

Lou Awad | PT, DPT, PhD

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☎ (617) 358 3043 • ✉ louawad@bu.edu • 🏠 Neuromotor Recovery Laboratory

PROFESSIONAL AFFILIATIONS

Academic.....

Boston University

2016–Present: Assistant Professor, Department of Physical Therapy and Athletic Training

2019–Present: Assistant Professor, Department of Mechanical Engineering (secondary appointment)

Rutgers University

2009: Adjunct Professor, Department of Exercise Science

Research.....

Boston University

2016–Present: Director, Neuromotor Recovery Laboratory

2019–Present: Associate Faculty, Center for Neurophotonics, Department of Biomedical Engineering

Harvard University

2016–2020: Associate Faculty Member, Wyss Institute for Biologically Inspired Engineering

2016–Present: Associate, Department of Materials Science and Mechanical Engineering

2020–Present: Faculty Member, Harvard Assistive Technology Initiative

Harvard Medical School

2016–Present: Associate, Department of Physical Medicine and Rehabilitation

2017–Present: Research Staff, Spaulding Rehabilitation Hospital

Clinical.....

University of Delaware Neurologic and Older Adult Physical Therapy Clinic, Newark, DE

2012–2014: Clinical Instructor and Physical Therapist (PRN)

Omega Medical Center, Newark, DE

2013–2014: Physical Therapist (PRN)

Rehabilitation Consultants Inc, Wilmington, DE

2012–2013: Physical Therapist (PRN)

Rutgers University, Department of Recreation, New Brunswick, NJ

2008–2009: Assistant Fitness and Personal Training Coordinator

Robert Wood Johnson Hospital Fitness and Wellness Center, Scotch Plains, NJ

2007–2008: Exercise Physiologist and Personal Trainer

ADVISORY POSITIONS

MedRhythms Inc, Portland, ME

2016–Present: Board of Advisors

2019–Present: Stroke Rehabilitation Scientific Advisory Board

2020–Present: Chief Science Advisor

ReWalk Robotics Ltd, Marlborough, MA

2016–Present: Stroke Rehabilitation Scientific Advisory Board

Wyss Institute for Biologically Inspired Engineering, Cambridge, MA

2014: Clinical Consultant

EDUCATION

Harvard University, Cambridge, MA

2015–2016: Postdoctoral Fellowship

Specialization: Wearable Robotics and Sensors

University of Delaware, Newark, DE

2012–2014: PhD, Biomechanics and Movement Science
Specialization: Motor Control and Development

University of Delaware, Newark, DE

2009–2012: DPT, Doctor of Physical Therapy
Specialization: Neurologic Physical Therapy

Rutgers University, New Brunswick, NJ

2004–2008: BS, Exercise Science
Minor: Psychology

LICENSES AND CREDENTIALS

Licenses.....

Massachusetts Board of Allied Health Professions

2015–Present: Licensed Physical Therapist (21530)

Delaware Examining Board for Physical Therapists

2012–2015: Licensed Physical Therapist (J1-0002848)

Credentials.....

American Physical Therapy Association

2012–Present: Credentialed Clinical Instructor

Delaware Office of Worker's Compensation

2013–2015: Certified Health Care Provider

American Council on Exercise

2007–2011: Certified Personal Trainer

USA Weightlifting Association

2008–2009: Sports Performance Coach

HONORS

2021: Best Paper Award, IEEE Conference on Neural Engineering

2021: Ignition Award, Boston University Office of Technology Development

2021: Marilyn Gossman Seminar Graduate Speaker Award (DR), Combined Sections Meeting of the APTA

2021: Marilyn Gossman Seminar Graduate Speaker Award (AR), Combined Sections Meeting of the APTA

2020–2021: Top 5 Research Outputs, Journal of NeuroEngineering and Rehabilitation (two papers in the top 5)

2020: Most Impactful Paper, IEEE Open Journal of Engineering in Medicine and Biology

2020: Featured author, Academy of Neurologic Physical Therapy Research Q&A

2019: Top Downloaded Paper 2018-2019, PM&R Journal

2019: Editor's pick, Journal of Neurologic Physical Therapy

2019: Fellow, American Heart Association Research Leaders Academy

2017–2019: KL2 Clinical Scholar Award, Boston University Clinical and Translational Science Institute

2018: Best Paper Award in Medical Robotics, IEEE Conference on Robotics and Automation

2017: Finalist for Best Presentation Award, IEEE Symposium on Wearable and Rehabilitation Robotics

2017: Fellow, Training in Grantsmanship for Rehabilitation Research (TIGRR) Program

2015: Marilyn Gossman Seminar Graduate Speaker Award, Combined Sections Meeting of the APTA

2015: Finalist for Best Paper Award, IEEE Conference on Rehabilitation Robotics

2015: Featured article, PTinMotion News

2014: Editor's pick, Lower Extremity Review Magazine

2013: Featured article, Orthotics and Prosthetics Business News

2010–2014: DPT/PhD Trainee, NIH NRSA T32 Award to University of Delaware

2008: Man of the Year Award, Rutgers University Office of Student Life

2008: Distinguished Leader Award, Rutgers University Office of Student Life

2008: Pillar of the Community Award, Rutgers University Office of Student Life

2007: Balanced Man Award, Sigma Phi Epsilon Fraternity Alumni and Volunteer Corporation

2007: Outstanding Chapter President Award, Rutgers University Office of Student Life

