone.0192938

J29. Engdahl, S.M.[a] and **Gates, D.H.** (2018) "Reliability of upper limb and trunk joint angles in healthy adults during activities of daily living" *Gait & Posture*. 60, 41-47. https://doi.org/10.1016/j.gaitpost.2017.11.001

J28. Cowley, J.C.[a] and **Gates, D.H.** (2017) “Inter-joint coordination changes during and after muscle fatigue” *Human Movement Science* 56 Part B, 109-118. https://doi.org/10.1016/j.humov.2017.10.015

J27. Engdahl, S.M.[a], Chestek, C., Kelly, B., Davis, A., and **Gates, D.H.** (2017) “Factors associated with interest in novel interfaces for upper limb prosthetic control” *PLoS ONE* 12(8): e0182482. https://doi.org/10.1371/journal.pone.0182482

J26. Cowley, J.C.[a], Leonardis, J.[a], Lipps, D., **Gates, D.H.** (2017) “The Influence of wrist posture, grip type and grip force on median nerve shape and cross-sectional area” *Clinical Anatomy* 30(4): 470-478. (PMID #28281294). https://doi.org/10.1002/ca.22871

J25. Cowley, J.C.[a] and **Gates, D.H.** (2017) “Proximal and distal muscle fatigue differentially affect coordination” *PLoS ONE.* 12(2): e0172835. https://doi.org/10.1371/journal.pone.0172835

J24. Koller, J.[a], **Gates, D.H.**, Ferris, D., Remy, C.D. (2017) “Confidence in the curve: establishing instantaneous cost mapping techniques using bilateral ankle exoskeletons" *Journal of Applied Physiology.* 122(2): 242-252. https://doi.org/10.1152/japplphysiol.00710.2016

J23. Cowley, J.C.[a], Resnik, L., Wilken, J.M., Smurr Walters, L, and **Gates, D.H.** (2017) “Movement quality of conventional prostheses and the DEKA arm during everyday tasks” *Prosthetics Orthotics International,* (Mar) 1-8. https://doi.org/10.1177/0309364616631348

J22. Davidson, A.[c], Gardinier, E.S.[b], **Gates, D.H.** (2016) “Within and between day reliability of energetic cost measures during treadmill walking” *Cogent Engineering.* 3(1): 1251028. https://doi.org/10.1080/23311916.2016.1251028

J21. Martini, D.[a], Goulet, G.C., **Gates, D.H.**, Broglio, S.P. (2016) “Long-term effects of adolescent concussion history on gait, across age” *Gait & Posture*, 49: 264-270.

J20. Musselman, M.[a], **Gates, D.H**, and Djurdjanovic, D. (2016) “A system-based approach to monitoring the neuromusculoskeletal system” *International Journal of Prognostics and Health Management*, 7(2):1-14.

J19. **Gates, D.H.**, Smurr Walters, L., Cowley, J.C.[a], Wilken, J.M., and Resnik, L. (2016) “Range of motion requirements for upper limb activities of daily living,” *American Journal of Occupational Therapy,* 70(1): 1-10. https://doi.org/10.5014/ajot.2016.015487

J18. Engdahl, S.[a], Christie, B.[c], Kelly, B., Davis, A., Chestek, C. and **Gates, D.H.** (2015) “Surveying the interest of individuals with upper limb loss in novel prosthetic control techniques” *Journal of Neuroengineering and Rehabilitation,* 12:53. https://doi.org/10.1186/s12984-015-0044-2

J17. Cowley, J.C.[a], Dingwell, J.B., and **Gates, D.H.** (2014) “Effects of local and widespread muscle fatigue on movement timing,” *Experimental Brain Research*. 232: 3939-48.

J16. Sturdy, J., **Gates, D.H.**, Darter, B.J., Wilken, J.M. (2014) “Assessing preparative gait adaptations in persons with transtibial amputation in response to repeated medial-lateral perturbations,” *Gait & Posture* 39: 995-998.

J15. **Gates, D.H.**, Aldridge, J.M., Wilken, J.M. (2013) “Kinematic comparison of walking on uneven ground using powered and unpowered prostheses.” *Clinical Biomechanics* 28: 467-472.

J14. **Gates, D.H.**, Scott, S.J., Wilken, J.M., Dingwell, J.B. (2013) “Frontal plane dynamic margins of stability of individuals with and without transtibial amputation walking on a loose rock surface” *Gait & Posture.* 38: 570-575.

[Began Assistant Professor Position at University of Michigan – Fall 2012]

J13. **Gates, D.H.**, Wilken, J.M., Scott, S.J., Sinitski, E.H., Dingwell, J.B. (2012) “Kinematic strategies when walking across a destabilizing rock surface,” *Gait & Posture,* 35(1): 36-42.

J12. **Gates, D.H.**, Dingwell, J.B., Scott, S.J., Sinitski, E.H., Wilken, J.M. (2012) "Gait characteristic of individuals with transtibial amputations walking on a destabilizing rock surface" *Gait & Posture,* 36: 33-39.

J11. **Gates, D.H.**, Darter, B.J., Dingwell, J.B., Wilken, J.M. (2012) "Comparison of walking overground and in Computer Assisted Rehabilitation Environment (CAREN) in individuals with and without transtibial amputations" *Journal of NeuroEngineering and Rehabilitation* 9:81.

J10. **Gates, D.H.** and Dingwell, J.B. (2011) "The effects of muscle fatigue and movement height on movement stability and variability." *Experimental Brain Research.* 209(4): 525-36.

J9. Segala, D, **Gates, D.H.**, Dingwell, J.B., Chelidze, D (2011) "Nonlinear smooth orthogonal decomposition of kinematic features of sawing reconstructs muscle fatigue evolution as indicated by electromyography." *Journal of Biomechanical Engineering* 133(3): 031009.

J8. Lam, T., and **Gates, D.H.** (2010) "Repeated impacts on a motorcycle helmet: What happens after a significant impact?" Technical Paper # 2010-01-1016, *SAE Technical Papers*.

J7. **Gates, D.H.**, Bridges, A., Welch, T.D.J., Lam, T., Scher, I., Yamaguchi, G.T. (2010) "Lumbar loads in low to moderate speed rear impacts." Technical Paper #2010-01-0141, *SAE Technical Papers*.

J6. Welch, T., Bridges, A, **Gates, D**, Heller, M, Stillman D, Raasch, C, Carhart, M (2010) "An evaluation of the BioRID II and Hybrid III during low- and moderate-speed rear impact." *SAE International Journal on Passenger Cars – Mechanical Systems.* 3(1): 704-33.

J5. **Gates, D.H.** and Dingwell, J.B. (2010) "Muscle fatigue does not lead to increased instability of upper extremity repetitive movements." *Journal of Biomechanics*. 43(5): 913-919.

J4. **Gates, D.H.** and Dingwell, J.B. (2009) "Comparison of different state space definitions for local dynamic stability analyses." *Journal of Biomechanics.* 42 (9): 1345-1349.

J3. **Gates, D.H.** and Dingwell, J.B. (2008) "The effects of neuromuscular fatigue on task performance during repetitive goal-directed movements." *Experimental Brain Research*, 187 (4): 573-585.

J2. **Gates, D.H.**, Su, J.L. and Dingwell, J.B. (2007) "Possible biomechanical origins of the long-range correlations in stride intervals of walking." *Physica A,* 380: 259-270*.*

J1. **Gates, D.H.** and Dingwell, J.B. (2007) "Peripheral neuropathy does not alter the fractal dynamics of stride intervals of gait." *Journal of Applied Physiology*, 102 (3): 965-971.

PEER REVIEWED FULL PAPERS PUBLISHED IN CONFERENCE PROCEEDINGS:

P5. Gonzalez, M.[a], Vu, P.[b], Vaskov, A.[b], Cederna, P., Chestek, C., and **Gates, D.H.** "Characterizing sensory thresholds and intensity sensitivity of Regenerative Peripheral Nerve Interfaces: A Case Study" *2022 IEEE 17th International Conference on Rehabilitation Robotics (ICORR)*, Rotterdam, The Netherlands, July 25-29, 2022.

P4. Mussleman, M., **Gates, D.H.**, Djurdjanovic, D. (2017) "System based monitoring of neuromusculoskeletal system using divide and conquer type models" *2017 IEEE Aerospace Conference*, Big Sky, MT, Mar 4-11, 2017 (12 pgs.) doi: 10.1109/AERO.2017.7943769.

P3. Koller, J.[a], **Gates, D.H.**, Ferris, D., Remy, C.D. (2016) " 'Body-in-the-Loop' Optimization of Assistive Robotic Devices: A Validation Study" *Proceedings of Robotics: Science and Systems,* Ann Arbor, MI, June 18-22, 2016. (10 pgs.) doi: 10.15607/RSS.2016.XII.007.

P2. Segala, D.B., Chelidze, D., **Gates, D.H**., and Dingwell, J.B. (2010) "Linear and Nonlinear Smooth Orthogonal Decomposition to Reconstruct Local Fatigue Dynamics: A Comparison," Paper # DETC2010-28852, *Proceedings of the 2010 ASME International Design Engineering Technical Conferences (IDETC) and Computers and Information in Engineering Conference (CIE)*, Montréal, Canada, Aug. 15 – 18, 2010. (8 pgs.).

P1. Segala, D.B., Chelidze, D., **Gates, D.H.**, and Dingwell, J.B. (2009) "Dynamical Analysis of Sawing Motion Tracks Muscle Fatigue Evolution," Paper# DETC2009/VIB-87823, *Proceedings of the 23rd Biennial Conference on Mechanical Vibrations and Noise, 2009 ASME International Design Engineering Technical Conferences,* San Diego, CA, Aug. 30 – Sept. 2, 2009. (7 pgs.).

BRIEF (<4 PG) PEER REVIEWED REPORTS PUBLISHED IN CONFERENCE PROCEEDINGS

A3. O'Keeffe D.T., **Gates D.H.**, Bonato P, A wearable pelvic sensor design for drop foot treatment in post-stroke patients. *Conference Proceedings of the IEEE Engineering in Medicine and Biology Society*, 2007; 1820-3.

A2. Aiello E, **Gates D.H.**, Patritti B.L., Cairns K.D., Meister M, Clancy E.A., Bonato P, Visual EMG biofeedback to improve ankle function in hemiparetic gait. *Conference Proceedings of the IEEE Engineering in Medicine and Biology Society*, 2005; 7: 7703-6.

A1. **Gates D.H.**, Lelas J, Della Croce U, Herr H, Bonato P, Characterization of ankle function during stair ambulation. *Conference Proceedings of the IEEE Engineering in Medicine and Biology Society*, 2004; 6: 4248-51.

PUBLISHED DATASETS

D1. Kim, J.[a], Colabianchi, N., Wensman, J., and **Gates, D.H.** (2020) "IMU and accelerometer data from people with lower limb amputation during daily life," *IEEE Dataport [online].* http://dx.doi.org/10.21227/c7yj-0203

CONFERENCE PRESENTATIONS

C116. **Gates, D.H.**, Wensman, J., Gutierrez, T., Avalos, M., and Rosenblatt, N.J., A Randomized Clinical Trial of Adjustable Volume Transfemoral Prosthetic Sockets, 2023 Military Health System Research Symposium (MHSRS), Orlando, FL, Aug 14-17, 2023.