2004–2008: University Merit Award, Rutgers University

PEER-REVIEWED PAPERS

2021

36. Siviyy C*, Baker LM*, Quinlivan B*, Porciuncula F*, Swaminathan K*, **Awad LN**, Walsh CJ. Crawl, walk, run: Advances in exoskeletons and exosuits for locomotor assistance and training in the early 21st century. *Nature Biomedical Engineering*. 2021 (In Press)
35. Mitjans M*, Theofanidis M*, Collimore AN*, Disney ML*, Levine DM, **Awad LN**, Tron R. Visual-Inertial Filtering for Human Walking Quantification. In: *Robotics and Automation (ICRA), IEEE Int Conf on*. 2021 (In Press)
34. Luhmann AV, Zheng Y, Ortega-Martinez A, Kiran S, Somers DC, **Awad LN**, Ells TD, Boas DA, Yucel MA. Towards Neuroscience of the Everyday World (NEW) using functional Near Infrared Spectroscopy. *Current Opinion in Biomedical Engineering*. 2021. Jun;18:100272. PMID: 33709044
33. Arens P*, Siviyy C*, Bae J*, Choe DK*, Karavas N, Baker T, Ellis TE, **Awad LN**, Walsh CJ. Real-time gait metric estimation for everyday gait training with wearable devices in people poststroke. *Wearable Technologies*. 2021 Mar;2:e2
32. Sloutsky R*, Yücel MA, Collimore AN*, Ottman E*, Ellis TD, Walsh CJ, Boas DA, **Awad LN**. Targeting post-stroke walking automaticity with a propulsion-augmenting soft robotic exosuit: toward a biomechanical and neurophysiological approach to assistance prescription. In: *Neural Engineering (NER), IEEE Int Conf on*. 2021 (In Press)

2020

31. **Awad LN**, Lewek M, Kesar TM, Franz J, Bowden M. These legs were made for propulsion: Advancing the diagnosis and treatment of post-stroke propulsion deficits. *Journal of NeuroEngineering and Rehabilitation*. 2020. Oct;17:139. PMID: 33087137 PMCID: PMC7579929
30. Hutchinson KJ, Sloutsky R*, Collimore A*, Farmer B*, Harris B, Ellis TD, **Awad LN**. A music-based digital therapeutic: Proof-of-concept automation of a progressive and individualized rhythm-based walking training program after stroke. *Neurorehabilitation and Neural Repair*. 2020 Oct;34:11. PMID: 33040685
29. Revi DA*, Alvarez A*, Walsh CJ, De Rossi S, **Awad LN**. Indirect measurement of anterior-posterior ground reaction forces using a minimal set of wearable sensors: From healthy to hemiparetic walking. *Journal of NeuroEngineering and Rehabilitation*. 2020 Jun;17:82. PMID: 32600348 PMCID: PMC7322880
28. **Awad LN**, Esquenazi A, Francisco G, Nolan K, Jayaraman A. The ReWalk ReStore™ soft robotic exosuit: A multi-site clinical trial of the safety, reliability, and feasibility of exosuit-augmented post-stroke gait rehabilitation. *Journal of NeuroEngineering and Rehabilitation*. 2020;17:80. PMID: 32552775 PMCID: PMC7301475
27. Park EJ*, Akbas T*, Eckert-Erdheim A, Slood LH*, Orzel D, Schumm L, Ellis TD, **Awad LN**, Walsh CJ. A hinge-free, non-restrictive, lightweight tethered exosuit for knee extension assistance during walking. *IEEE Transactions on Medical Robotics & Bionics*. 2020 May;2:165-75. PMID: 33748694 PMCID: PMC7977627
26. Siviyy C*, Bae J*, Baker L*, Porciuncula F*, Baker T, Ellis TD, **Awad LN**, Walsh CJ. Offline assistance optimization of a soft exosuit for augmenting ankle power of stroke survivors during walking. *IEEE Robotics and Automation Letters*. 2020 Apr;5:828-35. PMID: 33748413 PMCID: PMC7971105
25. **Awad LN**, Kudzia P*, Revi DA*, Ellis TD, Walsh CJ. Walking faster and farther after stroke with a soft robotic exosuit: Implications for post-stroke gait assistance and rehabilitation. *IEEE Open Journal of Engineering in Medicine and Biology*. 2020 Apr;1:108-15. PMID: 33748765 PMCID: PMC7971412
24. **Awad LN**, Hsiao H, Binder-Macleod SA. Central drive to the paretic ankle plantarflexors affects the relationship between propulsion and walking speed after stroke. *Journal of Neurologic Physical Therapy*. 2020;44:42-8. PMID: 31834220
23. Nuckols RW*, Swaminathan K*, Lee S*, **Awad LN**, Walsh CJ, Howe RD. Automated detection of soleus concentric contraction in variable gait conditions for improved exosuit control. In: *Robotics and Automation (ICRA), IEEE Int Conf on*. 2020.

2019

22. **Awad LN**, Reisman DS, Binder-Macleod SA. Distance-induced changes in walking speed after stroke: Relationship to community walking activity. *Journal of Neurologic Physical Therapy*. 2019;43:220-223. PMID: 31449180
21. Porciuncula F*, Nuckols R*, Karavas N, Chang CK*, Baker TC, Orzel D, Perry D, Ellis T, **Awad LN**,

Walsh CJ. Assisting Limb Advancement During Walking After Stroke Using a Wearable Soft Hip Exosuit: A Proof-of-Concept. In: Masia L, Micera S, Akay M, Pons J (eds). *Converging Clinical and Engineering Research on Neurorehabilitation III*. ICNR 2018. Biosystems and Biorobotics (21). Springer, Cham. 2019.

2018

20. Porciuncula F*, Roto AV*, Kumar D, Davis I, Roy S, Walsh CJ, **Awad LN**. Wearable movement sensors for rehabilitation: A focused review of technological and clinical advances. *Physical Medicine and Rehabilitation Journal*. 2018 Sep;10S220-S232. PMID: 30269807
19. Bae J*, **Awad LN**, Long A, O'Donnell K, Hendron K, Holt KG, Ellis TD, Walsh CJ. Biomechanical mechanisms underlying exosuit-induced improvements in walking economy after stroke. *Journal of Experimental Biology*. 2018 Jan 18; pii:jeb.168815. PMID: 29361587
18. Kempinski K*, **Awad LN**, Buchanan TS, Higginson J, Knarr BA. Dynamic structure of lower limb joint angles during walking post-stroke. *Journal of Biomechanics*. 2018 Feb 8;68:1-5. PMID: 29325901
17. McNamara S*, Hevia EG*, St. Louis R*, Cho W*, Lee S*, Moyne M, Quinlivan B*, Payne CJ*, Walsh CJ, Schiller G, **Awad LN**. Isometric quadriceps strength test device to improve the reliability of handheld dynamometry in patients with anterior cruciate ligament injury. In: *Proceedings of the 2018 Design of Medical Devices Conference*. American Society of Mechanical Engineers Digital Collection. 2018
16. Bae J*, Siviyy C*, Rouleau M*, Menard N, O'Donnell K, Galiana I, Athanassiu M, Ryan D, Bibeau C, Sloot L*, Kudzia P*, Ellis TD, **Awad LN**, Walsh CJ. A lightweight and efficient portable soft exosuit for paretic ankle assistance in walking after stroke. In: *Robotics and Automation (ICRA), IEEE Int Conf on*. 2018.