C115. Vaskov, A. et al. "Long-term Reliable Prosthetic Hand and Wrist Control Using Regenerative Peripheral Nerve Interfaces (RPNIs) And Implanted Electrodes" 68th Annual Meeting of the Plastic Surgery Research Council, Cleveland, OH, April 13-16, 2023.

C114. Johansson, JL, Boxer, B., Keough, K., Park, S., Lawrence, K., Farrell, T.R., Perrin, K.[a], Nwokeabia, C.[a], Nolasco, L.[b], and **Gates, D.H.,** Design and testing of the CAESAR Foot: A Hybrid Run Walk

Prosthesis, American Academy of Orthotists and Prosthetists (AAOP) 49th Academy Meeting and Scientific Symposium, Nashville, TN March 1-4, 2023.

C113. **Gates, D.H.,** Nolasco, L.[b], Wensman, J., Gutierrez, T., Avalos, M., and Rosenblatt, N., Preliminary findings of a clinical trial comparing adjustable transfemoral prosthetic sockets, American Academy of Orthotists and Prosthetists (AAOP) 49th Academy Meeting and Scientific Symposium, Nashville, TN March 1-4, 2023.

C112. Perrin, K.[a], Nolasco, L.[b], Nwokeabia, C.[a], Johansson, JL, Boxer, B., Keough, K., Park, S., Lawrence, K., Farrell, T.R., and **Gates, D.H.** Ground reaction forces during running and walking with a bimodal run/walk ankle prosthesis, American Academy of Orthotists and Prosthetists (AAOP) 49th Academy Meeting and Scientific Symposium, Nashville, TN March 1-4, 2023.

C111. Nolasco, L.[b], Wensman, J., Gutierrez, T., Rosenblatt, N., Avalos, M., and **Gates, D.H.** Preliminary findings of a clinical trial comparing adjustable transfemoral prosthetic sockets. American Orthotics and Prosthetic Association (AOPA) 2022 National Assembly, San Antonio, TX, Sept 28-Oct 1, 2022.

C110. Johansson, JL, Boxer, B., Keough, K., Park, S., Lawrence, K., Farrell, T.R., Perrin, K.[a], Nwokeabia, C.[a], Nolasco, L.[b], and **Gates, D.H.** Design and testing of the CAESAR Foot: A Hybrid Run Walk Prosthesis, American Orthotics and Prosthetic Association (AOPA) 2022 National Assembly, San Antonio, TX, Sept 28-Oct 1, 2022. ****Thranhardt Award Winner****

C109. Gonzalez, M.[a], Vu, P.[b], Vaskov, A.[b], Cederna, P., Chestek, C., and **Gates, D.H.** "Characterizing sensory thresholds and intensity sensitivity of Regenerative Peripheral Nerve Interfaces: A Case Study" IEEE 17th International Conference on Rehabilitation Robotics (ICORR), Rotterdam, The Netherlands. July 25-29, 2022.

C108. Nolasco, L.[a], Silverman, A.K., and **Gates, D.H.** Effects of prosthetic leg length on hip joint contact forces during sit-to-stand. American Academy of Orthotics and Prosthetics (AAOP), Atlanta, GA. March 2-5, 2022.

C107. Lee, C.[a], Vaskov, AK.[a], Gonzalez, MA.[a], Davis, A.J., Chestek, C.A., **Gates, D.H.** A novel assessment of multi-grasp prosthetic control. American Academy of Orthotics and Prosthetics (AAOP), Atlanta, GA. March 2-5, 2022.

C106. Lee, C.[a], Engdahl, S.M[a]., **Gates, D.H**. Compensatory movements in body-powered and myoelectric prosthesis users during activities of daily living. American Academy of Orthotics and Prosthetics (AAOP), Atlanta, GA. March 2-5, 2022.

C105. Lee, C.[a], Vaskov, A .[a], Vu, P.[b], Davis, A., Cederna, P., Chestek C., and **Gates, D.H.** Evaluating cognitive effort associated with prosthetic grip selection using intramuscular electrodes and regenerative peripheral nerve interfaces. American Society for Peripheral Nerve Annual Meeting, Carlsbad, CA. Jan 14-16 2022.

C104. Lee, C.[a], Vaskov, A.[a], Vu, P.[b], Davis, A., Cedera, P., Chestek, C., and **Gates, D.H.** Intramuscular electrodes and regenerative peripheral nerve interfaces can reduce cognitive effort during prosthetic grip selection, International Society of Prosthetics and Orthotics (ISPO) 18th World Congress, virtual, Nov 1-4, 2021.

C103. **Gates, D.H.**, Barr, E.A.[d], Ebbs, K., Wensman, J., Gutierrez, A.R., and Rosenblatt, N.J. A survey of prosthetists' perspectives on adjustable-volume lower-limb prosthetic sockets, International Society of Prosthetics and Orthotics (ISPO) 18th World Congress, virtual, Nov 1-4, 2021.

C102. Gonzalez, M.[a], Bismuth, A.[c], Totah, D.[b] and **Gates, D.H.** Somatotopic sensation in upper and lower limb prosthesis users: A systematic review, International Conference on Rehabilitation Robotics (ICORR) at rehabweek 2021 (virtual), Sep. 23-25, 2021.

C101. Gonzalez, M.[a], Vaskov, A.[a], Vu, P.[b], Chestek, C., and **Gates, D.H.** Quantifying Peripheral Nerve Interface and Residual Muscle Control during Phantom Hand Movement, 45th Annual Meeting of the American Society of Biomechanics. Atlanta, GA (virtual) Aug 10-13, 2021.

C100. Lee, C.[a], Gonzalez, M.[a], Mulligan, M.[a], Kang, J., and **Gates, D.H.** Movement control of upper limb prosthesis users during goal-directed reaching, 45th Annual Meeting of the American Society of Biomechanics. Atlanta, GA (virtual) Aug 10-13, 2021.

C99. Kim, J.[a] and **Gates, D.H.** Using Foot Mounted IMUs to Estimate Toe Clearance in People with Lower Limb Amputation, 45th Annual Meeting of the American Society of Biomechanics. Atlanta, GA (virtual) Aug 10-13, 2021.

C98. Nolasco, L.A.[a], Silverman, A.K. and **Gates, D.H.** Hip-joint contact forces during sit-to-stand in people with transtibial amputation, 45th Annual Meeting of the American Society of Biomechanics. Atlanta, GA (virtual) Aug 10-13, 2021.

C97. Shuman, B.R., Totah, D.[b], **Gates, D.H.,** Russell Esposito, E. Comparison of the methods for evaluating ankle-foot orthosis stiffness, 45th Annual Meeting of the American Society of Biomechanics. Atlanta, GA (virtual) Aug 10-13, 2021.

C96. **Gates, D.H.**, Barr, E.A.[d], Ebbs, K., Wensman, J., Gutierrez, A.R., and Rosenblatt, N.J. A survey of prosthetists' perspectives on adjustable-volume lower-limb prosthetic sockets, 47th Academy Annual Meeting & Scientific Symposium (AAOP), virtual, May 4-7, 2021.

C95. Mulligan, M.[a], Ingraham, K.A.[a], Remy, C.D. and **Gates, D.H.** Comparing machine learning models to linear regression for real-time metabolic cost prediction from portable sensors, 44th Annual Meeting of the American Society of Biomechanics, Atlanta, Georgia (virtual) Aug 4-7, 2020.

C94. Nolasco, L.A.[a], Livingston, J.[c], Silverman, A.K. and **Gates, D.H.** Dynamic balance during 90-degree turns in people with a unilateral transtibial amputation, 44th Annual Meeting of the American Society of Biomechanics, Atlanta, Georgia (virtual) Aug 4-7, 2020.

C93. Nolasco, L.A.[a], Livingston, J.[c], Silverman, A.K. and **Gates, D.H.** Segment angular momentum in people with a unilateral transtibial amputation during 90-degree turns, 44th Annual Meeting of the American Society of Biomechanics, Atlanta, Georgia (virtual) Aug 4-7, 2020.

C92. Kim, J.[a], and **Gates, D.H.** Walking to exhaustion: The effects of powered prosthetic ankles, 44th Annual Meeting of the American Society of Biomechanics. Atlanta, GA (virtual) Aug 4-7, 2020.

C91. Kim, J.[a], and **Gates, D.H.** The effects of powered ankles on gait initiation in daily life, 44th Annual Meeting of the American Society of Biomechanics. Atlanta, GA (virtual) Aug 4-7, 2020.

C90. Lee, C.[a], Vaskov, A.K.[a], Vu, P.P.[a], Davis, A., Gillespie, R.B., Kemp, S., Kung, T.A., Chestek, C.A., Cederna, P.S., and **Gates, D.H.** The performance of implantable electrodes on the control of a myoelectric prosthesis over one year post-implantation, 44th Annual Meeting of the American Society of Biomechanics, Atlanta, GA (virtual) Aug 4-7, 2020.

C89. Vu, P.P.[a], Lu, C.[a], Vaskov, A.K.[a], **Gates, D.H.,** Gillespie, R.B., Kung, T.A., Cederna, P.S., Chestek, C.A., and Kemp, S.W. Restoration of proprioceptive and cutaneous sensation using regenerative peripheral nerve interfaces (RPNIs) in humans with upper-limb amputations, Plastic Surgery Research Council, Toronto, BC, May 28-31, 2020.

C88. Engdahl, S.M.[a] and **Gates, D.H.** Differences in movement quality between body-powered and myoelectric prostheses, 46th Academy Annual Meeting & Scientific Symposium (AAOP), Chicago, IL, Mar 4-7, 2020.

C87. Kim, J.[a], Wensman, J., and **Gates, D.H.** Effects of a powered prosthetic ankle on extended walking bouts, 46th Academy Annual Meeting & Scientific Symposium (AAOP), Chicago, IL, Mar 4-7, 2020.

C86. **Gates, D.H.**, Gonzalez, M.[a], Kang, J.[b], Lee, C.[a], and Gillespie, R.B., The impact of sensory feedback on grasping performance with different prosthetic types. Military Health System Research Symposium, Orlando, FL, Aug 19-23, 2019.

C85. Kim, J.[a], Colabianchi, N., Wensman, J. and **Gates, D.H.,** Using wearable sensors to quantify functional mobility in people with lower limb amputation during daily life. Joint meeting of the American Society of Biomechanics and International Society of Biomechanics, Calgary, AB, Jul 31-Aug 4, 2019.

C84. Vempala, V.[a], Gardinier, E.S.[b], Wensman, J. and **Gates, D.H.,** Muscle activity changes when using a powered prosthesis. Joint meeting of the American Society of Biomechanics and International Society of Biomechanics, Calgary, AB, Jul 31-Aug 4, 2019.

C83. Gonzalez, M.[a], Kang, J.[b], Lee, C.[a], Gillespie, R.B. and **Gates, D.H.,** The impact of prosthesis type on sensory perception and grasping performance. Joint meeting of the American Society of Biomechanics and International Society of Biomechanics, Calgary, AB, Jul 31-Aug 4, 2019.

C82. Lee, C.[a], Gonzalez, M. [a], Kang, J.[b] and **Gates, D.H.,** Accuracy and smoothness of goal-directed reaching movements in upper limb prosthesis users. Joint meeting of the American Society of Biomechanics and International Society of Biomechanics, Calgary, AB, Jul 31-Aug 4, 2019.

C81. Totah, D.[a], Barton, K. and **Gates, D.H.**, The effect of flexion speed on ankle-foot orthosis properties. Joint meeting of the American Society of Biomechanics and International Society of Biomechanics, Calgary, AB, Jul 31-Aug 4, 2019.

C80. Honnegger, J.D. [a], Actis, J.A., **Gates, D.H.**, Silverman, A.K., Munson, A.H., and Petrella, A.J. A multiscale model for whole body and tissue-level lumbar spine biomechanics. Joint meeting of the American Society of Biomechanics and International Society of Biomechanics, Calgary, AB, Jul 31-Aug 4, 2019.

C79. Wagner, K.E.[a], Nolasco, L.A.[a], Morgenroth, D., **Gates, D.H.** and Silverman, A.K. Effect of prosthetic alignment on muscle activity for people with a unilateral transtibial amputation during sit-to-stand. Joint meeting of the American Society of Biomechanics and International Society of Biomechanics, Calgary, AB, Jul 31-Aug 4, 2019.

C78. Nolasco, L.A.[a], Morgenroth, D., Silverman, A.K. and **Gates, D.H.** Spine kinematics during gait are affected by prosthetic leg length. Joint meeting of the American Society of Biomechanics and International Society of Biomechanics, Calgary, AB, Jul 31-Aug 4, 2019.

C77. Ingraham, K.[a], Remy, C.D., and **Gates, D.H.** Effect of increasing prosthetic ankle power on the EMG activity of individuals with transtibial amputation during walking, ISPO Canada/RehabWeek conference, Toronto, BC, June 24-28, 2019

C76. Lawera NG [a], Vu P [a], Irwin ZT [a], Vaskov AK [a], Nu C [a], **Gates D**, Gillespie RB, Kung TA, Cederna PS, Chestek CA, Kemp SWP. Real-time dexterous fine motor control of an advanced prosthetic arm using regenerative peripheral nerve signals. 64th Plastic Surgery Research Council, Baltimore MD, May 2-5, 2019. ***John F. Crikelair Research Award winner**

C75. Engdahl, S.M.[a] and **Gates, D.H.** Limb length estimation in body-powered and myoelectric prosthesis users. Trent International Prosthetics Symposium (TIPS), Manchester, UK, Mar 20-22, 2019.

C74. Nolasco, L.A.[a], Silverman, A.K., **Gates, D.H.** Changes in prosthetic alignment affect ground reaction force symmetry and pain during sit-to-stand. 45th Academy Annual Meeting (AAOP), Orlando, FL, Mar 6-9, 2019

C73. Totah, D.[a], Barton, K., Menon, M.[c], Jones-Hershinow, C.[a], and **Gates, D.H.** The impact of ankle-foot orthosis stiffness on gait: A literature review. 45th Academy Annual Meeting (AAOP), Orlando, FL, Mar 6-9, 2019.

C72. **Gates, D.H.**, Vu, P.P [a], Irwin, Z.T. [a], Vaskov, A.K. [a], Henning, P.T., Lueders, D., Laidlaw, A.T., Nu, C.S.[a], Gillespie, R.B., Kemp, S.W., Kung, T.A., Chestek, C.A. and Cederna, P.S. Regenerative

peripheral nerve interfaces enable dexterous hand control. 45th Academy Annual Meeting (AAOP), Orlando, FL, Mar 6-9, 2019.

C71. Ford, C.[c], Ingraham, K.[a], Gardinier, E.[b], Wensman, J., Remy, C.D., and **Gates, D.H.** Neuromuscular adaptations to varying prosthetic ankle power in people with a transtibial amputation. Regional Meeting of the American Society of Biomechanics, Dayton, OH, Feb 28-Mar 1, 2019.

C70. **Gates, D.H.**, Kim, J.[a], Colabianchi, N., Wensman, J., Assessing the impact of powered ankle prostheses on everyday activity. Military Health System Research Symposium, Orlando, FL, Aug 20-23, 2018.

C69. Menon, M.[c], Totah, D.[a], Chisena, R.[a], Shih, A., **Gates, D.H.**, and Barton, K. Reliability testing of the SMAPP device for characterizing ankle-foot orthosis stiffness. 42nd Annual Meeting of the American Society of Biomechanics, Rochester, MN, Aug 8-11, 2018.

C68. Nolasco, L.[a], Silverman, A.K. and **Gates, D.H.** Changes in prosthetic alignment affect ground reaction force symmetry and pain during sit-to-stand, 42nd Annual Meeting of the American Society of Biomechanics, Rochester, MN, Aug 8-11, 2018.

C67. Gonzalez, M.[a], Rosenblatt, N. and **Gates, D.H.** Impact of obesity on gait stability in older adults, 42nd Annual Meeting of the American Society of Biomechanics, Rochester, MN, Aug 8-11, 2018.

C66. Kim, J.,[a] Colabianchi, N., Wensman, J. and **Gates, D.H**. Quantifying the effects of powered ankle prostheses on everyday activity. 8th World Congress of Biomechanics, Dublin, Ireland, July 8-12, 2018.

C65. Totah, D.[a], Chisena, R.[a], Menon, M.[c], Shih, A., **Gates, D.H.**, and Barton, K. "Development of a representation of ankle-foot orthoses for haptic emulation. 8th World Congress of Biomechanics, Dublin, Ireland, July 8-12, 2018.

C64. Kubiak CA, Vu P[a], Irwin ZT[a], Nu C[a], Henning T, **Gates D,** Gillespie RB, Kung TA, Cederna PS, Chestek C, and Kemp SW. Successful Control of Virtual and Robotic Hands using Neuroprosthetic Signals from Regenerative Peripheral Nerve Interfaces in a Human Subject. 63rd Annual Meeting of the Plastic Surgery Research Council, Birmingham, AL, May 17-20, 2018. ***Best Resident Clinical Research Paper Award**

C63. Honegger, J.D.[a], Actis, J.A.[a], Silverman, A.K. **Gates**, **D.H.**, and Petrella, A.J. Prediction of lumbar spine tissue mechanics for people with and without a transtibial amputation using multiscale modeling techniques. Orthopaedic Research Society 2018 Annual Meeting, New Orleans, LA, March 10-13, 2018.

C62. Kim, J.[a] Colabianchi, N., Wensman, J., **Gates, D.H.** Quantifying the effects of powered ankle prostheses on everyday activity levels. 44th Academy Annual Meeting (AAOP), New Orleans, LA, Feb 14-17, 2018.

C61. Engdahl, S.M.[a], Chestek, C.A., Kelly, B., Davis, A., **Gates, D.H.** Factors associated with interest in novel prosthetic interfaces. 44th Academy Annual Meeting (AAOP), New Orleans, LA, Feb 14-17, 2018.

C60. Actis, J.[a], Nolasco, L.[a], **Gates, D.H.,** and Silverman, A.K. Low back loading during sit-to-stand in people with a unilateral transtibial amputation, 41th Annual Meeting of the American Society of Biomechanics, Boulder, CO, Aug 8-11, 2017.

C59. Actis, J.[a], Honegger, J.D.[a], Nolasco, L.[a], Petrella, A.J. **Gates, D.H.,** and Silverman, A.K. Validation of a musculoskeletal model including the lower limbs and lumbar spine using intradiscal pressure measurements, 41th Annual Meeting of the American Society of Biomechanics, Boulder, CO, Aug 8-11, 2017.

C58. Choi, H.[b], Gardinier, E.S.[b], Remy, C.D., and **Gates, D.H.** Effects of different power of powered prosthesis on gait asymmetry and metabolic cost, 41th Annual Meeting of the American Society of Biomechanics, Boulder, CO, Aug 8-11, 2017.

C57. Nolasco, L.[a], Silverman, A.K. and **Gates, D.H.** Whole-body and segmental angular momentum during turning, 41th Annual Meeting of the American Society of Biomechanics, Boulder, CO, Aug 8-11, 2017.

C56. Kim, J.[a], Davidson, A.[c] and **Gates, D.H.** Characterizing ambulatory tendencies for lower limb amputees. 41th Annual Meeting of the American Society of Biomechanics, Boulder, CO, Aug 8-11, 2017.

C55. Cowley, J.C.[a] and **Gates, D.H.** Effects of remote pain on muscle fatigue during repetitive movements, 41th Annual Meeting of the American Society of Biomechanics, Boulder, CO, Aug 8-11, 2017.

C54. Engdahl, S.M.[a] and **Gates, D.H.** Minimum detectable change values for upper limb kinematics in healthy adults, 41th Annual Meeting of the American Society of Biomechanics, Boulder, CO, Aug 8-11, 2017.

C53. Lapointe, A.[a], Nolasco, L.[a], Sosnowski, A.[c], Andrews, E.[c], Martini, D.N.[a], **Gates, D.H**., and Broglio, S.P. Gender specific differences in knee kinematics between participants with and without a concussion history. American College of Sports Medicine. Denver, CO, May 30-June 3, 2017.

C52. Actis, J.[a], Honegger, J.D.[a], Nolasco, L.[a], Petrella, A.J. **Gates, D.H.,** and Silverman, A.K. Lumbar spine loading validation of a musculoskeletal model including the lower limbs and lumbar spine. Rocky Mountain ASB, Estes Park, CO, April 7-8, 2017. ***Best graduate student poster winner**

C51. Lapointe, A.[a], Nolasco, L.[a], Sosnowski, A.[c], Andrews, E.[c], Martini, D.N.[a], **Gates, D.H**., and Broglio, S.P. Biomechanical differences during a jump cut motion in those with and without a concussion history. 5th International Consensus Conference on Concussion in Sport. Berlin, Germany, Oct 22-23, 2016

C50. Koller, J.[a], **Gates, D.**, Ferris, D. and Remy, C.D. Confidence in the curve: validating instantaneous cost mapping with bilateral ankle exoskeletons. 40th Annual Meeting of the American Society of Biomechanics, Raleigh, NC, Aug 2-5, 2016.

C49. Cowley, J.[a], Leonardis, J.[a], Lipps, D. and **Gates, D.H.** Posture and grip force affect median nerve morphology. 40th Annual Meeting of the American Society of Biomechanics, Raleigh, NC, Aug 2-5, 2016.

C48. Engdahl, S.M. [a], Cowley, J.C.[a] and **Gates, D.H.** Between-trial variability of upper limb activities of daily living. 40th Annual Meeting of the American Society of Biomechanics, Raleigh, NC, Aug 2-5, 2016.

C47. Actis, J.A.[a], Nolasco, L.A.[a], **Gates, D.H.**, and Silverman, A.K. Trunk-pelvis kinematics and ground reaction forces during sit-to-stand in individuals with unilateral transtibial amputation. 40th Annual Meeting of the American Society of Biomechanics, Raleigh, NC, Aug 2-5, 2016.