2017

15. **Awad LN**, Bae J, O'Donnell K, De Rossi SMM, Hendron K, Sloot LH, Kudzia S, Allen S, Holt KG, Ellis T, Walsh CJ. A soft robotic exosuit improves walking in patients after stroke. *Science Translational Medicine*. 2017 Jul. 26;9:ea9084. PMID: 28747517
14. **Awad LN**, Bae J, Kudzia, P, Long A, Hendron K, Holt KG, O'Donnell K, Ellis T, Walsh CJ. Reducing circumduction and hip hiking during hemiparetic walking through targeted assistance of the paretic limb using a soft robotic exosuit. *American Journal of Physical Medicine and Rehabilitation*. 2017 Oct. PMID: 28777105

2016

13. **Awad LN**, Reisman DS, Pohlig RT, Binder-Macleod SA. Identifying candidates for targeted gait rehabilitation after stroke: better prediction through biomechanics-informed characterization. *Journal of NeuroEngineering and Rehabilitation*. 2016 Sep;13:84. PMID: 27663199. PMCID: PMC5035477
12. Hsiao H, **Awad LN**, Palmer JA, Higginson JS, Binder-Macleod SA. Contribution of paretic and non-paretic limb peak propulsive forces to changes in walking speed in individuals poststroke. *Neurorehabilitation and Neural Repair*. 2016 Sep;30:743-52. PMID: 26721869. PMCID: PMC4930429
11. **Awad LN**, Reisman DS, Pohlig RT, Binder-Macleod SA. Reducing the cost of transport and increasing walking distance after stroke: a randomized controlled trial on fast locomotor training combined with functional electrical stimulation. *Neurorehabilitation and Neural Repair*. 2016 Aug;30:661-70. PMID: 26621366. PMCID: PMC4885807
10. Palmer JA, Hsiao H, **Awad LN**, Binder-Macleod SA. Symmetry of corticomotor input to plantarflexors influences the propulsive strategy used to increase walking speed post-stroke. *Clinical Neurophysiology*. 2016 Aug;30:661-70. PMID: 26724913. PMCID: PMC4753089

pre-2016

9. Kesar TM, Reisman DS, Higginson JS, **Awad LN**, Binder-Macleod SA. Changes in Post-Stroke Gait Biomechanics Induced by One Session of Gait Training. *Physical Medicine and Rehabilitation - International*. 2015 Dec;2:1072. PMID: 2781906. PMCID: PMC5096644
8. **Awad LN**, Binder-Macleod SA, Pohlig RT, Reisman DS. Paretic propulsion and trailing limb angle are key determinants of long-distance walking function after stroke. *Neurorehabilitation and Neural Repair*. 2015 Jul;29:499-508. PMID: 25385764. PMCID: PMC4426250
7. **Awad LN**, Palmer JA, Pohlig RT, Binder-Macleod SA, Reisman DS. Walking speed and step length asymmetry modify the energy cost of walking after stroke. *Neurorehabilitation and Neural Repair*. 2015 Jun;29:416-23. PMID: 25288581. PMCID: PMC4385745
6. Bae J*, De Rossi SMM, O'Donnell K, Hendron KL, **Awad LN**, Teles Dos Santos TR, De Araujo VL, Ding Y, Holt KG, Ellis TD, Walsh CJ. A soft exosuit for patients with stroke: Feasibility study with a mobile off-board actuation unit. In: *Rehabilitation Robotics (ICORR), IEEE Int Conf on*. 2015.
5. **Awad LN**, Reisman DS, Wright TR, Roos M, Binder-Macleod SA. Maximum walking speed is a key determinant

of long distance walking function after stroke. Topics in Stroke Rehabilitation. 2014 Nov-Dec;21:502-9. PMID: 25467398. PMCID: PMC4382083

4. **Awad LN**, Reisman DS, Binder-Macleod SA. Do improvements in balance relate to improvements in long-distance walking function after stroke? Stroke Research and Treatment. 2014;2014.646230. PMID: 25120939. PMCID: PMC4121191
3. **Awad LN**, Reisman DS, Kesar TM, Binder-Macleod SA. Targeting paretic propulsion to improve post-stroke walking function: a preliminary study. Archives of Physical Medicine and Rehabilitation. 2014 May;95:840-8. PMID: 24378803. PMCID: PMC4160043
2. **Awad LN**, Kesar TM, Reisman D, Binder-Macleod SA. Effects of repeated treadmill testing and electrical stimulation on post-stroke gait kinematics. Gait and Posture. 2013 Jan;37:67-71. PMID: 22796242. PMCID: PMC3488355
1. Hanna JJ, **Awad LN**, Paskhover B. The second-class disease: Pediatric cancer. Einstein Journal of Biology and Medicine. 2011;27:18-19.

PEER-REVIEWED EXTENDED ABSTRACTS

10. Collimore AN*, Roto AV*, Hutchinson K, Harris B, **Awad LN**. Rhythmic Auditory Stimulation improves cost of transport and asymmetry after stroke. In: Proceedings of the 45th Annual Meeting of the American Society of Biomechanics. 2021. (accepted)
9. Nuckols RW*, Porciuncula F*, Chang CK*, Baker TC, Orzel D, Eckert-Erdehim A, Perry D, Ellis TD, **Awad LN**, Walsh CJ. Mobile unilateral hip flexion exosuit assistance for overground walking in individuals post-stroke: A case series. In: Proceedings of 2020 International Symposium on Wearable Robotics. 2020.
8. Revi DA*, Alvarez AM*, Braga LR*, Walsh CJ, De Rossi SMM, **Awad LN**. Beyond walking distance: Evaluating propulsion function during the 6-minute walk test with wearable inertial sensors. In: Proceedings of the 44th Annual Meeting of the American Society of Biomechanics. 2020.
7. Alvarez AM*, Collimore AN*, Aiello AJM*, Binder-Macleod SA, **Awad LN**. Propulsion timing affects the relationship between paretic propulsion and long-distance walking function after stroke. In: Proceedings of the 44th Annual Meeting of the American Society of Biomechanics. 2020.
6. Sloat L*, Bae J*, Baker L*, O'Donnell K, Menard N, Porciuncula F*, Choe D*, Ellis T, **Awad LN**, Walsh CJ. A soft robotic exosuit assisting the paretic ankle in patients post-stroke: Effect on muscle activation during overground walking. Gait and Posture. 2018.
5. **Awad LN**, Bae J*, O'Donnell K, Hendron KL*, Sloat L*, Sivi C*, Kudzia P*, Ellis TD, Walsh CJ. Soft exosuits increase walking speed and distance after stroke. In: 2017 International Symposium on Wearable Robotics and Rehabilitation (WeRob). IEEE. 2017.
4. Bae J*, **Awad LN**, Menard N, Rouleau M*, Sivi C*, O'Donnell K, Ellis TD, Walsh CJ. Exosuit-induced improvements in walking after stroke: comprehensive analysis on gait energetics and biomechanics. In: 2017 International Symposium on Wearable Robotics and Rehabilitation (WeRob). IEEE. 2017.
3. Kudzia P*, Bae J, **Awad LN**, Long A*, Sloat LH*, Hendron K, Holt KG, O'Donnell K, Ellis TD, Walsh CJ. A uni-lateral soft exosuit for the paretic ankle can reduce gait compensations in patients post-stroke. In: Proceedings of the 41st Annual Meeting of the American Society of Biomechanics. 2017.
2. Sloat L*, Hejrati B*, Kudzia P*, Bae J*, Hendron K*, O'Donnell K, Holt KG, Ellis TD, **Awad LN**, Walsh CJ. A uni-lateral ankle assisting soft robotic exosuit can improve post-stroke gait during overground walking. In: Proceedings of the 41st Annual Meeting of the American Society of Biomechanics. 2017.
1. Bae J*, **Awad LN**, O'Donnell K, Hendron KL, Allen S, De Rossi SMM, Holt KG, Ellis TD, Walsh CJ. Assisting paretic ankle motion with a soft exosuit can reduce whole-body compensatory gait patterns and improve walking efficiency for patients after stroke. In: Dynamic Walking. 2016.

PUBLISHED BOOK CHAPTERS

1. **Awad LN**, Walsh CJ, Malcolm P. Soft Wearable Robots. In: Wang Q, Vitiello N, Hasegawa Y (eds). *Wearable Robotics for Motion Assistance and Rehabilitation*. Springer Publishing. (In Press)

PRESENTATIONS (Organized, Contributed, and Invited)

National Conference Organized Educational Sessions.....

104. **Awad LN**, Kesar TM, Lewek M, Walsh CJ, Sawicki G. (EDUCATIONAL SESSION) Active versus passive interventions that restore versus substitute impaired locomotor subtasks after neuromotor injury. Combined Sections Meeting of the American Physical Therapy Association. 2022. (submitted)
103. **Awad LN**, Harris B, Spaulding A. (EDUCATIONAL SESSION) Rhythm and the motor system: New oppor-

- tunities for gait training. Annual Meeting of the American Congress on Rehabilitation Medicine. Virtual. 2021
102. **Awad LN**, Hornby G, Hohl K, Packel A. (EDUCATIONAL SESSION) High Intensity Locomotor Training and Robotics: Friend or Foe? Annual Meeting of the American Congress on Rehabilitation Medicine. Virtual. 2021
 101. **Awad LN**, Lewek M, Ellis T, Spaulding A, Harris B. (EDUCATIONAL SESSION) Rhythm and the motor system: New opportunities for gait training. Combined Sections Meeting of the American Physical Therapy Association. Denver, CO. 2020
 100. **Awad LN**, Harris B, Spaulding A. (EDUCATIONAL SESSION) Rhythm and the motor system: New opportunities for gait training. Training Institute of the American Congress on Rehabilitation Medicine. Chicago, IL. 2019
 99. **Awad LN**, Lewek M, Finley J, Kesar TM, Thompson LV. (EDUCATIONAL SESSION) Treating gait asymmetry after stroke: Basic and clinical research insights. Combined Sections Meeting of the American Physical Therapy Association. Washington, DC. 2019
 98. **Awad LN**, Harris B, Spaulding A. (PRE-CONFERENCE WORKSHOP) Rhythm and the Motor System: New Opportunities for Gait Training. Annual Meeting of the American Congress on Rehabilitation Medicine. Dallas, TX. 2018
 97. **Awad LN**, Bowden M, Lewek M, Franz J. (EDUCATIONAL SESSION) Diagnosing and Treating Deficits in Propulsion to Improve Walking After Stroke. Combined Sections Meeting of the American Physical Therapy Association. New Orleans, LA. 2018
 96. **Awad LN**, Bowden M, Lewek M, Franz J. (EDUCATIONAL SESSION) Diagnosing and Treating Deficits in Propulsion to Improve Walking After Stroke: Clinical and Technological Advances. Annual Meeting of the American Congress on Rehabilitation Medicine. Atlanta, GA. 2017
 95. Eng Lo, **Awad LN**. (EDUCATIONAL SESSION) Engineering for Stroke Science. International Stroke Conference of the American Heart Association. Houston, TX. 2017
 94. Joel Stein, **Awad LN**. (EDUCATIONAL SESSION) New Frontiers in Rehabilitation Robotics. Annual Meeting of the Association of Academic Physiatrists. Las Vegas, NV. 2017

National Conference Contributed Presentations.....