C46. Gardinier, E.[b], Pennito, A.[a], Wensman, J., Kelly, B., and **Gates, D.H.** Improvements in walking performance when using a powered ankle prosthesis. American Academy of Orthotists and Prosthetists, Orlando, FL, Mar 9-12, 2016.

C45. Engdahl, S.M.[a], Christie, B.[c], Kelly, B., Davis, A., Chestek, C. and **Gates, D.H.** Surveying the interest of individuals with upper limb loss in novel prosthetic control techniques. American Orthotics and Prosthetics Association National Assembly, San Antonio, TX, October 7-10, 2015.

C44. Totah, D.[a], Odeja, L. Johnson, D. **Gates, D.**, Provost, E. and Barton, K. Modeling of human intent for classification of a weight lifting task. 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, Aug 5-8, 2015.

C43. Engdahl, S.M.[a], Christie, B.[c], Kelly, B., Davis, A., Chestek, C. and **Gates, D.H.** Surveying the interest of individuals with upper limb loss in novel prosthetic control techniques. 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, Aug 5-8, 2015.

C42. Felt, W. [a], Gardinier, E. [b], Wensman, J., **Gates, D.**, and Remy, C., Body-in-the-Loop optimization for the selection of prosthetic control parameters – A pilot study. 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, Aug 5-8, 2015.

C41. Johnson, A. [a], Mirdamadi, J. [c], Gervasi, N. [c], and **Gates, D.H.** Muscle activation strategies of stepping onto a compliant surface in healthy adults. 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, Aug 5-8, 2015.

C40. Sriram, H.[a], Cowley, J.C. [a], and **Gates, D.H.** Movement quality during unimanual and bimanual functional reaching movements. 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, Aug 5-8, 2015.

C39. Davidson, A.[c], Felt, W. [a], Wensman, J., Gardinier, E., Remy, C., and **Gates, D.H.** Metabolic cost changes with the amount of prosthetic ankle power provided. 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, Aug 5-8, 2015.

C38. Cowley, J.C. [a], Saunders, R. [c], and **Gates, D.H.** Effects of proximal and distal muscle fatigue on repetitive movements. 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, Aug 5-8, 2015.

C37. Martini, D.[a], Goulet, G., Meehan, S., **Gates, D.H.** and Broglio, S. A Preliminary investigation: long-term effects of concussion on obstacle crossing. Annual Meeting of the American College of Sports Medicine, San Diego, CA. May 26-30, 2015.

C36. Gardinier, E.S.[b] and **Gates, D.H.** Neuromuscular adaptations to assistive ankle power during gait in individuals with transtibial amputations. 20th Annual Meeting of the Gait and Clinical Movement Analysis Society. Portland, OR. March 18-21, 2015.

C35. Engdahl, S.M.[a], Christie, B., Kelly, B., Davis, A., Chestek, C. and **Gates, D.H.** Assessing interest in novel control modalities for upper limb prostheses. 3rd ASU Workshop on Rehabilitation Robotics. Tempe, AZ. Feb 13 – 14, 2015.

C34. Gordon, D.[c], Gardinier, E.S.[b] and **Gates, D.H.** The Reliability of Energetic Cost Measurements. MICHR 2014 Research Symposium. Ann Arbor, MI. October 1, 2014. ***Second Place Scholars Poster Award**

C33. Gardinier, E.S.[b], Wensman, J., Kelly, B.M., and **Gates, D.H.** Improving walking performance and reducing knee loads in below-knee amputees. MICHR 2014 Research Symposium. Ann Arbor, MI. October 1, 2014.

C32. **Gates, D.H.**, Wilken, J.M., Smurr Walters, L., Resnik, L. Comparing movement time with upper extremity prostheses during activities of daily living. 19th Annual Meeting of the Gait and Clinical Movement Analysis Society. Newark, DE. June 24-27, 2014.

C31. Cowley, J.C., Smurr, L., Resnik, L., **Gates, D.H.** Reach trajectories of the dominant and non-dominant hands. 19th Annual Meeting of the Gait and Clinical Movement Analysis Society. Newark, DE. Jun 24-27, 2014.

C30. Engdahl, S.M.[a], **Gates, D.H.**, Wilken, J.M., Smurr, L., Resnik, L. The effect of wrist motion on reduction compensatory trunk motion in transradial prosthesis users. 19th Annual Meeting of the Gait and Clinical Movement Analysis Society. Newark, DE. June 24-27, 2014.

C29. Cowley, J.C.[a], Smurr, L., Resnik, L., **Gates, D.H.** Reach trajectories of the dominant and non-dominant hands. Midwest American Society of Biomechanics Regional Meeting. Akron, OH. Mar 4-5, 2014.

C28. Engdahl, S.M.[a], **Gates, D.H.**, Wilken, J.M., Smurr, L., Resnik, L. The effect of wrist motion on reduction compensatory trunk motion in transradial prosthesis users. Midwest American Society of Biomechanics Regional Meeting. Akron, OH. Mar 4-5, 2014.

C27. **Gates, D.H.**, Wilken, J.M., Smurr Walters, L., Resnik, L. Comparison of performance using upper extremity prostheses with and without active wrist motion. 2nd ASU Workshop on Rehabilitation Robotics. Tempe, AZ. Feb 28 - Mar 1, 2014.

C26. Cowley, J., Dingwell, J.B., and **Gates, D.H.** Effects of localized and widespread fatigue on a repetitive sawing task. 37th Annual Meeting of the American Society of Biomechanics, Omaha, NE. Sept. 4-7, 2013.

C25. **Gates, D.H.**, Scott, S.J., Wilken, J.M., Dingwell, J.B., The effect of walking surface on lateral stability of individuals with and without transtibial amputations. Annual Meeting of the Gait and Clinical Movement Analysis Society. Cincinnati, OH. May 14-17, 2013.

C24. **Gates, D.H.**, Aldridge, J.M., Wilken, J.M. Comparison of powered and unpowered prostheses in patients with transtibial amputation walking on a rock surface. University of Michigan Orthotics and Prosthetics Center: Centennial Celebration and Education Seminar. Ann Arbor, MI. Oct. 18-19, 2012.

C23. **Gates, D.H.**, Aldridge, J.M., Wilken, J.M. Kinematic comparison of walking on uneven ground using powered and unpowered prostheses. 36th Annual Meeting of the American Society of Biomechanics. Gainesville, FL. Aug 15-18, 2012.

C22. **Gates, D.H.**, Dingwell, J.B., Scott, S.J., Sinitski, E.H., Wilken, J.M. Gait adaptations when walking on a destabilizing rock surface. 35th Annual Meeting of the American Society of Biomechanics. Long Beach, CA. Aug 10-13, 2011.

C21. **Gates, D.H.**, Dingwell, J.B., Scott, S.J., Sinitski, E.H., Wilken, J.M. Gait characteristic of individuals with transtibial amputations walking on a destabilizing rock surface. George E. Omer Jr. Research and Alumni Lectureship. San Antonio, TX. May 6, 2011.

C20. Welch, T., Bridges, A., **Gates D.**, Heller, M., Stillman D., Raasch, C., Carhart, M. An evaluation of the BioRID II and Hybrid III during low- and moderate-speed rear impact. SAE 2010 World Congress. Detroit, MI. April 13-15, 2010.

C19. **Gates, D.H.**, Bridges, A., Welch, T.D.J., Lam, T., Scher, I., Yamaguchi, G.T. Lumbar loads in low to moderate speed rear impacts. SAE 2010 World Congress. Detroit, MI. April 13-15, 2010.

C18. **Gates, D.H.**, and Lam, T. Repeated impacts on a motorcycle helmet: What happens after a significant impact? SAE 2010 World Congress. Detroit, MI. April 13-15, 2010. ***Best presentation winner**

C17. **Gates, D.H.** and Dingwell, J.B. Upper Extremity Muscle Fatigue That Induces Muscle Imbalances Does Not Increase Movement Instability. 33rd Annual Meeting of the American Society of Biomechanics. State College, PA. Aug 26-29, 2009.

C16. **Gates, D.H.**, Smallwood, R., and Dingwell, J.B. Muscle Fatigue Affects Task Performance during Repetitive Upper Extremity Movements. 33rd Annual Meeting of the American Society of Biomechanics. State College, PA. Aug 26-29, 2009.

C15. **Gates, D.H.** and Dingwell, J.B. Upper Extremity Muscle Fatigue that Induces Muscle Imbalances does not Increase Movement Instability. 14th Annual Meeting of the Gait and Clinical Movement Analysis Society. Denver, CO. March 10-13, 2009

C14. **Gates, D.H.**, and Dingwell, J.B. The Effect of Muscle Fatigue on Task Performance during Repetitive Goal Directed Movements. 13th Annual Meeting of the Gait and Clinical Movement Analysis Society. Richmond, VA. April 2-5, 2008.

C13. **Gates, D.H.**, and Dingwell, J.B. Movement Stability Is Affected By Muscle Fatigue. 13th Annual Meeting of the Gait and Clinical Movement Analysis Society. Richmond, VA. April 2-5, 2008.

C12. O'Keefe, D.T., **Gates, D.H.**, Bonato, P. A Wearable Pelvic Sensor Design for Drop Foot Treatment in Post-Stroke Patients. IEEE Engineering in Medicine and Biology Society. Aug 23-27, 2007.

C11. **Gates, D.H.**, and Dingwell, J.B. The Effect of Muscle Fatigue on Correlations in Timing Errors. 31st Annual Meeting of the American Society of Biomechanics. Stanford, CA. August 23-25, 2007.

C10. **Gates, D.H.**, and Dingwell, J.B. Movement Height Affects Kinematic Variability during Fatigue. 31st Annual Meeting of the American Society of Biomechanics. Stanford, CA. August 23-25, 2007.

C9. **Gates, D.H.**, Su, J.L and Dingwell, J.B. Origins of the Long-range Correlations in Stride Times. 31st Annual Meeting of the American Society of Biomechanics. Stanford, CA. August 23-25, 2007.

C8. **Gates, D.H.**, and Dingwell, J.B. Movement Stability is Affected by Muscle Fatigue. 31st Annual Meeting of the American Society of Biomechanics. Stanford, CA. August 23-25, 2007.

C7. **Gates, D.H.,** Su, J.L and Dingwell, J.B. Possible Biomechanical Origins of the Long-range Correlations in Stride Times. 12th Annual Meeting of the Gait and Clinical Movement Analysis Society. Springfield, MA. April 11-14, 2007.

C6. **Gates, D.H.,** and Dingwell, J.B. Does Peripheral Neuropathy Alter the Fractal Dynamics of Gait Stride Intervals? 12th Annual Meeting of the Gait and Clinical Movement Analysis Society. Springfield, MA. April 11-14, 2007. *** Best Student Presentation Award Winner**

C5. **Gates, D.H.** and Dingwell, J.B. Peripheral Neuropathy Does Not Alter the Fractal Dynamics of Gait Stride Intervals. American Society of Biomechanics, Blacksburg, VA, September 6-9, 2006.

C4. **Gates, D.H.** and Dingwell, J.B. Are long-range correlations in stride intervals centrally mediated? World Congress of Biomechanics, Munich, Germany, July 29-August 4, 2006.

C3. Aiello, E., **Gates, D.H.**; Patritti, B.L., Cairns, K.D., Meister, M., Clancy, E.A., Bonato, P. Visual EMG Biofeedback to Improve Ankle Function in Hemiparetic Gait, 26th Annual Meeting of IEEE Engineering in Medicine and Biology Society. Shanghai, China. Sept 1-4, 2005.

C2. Bishop, S., Lelas, J., Hoerner, J., **Gates, D.**, Della Croce, U., Nimec, D., Bonato, P. Use of minimal bracing to treat toe walking**.** American Academy of Physical Medicine and Rehabilitation Annual Assembly**,** Phoenix, AZ. October 7-10, 2004.

C1. **Gates, D.H.**, Lelas, J., Croce, U.D., Herr, H., Bonato, P., Characterization of ankle function during stair ambulation. 25th Annual Meeting of IEEE Engineering in Medicine and Biology Society. San Francisco, CA. Sept 1-5, 2004.

Invited Conference Talks

1. *"Prosthetic Grip Selection Using Regenerative Peripheral Nerve Interfaces (RPNIs) and Intramuscular Electrodes"* World Congress of Biomechanics, Taipei, Taiwan, July 11-15, 2022. (virtual)
2. *"Optimizing upper limb function through neurally controlled prostheses"* WearRAcon, Phoenix, AZ, April 23-24, 2022.
3. Workshop Title: Advances in Lower Limb Dynamic Prostheses for Agile and Dynamic Walking, International Conference on Robotics and Automation (ICRA), Paris, France, May 21, 2020. (virtual)
4. *"Prosthetic ankle power: The key to efficient gait?"* Neuromechanics Satellite meeting at the XXVII Congress of the International Society of Biomechanics (ISB), Calgary, AB, July 29, 2019.
5. *"Refreshing perspectives in assistive technology: Prosthetics and power"* Symposium Title: Refreshing Perspectives on Assistive Technology, XXVII Congress of the International Society of Biomechanics (ISB), Calgary, AB, July 31-Aug 4, 2019.
6. *"The influence of muscle fatigue and pain on multi-joint movements"* Symposium Title: Motor Control in Biomechanics, 66th Annual Meeting of the American College of Sports Medicine (ACSM), Orlando, Florida, May 28, 2019.

7. *"Prosthetic intervention: translating short-term studies to long-term benefits"* Symposium Title: Assessing Outcomes in O&P, Orthotic & Prosthetic Innovative Technologies Conference, Ann Arbor, MI, May 16-19, 2019.
8. *"Patient interest in surgical approaches for prosthetic control"* Symposium Title: Abandonment Issues in Upper Limb Prosthetics: Addressing the Problems, 45th meeting of the American Academy of Orthotists and Prosthetists (AAOP), Orlando, FL, Mar 6-9, 2019.
9. *"Regenerative peripheral nerve interfaces enable dexterous hand control"* Symposium Title: Future Possibilities in Amputation Surgery, American Orthotics and Prosthetics Association (AOPA) National Assembly, Vancouver, BC, Sept 26-29, 2018.
10. *"Outcomes with upper limb prostheses"* Functional Restoration Seminar, University of Michigan, Ann Arbor, MI, October, 31, 2017.
11. *"Optimizing individual performance with powered ankle prostheses"* Midwest Robotics Workshop, Toyota Technological Institute at Chicago, Chicago, IL, May 19, 2017.
12. *"Powered ankle prostheses: who can benefit and how do we maximize improvements?"* Workshop Title: Assistive Robotic Devices for Dynamic Locomotion, Robotics Signals and Systems, Ann Arbor, MI, June 19, 2016.
13. *"Quantifying performance with upper extremity prostheses"* Symposium at the 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. Chicago, IL, August 26-30, 2014.
14. *"Quantifying performance with upper extremity prostheses."* 4th Annual Musculoskeletal Rehabilitation Sciences (MRS) Training Day, Chicago, IL, August 22, 2014

Invited Talks – Seminar Series / Universities

1. *"Proactive health: improving mobility and balance"* Biosciences Scientific Research Initiative in Regenerative Medicine Grand Challenge, University of Michigan, May 24, 2023.
2. *"Regenerative peripheral nerve interfaces (RPNIs) for prosthetic control and sensation"* Neural Engineering Research Symposium, University of Michigan, May 14, 2023.
3. *"Neuromuscular Control in Prosthetics"* Virginia Tech University course on Rehabilitation Engineering, January 31, 2023.
4. *"Enhancing Human Performance through Optimized Assistive Technology"* National Center for Medical Rehabilitation Research (NCMRR) Medical Rehabilitation Speaker Series, virtual, Nov 18, 2022.
5. *"Enhancing Human Performance through Robotic Prostheses"* Department of Mechanical Engineering, University of Washington, Seattle, WA, February 3, 2022.
6. *"Optimizing upper limb function through neurally controlled prostheses"* School of Kinesiology Research Excellence Award Talk, December 10, 2021.
7. *"Enhancing Human Performance through Robotic Prostheses"* Department of Human Physiology, University of Oregon, Eugene, OR, December 3, 2021.
8. *"Enhancing Human Performance with Robotic Prostheses"* Dept. of Kinesiology, University of Texas at Austin, Austin, TX, January 21, 2020.
9. *"Enhancing Human Performance with Robotic Prostheses"* Georgia Center for Medical Robotics (GCMR) Seminar Series, Georgia Tech University, Atlanta, GA, December 3, 2019.
10. *"Optimizing prostheses to enhance individual performance"* 2017-2018 New Frontiers in Biomedical Research Seminar Series, Louisiana Tech University, Ruston, LA, January 22, 2018.
11. *"Optimizing individual performance with powered ankle prostheses"* Robotics Institute Seminar Series, Carnegie Mellon University, Pittsburgh, PA, November 17, 2017.

12. *"Leveraging ankle power to improve walking in people with transtibial amputation"* Center for Exercise Research (CXR) Seminar Series, University of Michigan, Ann Arbor, MI March 10, 2017.
13. *"Leveraging ankle power to improve walking in people with transtibial amputation"* Biomechanics Colloquium, Dept. of Mechanical Engineering, Colorado School of Mines, Golden, CO, September 15, 2016.
14. *"Advances in Prosthetic Technology"* Colorado School of Mines, Golden, CO, Sept.18, 2014.
15. *"Robotics to Enhance Rehabilitation"* Musculoskeletal Research in Progress Seminar Series, University of Michigan, Ann Arbor, MI, February 12, 2014.
16. *"History and Future of Prosthetics: Moving Toward Intelligent Technology"* BME 500 Seminar Series, University of Michigan, Ann Arbor, MI, February 27, 2013.

Media

Fablab TV https://youtu.be/DaohjhTViOs

Big 10 *"Michigan lab displays prosthetic prowess: LiveBIG 2016-17"*
https://www.youtube.com/watch?v=inG3w3Oh4n4&feature=youtu.be

UM News http://michigantoday.umich.edu/biomechanics-and-bionics/
http://ns.umich.edu/new/releases/24118-motorized-prosthetics-improves-lives-of-amputees

UM Promo Video featuring RBL:
2022: This is your day, no other! https://youtu.be/U_5JjvWCF_g

American Academy of Orthotists and Prosthetists' O&P Research Insights podcast
2022: Employment Status in Individuals with Upper Limb Loss: https://bit.ly/3Tc4jYU

Research Featured in National Geographic, "The Power of Touch" July 2022

GRANT FUNDING

Current – Extramural

OR220120 (Gates, PI) 9/1/2023 – 8/31/2027
Department of Defense, Congressionally Directed Medical Research Program (CDMRP),
Peer-Reviewed Orthopaedic Research Program (PRORP)
"Regenerative peripheral nerve Interfaces (RPNIs) to enhance function and sensation in people with transfemoral amputation", This project will determine the extent to which RPNIs enable generation of high-fidelity motor control signals for an advanced above-knee prosthesis. We will also determine whether stimulation of RPNIs provides meaningful sensory feedback that can enhance stability.
Role: PI, Total Award Amount: $1,500,000

OP220046 (Gates, PI) 02/01/2023 – 1/31/2025
Department of Defense, Congressionally Directed Medical Research Program (CDMRP),
Orthotics and Prosthetics Outcomes Research Program (OPORP)
"Assessment of the control and utility of multi-grip prosthetic hands," This project will develop and validate an outcome assessment for multi-grip prosthetic control. We will also establish normative values for upper limb prosthesis users.
Role: PI, Total Award Amount: $349,059

NSF2221979 (Kang, Gates, mPI) 09/01/2022 – 08/31/2025

National Science Foundation (NSF)
"Collaborative Research: A holistic human-in-the-loop framework for optimizing a personalized prosthetic arm"; This project will develop a prosthesis emulator that moves the motor off board. This will enable us to optimize prosthetic function without the confounder of added weight.
Role: co-PI; Total Award Amount: $376,579 ($156,571 to UM)

OP210051 (Rosenblatt, PI) 09/01/2022 – 8/31/2024
Department of Defense, Congressionally Directed Medical Research Program (CDMRP),
Orthotics and Prosthetics Outcomes Research Program (OPORP)
"Assessing the role of socket trim line on reactive balance in people with transfemoral amputation," This study will determine if socket trim line affects the ability to utilize hip musculature and thus how people with transfemoral amputations respond to destabilizing forces.
PI of sub-award to UM; Total Award Amount: $350,000 ($156,207 to UM)

W81XWH-2010511 (McDonald, PI) 09/15/2020 – 09/14/2024
Department of Defense, RESTORE, "*Socket Fit Sensing and Management System",* This study involves the development and testing of a sensor for measuring socket fit and a system to notify patients when to add socks to improve their fit.
Role: PI of sub-award to UM; Total Award Amount: $1,498,051 ($249,147 to UM)

OP170086 (Gates, PI) 09/30/2018 – 09/29/2022 (no cost until 09/29/2023)
Department of Defense, Congressionally Directed Medical Research Program (CDMRP),
Orthotics and Prosthetics Outcomes Research Program (OPORP)
"A Comparative Assessment of Conventional and Adjustable Transfemoral Prosthetic Sockets"; This clinical trial will compare patient outcomes between various adjustable prosthetic sockets.
Role: PI; Total Award Amount: $2,398,239

1R01NS105132 (Chestek, PI) 07/01/2018 – 06/29/2023 (no cost until 06/29/2024)
NIH/NINDS, *"Regenerative Peripheral Nerve Interfaces for Restoring Individual Finger Movement in People with Upper Limb Amputations";* This study will investigate use regenerative peripheral nerve interfaces to control dexterous prosthetic hands in three people with upper limb loss.
Role: Co-I; Total Award Amount: $2,116,227 ($645,255 to the Gates lab)

Prior Support - Extramural

W81XWH-17-C-0084 (Johansson, PI) 02/11/2019 – 02/10/2021 (no cost to 02/10/2023)
Department of Defense, STTR Phase II, *"No Power Bionic Lower Extremity Prostheses";* This project will assess the benefits of a non-powered ankle with increased energy storage and return and range of motion on performance during a variety of daily ambulatory tasks.
Role: PI of sub-award to UM; Total Award Amount to UM: $299,989

1R03HD092639 (Gates/Remy, PI) 04/01/2018 – 03/31/2020 (no cost to 03/31/2021)
NIH/NICHD, "*Evaluating and Improving Assistive Robotic Devices Continuously and in Real-time"*
The goal of this project is to develop methodology to measure metabolic costs through small unobtrusive sensors and use this information to tune prostheses and exoskeletons in real-time.
Role: PI; Total Award Amount: $155,959

N66001-16-1-4006 (Chestek/Cederna, mPIs) 01/04/2016 – 07/24/2020
DARPA HAPTIX
"Providing intuitive prosthetic movement and sensation using residual nerve endings to neurotize regenerative muscle grafts"; The goal of this project is to surgically connect pieces of muscle to free nerve endings in an amputated limb and use this signal to control a prosthetic arm. As part of this project, we will perform a stakeholder analysis to determine patient interest in surgical options.