93. Collimore AN*, Roto AV*, Hutchinson K, Harris B, **Awad LN**. Rhythmic Auditory Stimulation improves cost of transport and asymmetry after stroke. American Society of Biomechanics Annual Meeting. 2021. (accepted)
92. Collimore AN, Aiello AJ, Pohlig RT, **Awad LN**. (POSTER) The dynamic motor control index is a better marker of age-related neuromotor impairments than the number of muscle synergies. Neural Control of Movement. Virtual. 2021
91. Swaminathan K, Park S, Porciuncula F, Fouzia R, **Awad LN**, Walsh CJ. (POSTER) Preliminary Evidence for Short-term Retention of Increased Paretic Propulsion after Intermittent Exosuit Assistance in People Post-Stroke with Moderate Propulsion Deficit. Neural Control of Movement. Virtual. 2021
90. Sloutsky R*, Yücel MA, Ottman E, Ellis TD, Walsh CJ, Boas DA, **Awad LN**. (POSTER) Toward individualized and outcome-specific prescriptions of paretic plantarflexor assistance parameters during soft robotic exosuit-augmented locomotion. Combined Sections Meeting of the American Physical Therapy Association. Virtual. 2021
89. Porciuncula F*, Revi DA, Baker TC, Bae J, Sloutsky R, Baker LM, Ellis TD, Walsh CJ, **Awad LN**. (POSTER) Speed-Based Gait Training with Soft Robotic Exosuits Improves Walking after Stroke: A Crossover Pilot Study. Combined Sections Meeting of the American Physical Therapy Association. Virtual. 2021
88. Roto AV*, Sloutsky R, Starr JA, **Awad LN**. From Heart Rate to VO₂: Estimation equation for post-stroke hemiparetic walking across different training intensities. (PLATFORM) Combined Sections Meeting of the American Physical Therapy Association. Virtual. 2021
87. Revi DA*, Braga LR, Alvarez AM, Walsh CJ, De Rossi SMM, **Awad LN**. (PLATFORM) Evaluating post-stroke paretic propulsion function during the 6-minute walk test with wearable inertial sensors. Combined Sections Meeting of the American Physical Therapy Association. Virtual. 2021
86. Butler J, O'Donnell K, **Awad LN**. (POSTER) The ReStore exosuit is a safe addition to physical therapy treatment to improve walking outcomes post-stroke. Annual Meeting of the American Congress on Rehabilitation Medicine. Virtual. 2020
85. Harris B, **Awad LN**. (POSTER) Automating a progressive and individualized rhythm-based walking training program after stroke: Feasibility of a music-based digital therapeutic. Annual Meeting of the American Congress on Rehabilitation Medicine. Virtual. 2020
84. Revi DA*, Alvarez AM, Braga LR, Walsh CJ, De Rossi SMM, **Awad LN**. (POSTER) Beyond walking distance: Evaluating propulsion function during the 6-minute walk test with wearable inertial sensors. American Society

of Biomechanics Annual Meeting. Virtual. 2020

83. Alvarez AM*, Collimore AN, Aiello AJM, Binder-Macleod SA, **Awad LN**. (POSTER) Propulsion timing affects the relationship between paretic propulsion and long-distance walking function after stroke. American Society of Biomechanics Annual Meeting. Virtual. 2020
82. O'Connor MV*, Roto AV, Aiello AJ, Collimore AN, Sloutsky R, Harris B, **Awad LN**. (POSTER) Targeting Rhythm to Improve Economy: One Session of Music-Based Rhythmic Locomotor Training Improves Post-Stroke Economy. Combined Sections Meeting of the American Physical Therapy Association. Denver, CO. 2020
81. Hutchinson KJ, Farmer B, Sloutsky R, Harris B, Ellis TD, **Awad LN**. (POSTER) Closing the Loop on Rhythm: Automated, Progressive, and Music-Based Rhythmic Training Increases Post-Stroke Gait Speed. Combined Sections Meeting of the American Physical Therapy Association. Denver, CO. 2020
80. Porciuncula F*, Baker TC, Revi DA, Bae J, Sloutsky R, Baker L, Ellis T, Walsh CJ, **Awad LN**. (POSTER) Soft Robotic Exosuits for Targeted Gait Rehabilitation After Stroke: A Case Study. American Society for Neurorehabilitation. Chicago, IL. 2019
79. Ledwick CW*, Roto A, Binder-Macleod SA, **Awad LN**. (PLATFORM) Relationship between poststroke depression and self-perception, physical abilities, and physical activity. Combined Sections Meeting of the American Physical Therapy Association. Washington, DC. 2019.
78. Paskewitz JS*, Alvarez A, Binder-Macleod SA, **Awad LN**. (POSTER) Identifying paretic propulsion and ground clearance impairments after stroke through the combined assessment of walking speed and specific functional gait assessment items. Combined Sections Meeting of the American Physical Therapy Association. Washington, DC. 2019
77. Porciuncula F*, Nuckols R, Karavas N, Chang CK, Baker TC, Orzel D, Perry D, Ellis T, **Awad LN**, Walsh CJ. (PLATFORM) Assisting limb advancement during walking in stroke using a wearable soft hip exosuit: A proof-of-concept. International Conference on Neurorehabilitation. Pisa, Italy. 2018.
76. **Awad LN**, Knarr B, Kudzia P, Buchanan T. (POSTER) Speed-based changes to walking stability and economy may explain preferred walking speed after stroke. World Congress of Biomechanics. Dublin, Ireland. 2018.
75. Slood LH*, Bae J, Nuckols RW, Baker LM, O'Donnell K, Menard N, Porciuncula F, Sloutsky R, Baker T, Choe DK, Ellis TD, **Awad LN**, Walsh CJ. (PLATFORM) A soft robotic exosuit assisting the paretic ankle in patients post-stroke: effect on muscle activation during overground walking. World Congress of Biomechanics. Dublin, Ireland. 2018.
74. McNamara S*, Hevia EG, Lee S, St. Louis R, Cho W, Payne CJ, Moyne M, Quinlivan B, Schiller G, **Awad LN**, Walsh CJ. (POSTER) Isometric quadriceps strength test device to improve the reliability of handheld dynamometry in patients with anterior cruciate ligament injury. ASME Design of Medical Devices Conferences. Minneapolis, MN. 2018.
73. Bae J*, Siviyy C, Rouleau M, Menard N, O'Donnell K, Galiana I, Athanassiu M, Ryan D, Slood L, Kudzia P, Ellis TD, **Awad LN**, Walsh CJ. (PLATFORM) Portable soft exosuit for paretic ankle assistance in overground walking after stroke. Dynamic Walking. Pensacola, FL. 2018.
72. **Awad LN**, Binder-Macleod S. (PLATFORM) Contribution of impairments in paretic plantarflexor force capacity, volitional strength, and activation to paretic propulsion during hemiparetic walking. American Physical Therapy Association Combined Sections Meeting. New Orleans, LA. 2018
71. Bae J*, Siviyy C, Rouleau M, Menard N, O'Donnell K, Galiana I, Athanassiu M, Ryan D, Bibeau C, Slood L, Kudzia P, Ellis TD, **Awad LN**, Walsh CJ. (PLATFORM) A lightweight and efficient portable soft exosuit for paretic ankle assistance in walking after stroke. IEEE International Conference on Robotics and Automation (ICRA). Brisbane, Australia. 2018
70. **Awad LN**, Bae J, O'Donnell K, Hendron K, Slood L, Siviyy C, Kudzia P, Ellis TD, Walsh CJ. (POSTER) Soft Exosuits Increase Walking Speed and Distance after Stroke. IEEE International Symposium on Wearable Robotics and Rehabilitation (WeRob). Houston, TX. Nov 2017
69. Bae J*, **Awad LN**, Siviyy C, O'Donnell K, Ellis TD, Walsh CJ. (POSTER) Exosuit-Induced Improvements in Walking after Stroke: Comprehensive Analysis of Gait Energetics And Biomechanics. IEEE International Symposium on Wearable Robotics and Rehabilitation (WeRob). Houston, TX. Nov 2017
68. Kudzia P*, Bae J, **Awad LN**, Long A, Slood L, Hendron K, Holt KG, O'Donnell K, Ellis T, Walsh CJ. (POSTER) A Unilateral Soft Exosuit for the Paretic Ankle can Reduce Gait Compensations in Patients Poststroke. American Society of Biomechanics Annual Meeting. Boulder, CO. Aug 2017
67. Slood LH*, Hejrati B, Kudzia P, Bae J, Hendron K, O'Donnell K, Ellis T, **Awad LN**, Walsh CJ. (POSTER) A Unilateral Ankle Assisting Soft Robotic Exosuit can Improve Post-Stroke Gait during Overground Walking. American Society of Biomechanics Annual Meeting. Boulder, CO. Aug 2017.
66. **Awad LN**, Reisman DS, Binder-Macleod SA. (PLATFORM) Identifying Candidates for Targeted Gait Rehabilitation: Better Prediction through Biomechanics-Informed Characterization. American Physical Therapy

Association Combined Sections Meeting. San Antonio, TX. Feb 2017

65. **Awad LN**, Bae J, O'Donnell K, Hendron KL, Kudzia P, Zurawski E, Holt KG, Ellis TD, Walsh CJ. (POSTER) Soft Wearable Robots Can Increase Walking Speed and Distance after Stroke: Proof-of-Concept. American Physical Therapy Association Combined Sections Meeting. San Antonio, TX. February 2017
64. Bae J*, **Awad LN**, O'Donnell K, Hendron KL, Allen S, De Rossi SMM, Holt KG, Ellis TD, Walsh CJ. (PLATFORM) Assisting Paretic Ankle Motion with a Soft Exosuit Can Reduce Compensatory Gait Patterns and Improve Walking Efficiency For Patients After Stroke. Dynamic Walking. Camp Ohiyesa, MI. June 2016
63. **Awad LN**, Bae J, De Rossi SMM, O'Donnell K, Hendron KL, Allen S, Holt KG, Ellis TD, Walsh CJ. (PLATFORM) Improving Poststroke Walking with a Soft Exosuit: A Potential Platform for Community-Based Neurorehabilitation. World Congress for Neurorehabilitation. Philadelphia, PA. May 2016
62. **Awad LN**, Bae J, O'Donnell K, Hendron KL, Allen S, De Rossi SMM, Holt KG, Ellis TD, Walsh CJ. (PLATFORM) Soft Wearable Robots Can Reduce the Energy Cost of Poststroke Walking: A Proof-of-Concept Study. American Physical Therapy Association Combined Sections Meeting. Anaheim, CA. February 2016
61. Palmer JA, Hsiao H, **Awad LN**, Binder-Macleod SA. (POSTER) Asymmetrical Corticomotor Input to the Plantarflexors Influences the Biomechanical Strategy of Speed Modulation in Individuals Post-stroke. Society for Neuroscience Annual Meeting. Chicago, IL. 2015
60. Bae J, De Rossi SMM, **Awad LN**, O'Donnell K, Holt KG, Ellis TD, Walsh CJ. (POSTER) Human-Machine Interaction with Mobility Enhancing Soft Exosuits. NSF Cyber-Physical Systems Principal Investigators Meeting. Arlington, VA. 2015
59. Bae J, De Rossi SMM, O'Donnell K, Hendron KL, **Awad LN**, Teles Dos Santos TR, De Araujo VL, Ding Y, Holt KG, Ellis TD, Walsh CJ. (PLATFORM) Soft Exosuit for Poststroke Gait Assistance. IEEE International Conference on Rehabilitation Robotics (ICORR). Singapore. 2015
58. **Awad LN**, Reisman DS, Binder-Macleod SA. (PLATFORM) Initial Results from the FastFES Randomized Controlled Trial. American Physical Therapy Association Combined Sections Meeting. Indianapolis, IN. 2015
57. **Awad LN**, Reisman DS, Binder-Macleod SA. (POSTER) Walking Speed Does Not Tell All After Stroke. American Physical Therapy Association Combined Sections Meeting. Indianapolis, IN. 2015
56. **Awad LN**, Binder-Macleod SA, Pohlig RT, Reisman DS. (PLATFORM) Paretic propulsion and trailing limb angle are key determinants of long-distance walking function after stroke. Gait and Clinical Movement Analysis Society Annual Meeting. Newark, DE. 2014
55. Knarr B, **Awad LN**, Reisman DS. (PLATFORM) Training with real-time visual feedback of propulsive force in poststroke individuals: a case study. Gait and Clinical Movement Analysis Society Annual Meeting. Newark, DE. 2014
54. **Awad LN**, Reisman DS, Wright TR, Binder-Macleod SA. (POSTER) Identifying deficits to target during post-stroke walking rehabilitation. American Physical Therapy Association Combined Sections Meeting. Las Vegas, NV. 2014
53. Brandis C, **Awad LN**, Hsiao H, Marion S, Kesar TM, Binder-Macleod SA. (PLATFORM) The Effects of Fatigue on Poststroke Muscle Force Production and Center of Mass Acceleration: A Musculoskeletal Simulation Analysis. 11th International Symposium, Computer Methods in Biomechanics and Biomedical Engineering. Salt Lake City, UT. 2013
52. **Awad LN**, Kesar TM, Binder-Macleod SA. (POSTER) How many training sessions are necessary to obtain an accurate assessment of gait performance in individuals post-stroke? American Physical Therapy Association Combined Sections Meeting, New Orleans, LA. 2011