Role: Co-I; Total Award Amount: $1,218,822

OP150078 (Gates, PI) 09/15/2016 – 09/14/2019 (no cost to 9/14/2020)
Department of Defense, Congressionally Directed Medical Research Program (CDMRP),
Orthotics and Prosthetics Outcomes Research Program (OPORP)
"Characterizing Limits of Performance Imposed by Upper-Limb Prostheses"; This study will quantify the quality and accuracy of movements made by individuals using body-powered and myoelectric prostheses and individuals without upper limb loss.
Role: PI, Total Award Amount: $492,416

NSF1536188 (Gates/Remy, PI) 09/01/2015 – 08/31/2018 (no cost through 8/31/19)
Sponsor: Civil, Mechanical and Manufacturing Innovation (CMMI) / General and Age-Related Disabilities Engineering (GARDE), National Science Foundation (NSF)
"Optimizing the Controllers of Powered Prostheses with the Human Body in the Loop"; The goal of the project is to improve the performance and benefits of powered prosthetic devices by enabling an automated subject-specific adaptation of controller parameters.
Role: PI, Total Award Amount: $358,245

W81XWH-15-1-0548 (Gates, PI) 09/30/2015 – 09/29/2018 (no cost through 7/29/19)
Department of Defense, Congressionally Directed Medical Research Program (CDMRP)
Orthotics and Prosthetics Outcomes Research Program (OPORP)
"Determining the potential benefit of powered prostheses"; The goal of the project is to determine the impact of powered prosthetic devices on compensatory muscle activity and the onset of muscle fatigue during an extended bout of walking, overall physical activity level, and quality of life.
Role: PI, Total Award Amount: $494,885

W81XWH-17-C-0084 (Johansson, PI) 09/01/2017 – 03/28/2018
Department of Defense STTR Phase I, *"No Power Bionic Lower Extremity Prostheses";* The goal of this work is to develop a passive prosthesis with increased range of motion and energy return capabilities.
Role: Co-I and University Partner to Liberating Technologies, Inc.
Total Award Amount: $150,000

K12HD073945 (Gates, PI) 10/01/2013 – 09/30/2015
NIH / NICHD, *"K12 Career Development in Movement and Rehabilitation Sciences"*
This grant supports the development of research areas linking engineering to clinical sciences.
Total Award Amount: $266,120

1R03HD058942 (Dingwell, PI) 09/01/2008 – 08/31/2010
NIH / NICHD, *"Changes in Control of Movement Timing and Stability with Muscle Fatigue"*
This project determined how widespread muscle fatigue vs. localized muscle fatigue affected the control of movement timing, stability, and the trial-to-trial variability in a repetitive upper arm sawing-like task.
Role: Co-I, Total Award Amount: $141,749

Student Grant-in-Aid (Gates, PI) 09/01/2006 – 09/01/2007
American Society of Biomechanics, *"Tracking Fatigue-Related Changes in Motor Coordination"*
This study quantified how the variability of kinematic, kinetic, and EMG patterns in the upper extremity change over time during the course of a work-like task similar to sawing when the upper body is in both kinematically constrained and unconstrained. Total Award Amount: $5,000

Prior Support – Intramural

MCUBED Program (Barton, PI) 01/01/2017 – 12/31/2017
University of Michigan, *"Advancements in 3D Printing for the Fabrication of Customized Orthoses and Prostheses",* Role: Co-Investigator, $60,000

UL1TR00043 (Gardinier, PI) 06/01/2014 – 08/31/2016
NIH, National Center for Advancing Translational Sciences, Postdoctoral Translational Scholars Program (PTSP), University of Michigan (MICHR), *"Improving performance and reducing knee loads in transtibial amputees",* Role: Postdoctoral Advisor; Total Award Amount: $100,000

MCUBED Program (Gates, PI) 09/01/2013 – 12/31/2014
University of Michigan, *"Reducing effort through an augmented lower limb prosthesis"*
This pilot study used a novel optimization process to determine the appropriate amount and timing of ankle power to supply a lower limb prostheses user during gait.
Role: PI, Total Award Amount: $60,000

Office of Research (Gates, PI) 09/01/2013 – 09/01/2014
University of Michigan, *"Assessing patient satisfaction and design priorities for upper extremity prosthetic technology"* This pilot study surveyed upper extremity prostheses users to determine current limitations of their devices and what features of new prostheses they would be most interested in adapting.
Role: PI, Total Award Amount: $18,000

Continuing Doctoral Fellowship (Gates, PI) 09/01/2008 – 05/28/2009
University of Texas at Austin, *"Changes in Control of Movement Timing and Stability with Muscle Fatigue"*
This project determined how widespread muscle fatigue vs. localized muscle fatigue affected the control of movement timing, stability, and the trial-to-trial variability in a repetitive upper arm sawing-like task.
Role: PI, Total Award Amount: $30,000

Student Fellowships (for which I am primary mentor) ~$650,000 total

Chinwendu Nwokeabia 2021-2025, Rackham Engineering Fellowship, University of Michigan, $117,000

Kristin Perrin
2023, Rackham Conference Travel Award, University of Michigan, $800
2023, Kinesiology Travel Award
2022, Rackham Pre-doctoral Research Grant, University of Michigan, $1500

Christina Lee
2022-2023, Rackham Pre-doctoral Fellowship, U. Michigan, $50,000
2022, Rackham Conference Travel Award, University of Michigan, $800
2019, Rackham International Travel Award, U. Michigan, $1050
2018, Biomedical Engineering Fellowship, University of Michigan, $22,000

Michael Gonzalez
2019, Rackham International Travel Award, U. Michigan, $1050
2018, Rackham Conference Travel Award, University of Michigan, $800
2017-2022, Rackham Engineering Fellowship, University of Michigan, $117,000

Luis Nolasco
2019, Rackham International Travel Award, U. Michigan, $1050
2018, Rackham Conference Travel Award, University of Michigan, $800
2017-2022, Rackham Merit Fellowship, University of Michigan, $117,000
2017, Rackham Conference Travel Award, University of Michigan, $800
2016, Diversity Travel Award, American Society of Biomechanics, $500
2014, Kinesiology Merit Fellowship, University of Michigan, $10,000

Jaywoo Kim
2020 DeLuca Foundation & Delsys Summer Research Award, $1000
2020 Rackham One-Term Dissertation Fellowship, $15,401
2018, School of Kinesiology Travel Grant, University of Michigan, $600
2018, Rackham Conference Travel Award, University of Michigan, $1050
2016-2020, School of Kinesiology Fellowship, University of Michigan, $17,567
2017, Rackham Conference Travel Award, University of Michigan, $800

Susannah Engdahl 2017, Rackham Conference Travel Award, University of Michigan, $800

2016, Rackham Conference Travel Award, University of Michigan, $800
2015, Rackham Pre-doctoral Research Grant, University of Michigan, $1500
2015, Rackham Conference Travel Award, University of Michigan, $800
2014, Rackham Conference Travel Award, University of Michigan, $458
2014, Student Travel Grant, Gait and Clinical Movement Analysis Society, $342
2014-2017, Graduate Research Fellowship, National Science Foundation, $132,000
2013-2018, Rackham Merit Fellowship, University of Michigan, $112,479

Jeffrey Cowley
2017, Rackham Conference Travel Grant, University of Michigan, $800
2017, Rackham One-Term Dissertation Fellowship, University of Michigan, $15,401
2016, Rackham Conference Travel Grant, University of Michigan, $800
2015, Rackham Graduate Student Research Grant, University of Michigan, $3000
2015, School of Kinesiology Travel Grant, University of Michigan, $500
2014, Student Travel Grant, Gait and Clinical Movement Analysis Society, $342
2014, School of Kinesiology Travel Grant, University of Michigan, $400
2013, Rackham Conference Travel Grant, University of Michigan, $700
2012-2016, School of Kinesiology Fellowship, University of Michigan, $16,881

Funded Summer Programs

Alexandra Reed	2023, MICHR Summer Research Program, funded by NIH UL1TR00043
Alexus Warchock	2021, UM-SMART, University of Michigan
Robyn Pfeiffer	2021, Undergraduate Research Opportunities Program (UROP), U. Michigan
Lydia Mason	2019, Summer Research Opportunities Program (SROP), U. Michigan
Sean Mori Carroll	2019, MICHR Summer Research Program, funded by NIH UL1TR00043
Diego Fernando Morales	2018, Summer Research Opportunities Program (SROP), U. Michigan
María Larrága-Martinez	2017, Summer Research Opportunities Program (SROP), U. Michigan
Luis Nolasco	2016, MICHR Summer Research Program, funded by NIH UL1TR00043
Darren Gordon	2014, MICHR Clinical Research Scholars Program, NIH UL1TR00043

TEACHING

University of Michigan – Instructor

MOVESCI 110 Biological and Behavioral Bases of Human Movement, Movement Science
Introductory undergraduate team-based learning course
Enrollments: W'23: 105

MOVESCI 330 Biomechanics of Human Movement, Movement Science
Undergraduate lecture and laboratory course on musculoskeletal biomechanics.
Enrollments: W'13: 60, F'13: 73, W'16: 74, F'18*:* 55, F'22: 81

MOVESCI 431 Clinical Gait Analysis, Movement Science
Undergraduate/Graduate lecture course on gait biomechanics.
Enrollments: F'15: 17, F'16*:* 16, F'17: 22, F'18*:* 25, F'20: 15 (online); F'22: 16

MOVESCI 531 Analysis of Biologic Data using MATLAB, Movement Science
Graduate lecture and laboratory course in Matlab programming.
Enrollments: F'12: 17, F'14*:* 15, F'15: 10, F'17: 10, W'22: 9

Lectures / Workshop Presentations

- "Blended Course Design for Active Learning: Starting from Scratch", 20th Annual Enriching Scholarship Conference, May 2, 2017
- Teaching and Learning in Kinesiology Spring Symposium Presenter, May 15, 2017.

Teaching Grants

Victors for Michigan (Gates, PI) 01/01/2018– 12/01/2018
University of Michigan, *"Kinesiology Makerspace,"* Supports converting an old machine shop into a makerspace that can be used for undergraduate/graduate education. Total Award Amount: $5,000.

Transforming Learning for the Third Century (TLTC) (Kuo, PI) 03/01/2015 – 08/31/2016
University of Michigan, *"The Flipped Engineering Laboratory"* Supports the development of a lending laboratory of inexpensive, miniature sensor technology to be utilized in several engineering design courses. Role: Co-PI**;** Total Award Amount: $50,000

Transforming Learning for the Third Century (TLTC) (Gross, PI) 03/01/2015 – 08/31/2016
University of Michigan, *"Using Hybrid Modular Courses to Scale up Engaged Learning",* Supports the development of courses focused on active learning experiences with associated online content,
Role: Co-PI; Total Award Amount: $50,000

University of Texas at Austin – Teaching Assistant

BME 365S Quantitative Engineering Physiology II, Department of Biomedical Engineering, Spring 2008
Undergraduate lecture course in quantitative physiology for biomedical engineers

BME 334 Biomechanics, Department of Biomedical Engineering, Fall 2007
Undergraduate lecture and lab course in biomechanics for biomedical and mechanical engineering students

Boston University – Teaching Assistant

ENG EK 424 Thermodynamics and Statistical Mechanics, School of Engineering, Spring 2003
Undergraduate lecture course in thermodynamics for engineering students

BME 515 Introduction to Medical Imaging, Department of Biomedical Engineering, Fall 2002, Fall 2004
Undergraduate/graduate lecture and lab course using MathCad to analyze medical images

SERVICE

Journal Editorial Service

2021 – pres Consulting Editor, *Journal of Biomechanics*
2018 Associate Editor, *IEEE BioRob 2018*
2017 – 2023 Associate Editor, *IEEE Transactions on Neural Systems & Rehabilitation Engineering*
2010 – pres Ad hoc Reviewer,

Brain and Behavior Functions
Clinical Biomechanics
Disability and Rehabilitation
Ergonomics
Exercise and Sport Sciences Reviews
Experimental Brain Research
Expert Review of Medical Devices
Gait and Posture
Human Movement Science
IEEE Transactions on Occupational Ergonomics & Human Factors
IEEE Transactions on Neural Systems & Rehabilitation Engineering
Journal of Applied Biomechanics
Journal of Applied Physiology
Journal of Biomechanical Engineering
Journal of Biomechanics
Journal of Electromyography and Kinesiology
Journal of Motor Behavior
Journal of Neuroengineering and Rehabilitation
Journal of Pain Research
Journal of Prosthetics and Orthotics
Journal of Rehabilitation and Assistive Technologies Engineering
Journal of the Royal Society Interface
Journal of Science and Medicine in Sport
Medical Engineering & Physics
Military Medical Research
Nature Human Behavior
Neuroscience Letters
Nonlinear Dynamics
Novel Physiotherapies
PLoS One
Prosthetics Orthotics International
Science Robotics
Scientific Reports

Grant Review Service

2022-2024 VA Rehabilitation Research and Development Service (RR&D), Standing Panel Member
2021 National Science Foundation (NSF), Ad-Hoc Panel Reviewer
2020 NIH, Musculoskeletal Rehabilitations Sciences (MRS), Ad-hoc Panel Reviewer
NIH, Special Emphasis Panel, Ad-hoc Panel Reviewer
2019 NIH, Motor Function, Speech, and Rehabilitation (MFSR), Ad-hoc Panel Reviewer
DoD Congressionally Directed Medical Research Programs (CDMRP), Tele-reviewer **(x2)**
Orthotics and Prosthetics Education and Research Foundation (OPERF), Mail-in Review
Natural Sciences and Engineering Research Council of Canada (NSERC), Mail-in Review
2018 DoD Congressionally Directed Medical Research Programs (CDMRP), Tele-reviewer
DoD Defense Medical Research and Development Program (DMRDP), Tele-reviewer
2017 DoD Congressionally Directed Medical Research Programs (CDMRP), Panel Reviewer **(x2)**
2016 Royal British Legion, Mail-in Review
National Science Foundation (NSF), Panel Reviewer
2015 Food and Drug Administration (FDA), Mail-in Review
The Henry Smith Charity, London, UK, Mail-in Review
2014 DoD Congressionally Directed Medical Research Programs (CDMRP), Panel Reviewer
2013 DoD Congressionally Directed Medical Research Programs (CDMRP), Tele-reviewer

Abstract / Award Review Service

2023 ISB Conference Abstract Review
2021 AAOP Conference Abstract Review
2019, 2020, 2021 American Society of Biomechanics (ASB) Awards Review
2018 Judge, Applied Collegiate Exoskeleton (ACE) Competition 2018
2018 Judge, Engineering Graduate Symposium, Richard and Eleanor Towner Prize for Outstanding Ph.D. Research

2018 American Society of Biomechanics, J. Biomechanics and Clinical Biomechanics Awards
2018 American Society of Biomechanics (ASB) Meeting Abstracts
2016 International Society of Electrophysiology and Kinesiology (ISEK) Conference Abstracts
2016 EMBS Conference Papers
2015, 2016 American Society of Biomechanics (ASB) Meeting Abstracts
2015 Gait and Clinical Movement Analysis Society (GCMAS) Conference Award Papers
2014 Gait and Clinical Movement Analysis Society (GCMAS) Conference Presentation Awards
2014 MICHR Symposium Undergraduate Scholars Poster Awards

Leadership Positions

2018 – 2019 Member, Executive Committee, School of Kinesiology, University of Michigan
2017 – 2019 Member, Graduate Committee, Robotics Program, University of Michigan
2017 Member, ASB Program Committee
2016 Member, ISEK Program Committee
2014 – 2019 Education Committee, Gait and Clinical Movement Analysis Society

Conference Organization

2023 Organizing Committee Member, International Society of Biomechanics (ISB) Conference
2022 Co-Chair, Orthopedic and Rehabilitation Engineering Track, BMES 2022, San Antonio, Texas, Oct 12-15, 2022.
2022 Session Moderator, "Assistive Devices for Balance and Posture," World Congress of Biomechanics, Taipei, Taiwan, July 10-14, 2022.
2019 Scientific Program Co-Chair, Orthotic and Prosthetic Innovative Technologies Conference, Ann Arbor, MI, May 16-19, 2019.
2016 Co-organizer for Workshop on "Assistive Robotic Devices for Dynamic Locomotion" at the Robotics Signals and Systems Meeting, Ann Arbor, MI, June 18-19, 2016.

Professional Organizations

2016 Member, International Society of Electromyography and Kinesiology (ISEK)
2015- Member, American Academy of Orthotists and Prosthetists (AAOP)
2015- Member, International Society of Biomechanics (ISB)
2014- Member, Institute of Electrical and Electronics Engineers (IEEE)
2007- Member, Gait and Clinical Movement Analysis Society (GCMAS)
2006- Member, American Society of Biomechanics (ASB)
2000-2002 Member, Pi Tau Sigma Mechanical Engineering Honor Fraternity
2000-2002 Member, Tau Beta Pi, Engineering Honor Society

School of Kinesiology, University of Michigan, Service

2021 – Movement Science Graduate Program Director
2021 – Biomechanics User Group Lead
2018 – 2019 Member, Executive Committee
2018 Speaker, Detroit Prospective Students Day
2017 Member, Biomechanics Faculty Search Committee
2016 Reviewer, Kinesiology Undergraduate Scholarships
2016 Co-Chair, Biomechanics Faculty Search Committee
2016-2017 Member, Building Committee, Kraus Renovations
2014 Member, Biomechanics Faculty Search Committee
2013 Reviewer, Kinesiology Undergraduate Scholarships

University of Michigan Seminar Organization

Carrie Peterson, Ph.D. *Special Seminar in Kinesiology,* 3/21/2019
Stephen Piazza, Ph.D. *Kinesiology Seminar Series,* 11/11/2016
Anne Silverman, Ph.D. *Special Seminar in Kinesiology,* 11/13/2015
Elizabeth Hsiao-Wecksler, Ph.D. *Rehabilitation Robotics Seminar Series*, 3/24/2015
Todd Kuiken, M.D., Ph.D. *Rehabilitation Robotics Seminar Series,* 10/14/2014

Anne Simon, Ph.D., *Rehabilitation Robotics Seminar Series* 11/20/2013

Outreach

2023	Speaker, U-M Human Factors and Ergonomics Society Biomechanics Dinner, March 23, 2023
2022	Podcast guest, O&P Research Insights, Journal of Prosthetics and Orthotics
2021	Speaker, Biomedical Engineering Panel, Women in Science and Engineering (WISE) National Conference, Toronto, BC, January 24, 2021
2019	Podcast guest, Biomechanics on our minds (BOOM), International Society of Biomechanics
2019	GradSWE Networking Mixer, Discussion Leader
2016	Keynote Speaker, FIRST Robotics Kick-off, University of Michigan
2016	Amazin' Blue Preview, University of Michigan
2015	Seminar Leader, Robotics Day, April 10, 2015
2013-	Mentor, American Society of Biomechanics (ASB) Student Mentor Program
2013-2015	Instructor, Females Excelling More in Math Science and Engineering (FEMMES) Program
2006-2007	Mentor, Graduates Linked to Undergraduates in Engineering Program, Women in Engineering Program
2005-2009	Student instructor, Introduce a Girl to Engineering Day, Women in Engineering Program

MENTORING EXPERIENCE

Postdoctoral Fellows

1. Emily Gardinier, Ph.D. 2014-2016
2. Hwan Choi, Ph.D., 2017-2018, *Placement: Assistant Professor, Mechanical Engineering, University of Central Florida
3. Jiyeon Kang, Ph.D., 2018, *Placement: Assistant Professor, Mechanical Engineering, SUNY Buffalo
4. Deema Totah, Ph.D., 2020-2021, *Placement: Assistant Professor, Mechanical Engineering, Iowa State University
5. Luis Nolasco, Ph.D., 2022, *Placement: Engineer, Explica

Dissertation Committees

Chair / Co-Chair

1. Jeffrey Cowley (2017) Motor adaptations to muscle fatigue: moderating factors and implications, Kinesiology, University of Michigan, *Placement: Assistant Professor, Kinesiology, University of Wisconsin-Platteville (now Assistant Professor, Kinesiology, Southern Utah University)
2. Susannah Engdahl (2019), The effect of upper limb prosthesis type on functional outcomes and satisfaction, Biomedical Engineering, University of Michigan *Placement: Postdoctoral Fellow, George Mason University (now Manager of Health Policy and Research, American Orthotic and Prosthetic Association (AOPA))
3. Deema Totah (2020), Ankle-foot orthosis stiffness: biomechanical effects, measurement and emulation, Mechanical Engineering (co-chair: K. Barton), University of Michigan *Placement: Postdoctoral Fellow, University of Michigan (now Asst. Professor, Mechanical Engineering, U. Iowa)
4. Jaywoo Kim (2021), Evaluating the effects of powered prostheses on walking biomechanics in and out of the lab, Movement Science and Mechanical Engineering, University of Michigan *Placement: Post-doc Shirley Ryan Ability Lab, Chicago, IL (now Motion Scientist, Apple, Inc.)
5. Luis Nolasco (2022), Biomechanical adaptations to lower limb amputation during functional mobility tasks, Movement Science, University of Michigan *Placement: Postdoctoral Fellow, University of Michigan (now Biomechanics Scientist, Explica)
6. Michael Gonzalez (2023), Closing the loop: How sensation impacts prosthetic function and control, Robotics, University of Michigan *Placement: Staff Research Fellow - Office of Science and Engineering Laboratories (OSEL), Food and Drug Administration
7. Christina Lee (2023), Assessing motor control and performance with upper limb prostheses, Biomedical Engineering, University of Michigan *Placement: Post-doctoral Fellow, Harvard University, Boston, MA
8. Matt Mulligan (expected 2023), Movement Science (co-chair: B. Umberger), University of Michigan
9. Kristin Perrin (expected 2024), Movement Science, University of Michigan