Regional Conference Contributed Presentations.....

51. Collimore AN*, Aiello AJ*, **Awad LN**. Complexity of neuromuscular control is impaired with aging and associated with reduced central drive to the paretic plantarflexor muscles after stroke: A preliminary study. (POSTER) NeuroBoston. 2020.
50. Lansberry G*, Walsh C, **Awad LN**. reNeu: A neuroprosthesis for gait restoration after stroke. (PLATFORM) Annual Retreat of the Wyss Institute for Biologically Inspired Engineering. Boston, MA. 2019
49. Aiello A*, Choe D, Sloutsky R, Lansberry G, Walsh C, **Awad LN**. reNeu: neuroprosthesis for improving post-stroke gait. (POSTER) Annual Retreat of the Wyss Institute for Biologically Inspired Engineering. Boston, MA. 2019
48. Porciuncula FP*, Baker TC, Sloutsky R, Ellis TD, **Awad LN**. (EDUCATIONAL SESSION) May the (propulsion) force be with you: Soft robotic exosuits for gait restoration after stroke. Annual Conference of the APTAMA. Norwood, MA. 2019
47. Lansberry G*, Aiello A, Walsh T, Bonato P, Walsh C, **Awad LN**. Bio-machine integration of functional electrical stimulation and exosuits: Lighter, smaller, and more powerful soft wearable robots. (POSTER).

- Annual Retreat of the Wyss Institute for Biologically Inspired Engineering. Boston, MA. 2018
46. Porciuncula F*, Baker T, Sloutsky R, Revi D, Baker L, Ellis TD, Walsh CJ, **Awad LN**. Robotic Exosuit Augmented Locomotion (REAL): Personalized, gait-restorative training in the community. (POSTER). Annual Retreat of the Wyss Institute for Biologically Inspired Engineering. Boston, MA. 2018
 45. Doolan F*, Binder-Macleod S, **Awad LN**. Paretic Plantarflexor Muscle Function After Stroke: Impairments in Activation, not Capacity, Contribute to Deficits in Paretic Propulsion During Hemiparetic Walking. (POSTER) Boston University 6th Annual Translational Science Symposium. Boston, MA. 2017
 44. **Awad LN**, Reisman DS, Binder-Macleod SA. FastFES Targeted Locomotor Training After Stroke. (POSTER) Spaulding Stroke Institute and New England Regional Coordination Center Stroke Recovery Research Symposium. Charlestown, MA. 2016
 43. Bae J*, **Awad LN**, O'Donnell K, Hejrati B, Long A, Slood L, Walsh CJ. Soft Exosuit for Gait Recovery After Stroke: Feasibility Study with Chronic Stroke Patients. (POSTER) Spaulding Stroke Institute and New England Regional Coordination Center Stroke Recovery Research Symposium. Charlestown, MA. 2016
 42. O'Donnell K*, Bae J, **Awad LN**, Hendron K, Kudzia P, Long A, Slood L, Hejrati B*, Holt KG, Ellis T, Walsh CJ. Soft Medical Exosuits for Gait Rehabilitation: From the Lab to the Clinic. (PLATFORM) Annual Retreat of the Wyss Institute for Biologically Inspired Engineering. Boston, MA. 2016
 41. Bae J*, O'Donnell K, **Awad LN**, Hendron K, Kudzia P, Long A, Slood L, Hejrati B, Holt KG, Ellis T, Walsh CJ. Soft Exosuit for Poststroke Gait Assistance. (POSTER) Annual Retreat of the Wyss Institute for Biologically Inspired Engineering. Boston, MA. 2016
 40. O'Donnell K*, **Awad LN**, Bae J, Menard N, Wong T, De Rossi SMM, Willis C, Hendron K, Holt KG, Ellis T, Walsh CJ. Soft Medical Exosuits for Gait Assistance. (PLATFORM) Annual Retreat of the Wyss Institute for Biologically Inspired Engineering. Boston, MA. 2015
 39. **Awad LN**, Palmer J, Binder-Macleod SA, Pohl RT, Reisman DS. Walking Speed and Step Length Asymmetry Modify Walking Economy After Stroke. (PLATFORM) Center for Bioengineering Research Annual Biomechanics Research Symposium. Newark, DE. 2014
 38. Butkerait C, Wright T, **Awad LN**, Reisman DS, Binder-Macleod SA. Factors that attribute body weight through a treadmill training intervention. (POSTER) Center for Bioengineering Research Annual Biomechanics Research Symposium. Newark, DE. 2014
 37. **Awad LN**, Reisman DS, Wright TR, Binder-Macleod SA. The validity of using cross-sectional relationships to identify deficits to target during walking training post-stroke. (POSTER) Johns Hopkins Rehabilitation Therapy Services Clinical Showcase. Baltimore, MD. 2013
 36. **Awad LN**, Reisman DS, Wright TR, Binder-Macleod SA. Do improvements in commonly targeted mobility deficits relate to improvements in post-stroke locomotor recovery following intervention? (PLATFORM) Center for Bioengineering Research Annual Biomechanics Research Symposium. Newark, DE. 2013
 35. **Awad LN**, Binder-Macleod SA. Predictors of Functional Gait Recovery Following Treadmill Training in Post-stroke Individuals. (POSTER) Johns Hopkins Rehabilitation Therapy Services Clinical Showcase. Baltimore, MD. 2012
 34. **Awad LN**, Kesar TM, Binder-Macleod SA. How many testing sessions are necessary to determine the effectiveness of post-stroke gait interventions? (POSTER) Center for Bioengineering Research Annual Biomechanics Research Symposium, Newark, DE. 2011
 33. **Awad LN**, Kesar TM, Binder-Macleod SA. Post-Stroke Gait: Day-To-Day and Stride-To-Stride Variability. (POSTER) Center for Bioengineering Research Annual Biomechanics Research Symposium, Newark, DE. 2010.