10. Chinwendu Nwokeabia (expected 2025), Robotics, University of Michigan
11. Martin Kilbane (expected 2027), Mechanical Engineering (co-chair Sienko), University of Michigan
12. Jake Kanetis (expected 2028), Robotics, University of Michigan
13. Mira Mutnick (expected 2028), Biomedical Engineering, University of Michigan

Member

1. Douglas Martini (2015) Long-term effects of concussion on motor performance across the lifespan, Kinesiology, University of Michigan.
2. Zachary Irwin (2016) Restoring fine motor skills through neural interface technology, Biomedical Engineering, University of Michigan.
3. Richelle Williams (2016) The effects of concussive and sub-concussive head impacts on brain activity, Kinesiology, University of Michigan.
4. Jeff Koller (2017) Adaptive controllers for assistive robotic devices, Mechanical Engineering, University of Michigan.
5. Gu Eon Kang (2017) A pilot longitudinal study of motor behavior in Bipolar Disorder, Kinesiology, University of Michigan.
6. Aida Valevicius (2019) Revealing key movement strategies in upper limb function using novel standardized kinematic assessment tool, Biomedical Sciences, University of Alberta.
7. Joshua Leonardis (2020) The influence of breast reconstruction choice on functional shoulder biomechanics in women undergoing mastectomy for breast cancer, Kinesiology, University of Michigan
8. Kimberly Ingraham (2021) Evaluating optimality in the control of wearable robotic devices, Mechanical Engineering, University of Michigan.
9. Xiao-Yu Fu (2022) A model and experiment of human control of lateral balance during walking, Mechanical Engineering, University of Michigan.
10. Whitney Wolff (2022) The influence of idiopathic chronic neck pain on muscle activity and elasticity during activities of daily living, Kinesiology, University of Michigan.
11. Emma Reznick (2023) Robotics, University of Michigan.
12. Amani Alkayyali (2024), Electrical Engineering, University of Michigan.

Master's Thesis Students

Chair

1. Luis Nolasco (2017) Kinematics and dynamic balance during straight-line walking and turning in people with transtibial amputation, Movement Science, University of Michigan.
2. Riley Doherty (2019) Experimental testing of soft tissue using suction and digital image correlation, Biomedical Engineering, University of Michigan, *co-chair*
3. Sean Mori Carroll (2020) The effect of uneven terrain on muscle activity in people with transtibial amputations, Kinesiology, University of Michigan
4. Manan Anjaria (2020) The effect of different ankle-foot prostheses on muscle contributions during walking, Biomedical Engineering, University of Michigan.

Member

1. Alexa Johnson (2016) Neural and morphological factors regulate torque development after anterior cruciate ligament reconstruction at the time of return to activity, Kinesiology, University of Michigan.
2. Jason Actis (2017) Low-back biomechanics during sit-to-stand with transtibial amputation, Mechanical Engineering, Colorado School of Mines.
3. Katherine Wagner (2019) The effect of prosthetic alignment on muscle activity for people with a unilateral transtibial amputation during sit-to-stand, Mechanical Engineering, Colorado School of Mines.
4. Joshua Nkonge (2020) Customized design of a prosthetic socket to accommodate volume fluctuations in transtibial amputees in low resource settings (Kenya), Mechanical Engineering, University of Michigan.

Undergraduate Honors Thesis Students

1. Jeremy Ross (2015) Upper-limb reaching device for quantification of arm movement, Mechanical Engineering Honors Project, University of Michigan.
2. Audra Davidson (2016) Assessing community integration post lower limb amputation, Movement Science Honors Thesis, University of Michigan.
3. Claire Ford (2019) Neuromuscular adaptations to varying prosthetic ankle power in people with a transtibial amputation, Movement Science Honors Thesis, University of Michigan.

MICHR Clinical Research Scholars Program / MICHR Summer Research Program
Darren Gordon, Summer 2014
Luis Nolasco, Summer 2016
Sean Mori Carroll, Summer 2019
Alexandra Reed, Summer 2023

Summer Research Opportunities Program (SROP)
Maria Fernanda Larraga Martinez, University of Iowa, Summer 2017
Diego Fernando Perez Morales, Delaware State University, Summer 2018
Lydia Mason, Taylor University, Summer 2019

Undergraduate Research Opportunities Program (UROP)
Robyn Pfeiffer, Summer 2021
Carter Derosia, Fall 2021 – Winter 2022
Bryana Slough, Fall 2022 – Winter 2023
Emilia Swierzb, Fall 2022 – Winter 2023

UM-SMART Program
Alexus Warchock, University of Michigan - Flint, Summer 2021

Research Staff

Andrew Moseley-Gholl	Research Assistant	2013 – 2014
Jasmine Mirdamadi	Research Coordinator	2014 – 2015
Kelsey White	Clinical Research Coordinator	2016 – 2022
Jasmine Hunt	Research Assistant	2021
Jordan Kartes	Research Associate	2022 -

Graduate Students – Research Rotations

John Verros	Kinesiology	Winter 2014
Alexa Johnson	Kinesiology	Winter 2015
Josh Leonardis	Kinesiology	Fall 2015
Leelai Abraha	Kinesiology	2014-2016
Hari Sriram	Biomedical Engineering	2014-2015
Anthony Pennito	Biomedical Engineering	2015-2016
Pravin Ullagadi	Biomedical Engineering	Winter 2016
Jillian Kirby	Biomedical Engineering	Fall 2017, Winter 2018
Robert Oswald	Movement Science	Fall 2017, Winter 2018
Carlie Jones-Hershinow	Movement Science	Winter 2018, Summer 2018
Rachel Wathen	Biomedical Engineering	Winter 2018
Bryce LeBar	Movement Science	Summer 2018, Fall 2018
Riley Doherty	Biomedical Engineering	Fall 2018 – Winter 2019
Vibha Vempala	Biomedical Engineering	Fall 2018 – Winter 2020
Kiichi Ash	Biomedical Engineering	Winter 2019 – Winter 2020
Manan Anjaria	Biomedical Engineering	Winter 2019 – Winter 2020
Sean Mori Carroll	Movement Science	Winter 2019 – Winter 2020
Sean Boylan	Robotics	Summer 2019
Kaizhi Zheng	Robotics	Fall 2019

Madison Gayle	Biomedical Engineering	May 2021 – present
Jiongzhi Yang	Mechanical Engineering	Winter 2022
Pitt Volmers	Biomedical Engineering	Winter 2022
Claire Stebbins	Biomedical Engineering	Winter 2022
Matthew Fritze	Movement Science	Winter 2022
Stephanie Worthy	Robotics	Fall 2022
Boer Chen	Robotics	Winter 2023 -

Undergraduate Student Researchers

Breanne Christie	Biomedical Engineering	Summer 2013
Trevor Plizga	Movement Science	Summer 2013
Hari Sriram	Mechanical Engineering	Summer 2013 – Summer 2014
Jessica Ford	Movement Science	Fall 2013 – Summer 2014
Shannon Pomeroy	Movement Science	Fall 2013
Jessica Axelrod	Movement Science	Fall 2013 – Winter 2015
Daphne Chou	Biomedical Engineering	Fall 2013 – Winter 2014
Jasmine Wisely	Movement Science	Winter 2014
Amanda Chamberlain	Mechanical Engineering	Summer 2014 – Winter 2015, Summer 2017
Nicole Gervasi	Movement Science	Fall 2014, Winter 2015
Rebecca Saunders	Movement Science	Winter 2015
Maggie Armstrong	Movement Science	Winter 2015
Devin Nelson	Movement Science	Summer 2015
Daniel Kim	Mechanical Engineering	Summer 2015
Zachary Conley	Movement Science	Fall 2015, Winter 2016
Lauren Peterson	Electrical Engineering	Fall 2015, Winter 2016
Jaqueline Katz	Movement Science	Winter 2016, Summer 2016, Fall 2016
Alexander Lopez	Mechanical Engineering	Winter 2016
Erika Elliot	Health Science at Purdue	Summer 2016
Jacob Lynn	Movement Science	Summer 2016 – Summer 2017
Kristin Roberts	Movement Science	Summer 2016
Nicholas Dolnicek	Movement Science	Summer 2016
Nicole Johns	Biomedical Engineering	Summer 2016, Fall 2016
Danny Tian	Movement Science	Summer 2016 – Summer 2017
Yoonjoo Kim	Biomedical Engineering	Summer 2016, Fall 2016
Sarah Chen	Electrical Engineering	Summer 2016 – Summer 2017
Sean McLoughlin	Movement Science	Fall 2016
Alondra Lopez	Electrical Engineering	Winter 2017
Ann Starling	Movement Science	Fall 2016, Winter 2017
Erin Shy	Movement Science	Winter 2017
Elizabeth Lusk	Movement Science	Winter 2017, Fall 2017
Samantha Levin	Movement Science	Winter 2017
Maya Kohavi	Athletic Training	Winter 2017 – Winter 2019
Samantha Darmon	Movement Science	Winter 2017
Sarah Thompson	Movement Science	Winter 2017
Amaanat Gill	Movement Science	Winter 2017
Kelley Burger	Movement Science	Winter 2017
Sandyvel Lopez-Zeledon	Movement Science	Summer 2017 – Winter 2018
Claire Ford	Movement Science	Summer 2017 – Winter 2019
Hannah Landman	Movement Science	Summer 2017, Fall 2017
Max Adamo	Movement Science	Summer 2017 – Winter 2019
Kyle Lacroix	Movement Science	Fall 2017
Alexandra Kalabat	Movement Science	Fall 2017
Amanda Shah	Movement Science	Winter 2018

Natalie Bullock	Movement Science	Winter 2018 – Winter 2019
Loriann Hom	Movement Science	Winter 2018
Orion Siu	Movement Science	Winter 2018 – Summer 2019
Joseph Harake	Movement Science	Fall 2018 – Winter 2020
Mykel Dolinski	Biomedical Engineering	Summer 2019 – Winter 2020
Jenna Livingston	Mechanical Engineering	Summer 2019 – Fall 2020
Alex Bismuth	Computer Science	Summer 2020 – Summer 2022
Nathan Smith	Movement Science	Fall 2021 – Summer 2022
Alec McKheen	Movement Science	Fall 2021 – Summer 2023
Olivia Tu	Movement Science	Winter 2022
Monique Lamoureux	Movement Science	Winter 2022 – Fall 2022
Erin Zane	Movement Science	Summer 2023