Invited Talks, Academic.....

32. May the (propulsion) force be with you: Soft robotic exosuits for post-stroke gait recovery. Medical Rehabilitation Track General Session, WeaRAcon 2021. Virtual. 2021
31. Rhythm and the motor system: A music-based digital therapeutic to automate individualized and progressive rhythm-based walking training after stroke. MGH Center for NeuroTechnology and NeuroRecovery Research Seminar Series. Virtual. 2021.
30. Rhythm and the motor system: New opportunities for post-stroke rehabilitation. Braintree Neurorehabilitation Conference. Virtual. 2020
29. Rehabilitation interventions and technologies for gait measurement, substitution, and restoration after stroke. Research blitz webinar hosted by Boston University Center for NeuroPhotonics. Virtual. 2020
28. Rhythm and the motor system: New opportunities for post-stroke rehabilitation. Academy of Neurologic Physical Therapy Webinar. Virtual. 2020
27. May the (propulsion) force be with you: Soft robotics for gait restoration after stroke. Meeting of the APTAMA. Boston, MA. 2019

26. Next-generation interventions and technologies for gait measurement, substitution, and restoration after stroke. Wyss Institute Bioinspired Soft Robotics Platform. Boston, MA. 2019
25. Rhythm and locomotion: New opportunities for gait training. AbilityLab. Chicago, IL. 2019
24. From lab to community: Gait-restorative interventions and technologies after stroke. Pilot Project to Impactful Science Symposium: Highlights from the BU Clinical and Translational Science Institute. Boston, MA. 2019
23. Soft robotic exosuits for patients post-stroke. WeaRAcon 2019. Scottsdale, AZ. 2019
22. Gait-restorative Technologies for Targeted Locomotor Rehabilitation after Stroke. Delegation of the Italian Ministry of Health Wounded Warriors Program. Charlestown, MA. 2018
21. Gait-restorative Technologies for Targeted Locomotor Rehabilitation after Stroke. Representatives of the European Institute of Innovation and Technology. Charlestown, MA. 2018
20. Gait-restorative Technologies for Targeted Locomotor Rehabilitation after Stroke. Grand Rounds Beth Israel Deaconess Medical Center. Boston, MA. 2018
19. Soft Robotic Exosuits for Gait-Restorative Assistance and Rehabilitation. Orthotic and Prosthetic Innovative Technologies Conference. San Francisco, CA. 2018
18. Diagnosing and Treating Deficits in Paretic Propulsion to Improve Walking After Stroke. Motion Analysis Laboratory. Spaulding Rehabilitation Hospital, Charlestown, MA. 2017
17. Next Generation Rehabilitation Robots: Soft Exosuits for Targeted Poststroke Locomotor Rehabilitation. Barrow Neurological Institute Stroke Rehabilitation Symposium, Phoenix, AZ. 2016
16. Soft Exosuits for Patients Poststroke. Stroke Research and Recovery Institute. Spaulding Rehabilitation Hospital, Boston, MA. 2016
15. New Paradigms for Locomotor Rehabilitation: Technologies and Interventions. College of Health and Rehabilitation Sciences: Sargent College, Boston University, Boston, MA. 2015
14. A Soft Wearable Robot for Persons Poststroke. Spaulding Rehabilitation Hospital, Charlestown, MA. 2015
13. Principles of Experience-Dependent Neural Plasticity: Implications for Rehabilitation after Brain Damage by Kleim and Jones. Neuroplasticity Seminar, University of Delaware, DE. 2012
12. The Neuroanatomy of Motor Learning: Implications for the Damaged Brain. Neuroplasticity Seminar, University of Delaware, DE. 2012
11. Poststroke Gait Retraining: Research Update from the University of Delaware. Kessler Institute for Rehabilitation. West Orange, NJ. 2011
10. FES as a Tool for the Functional Rehabilitation of the Acute Stroke Patient. Johns Hopkins University Hospital, Department of Physical Medicine and Rehabilitation. Baltimore, MD. 2011
9. General Electrotherapy Principles for Rehabilitation Specialists. Johns Hopkins University Hospital, Department of Physical Medicine and Rehabilitation. Baltimore, MD. 2011
8. Effective Utilization of Clinical Predication Rules in the Outpatient Physical Therapy Setting. Kessler Rehabilitation Center. Hawthorne, NJ. 2011
7. Poststroke Gait Variability and Residual Gait Deficits Following Conventional Rehabilitation. St. Barnabas Medical Center Dept. of Rehabilitation Services. Livingston, NJ. 2010

Invited Talks, Industry.....

6. Restoring paretic propulsion: Using an exosuit to address propulsion deficits after stroke. Wolters Kluwer Health Webinar. Virtual. 2020.
5. Innovations in Gait Rehabilitation. MedRhythms Videocast Series. Virtual. 2020.
4. A biomechanical framework for using rhythm to restore the optimality of human locomotion. Continuing education course hosted by MedRhythms. Virtual. 2020
3. Soft robotic exosuits for post-stroke propulsion recovery. ReWalk Robotics Webinar. Virtual. 2020
2. May the (propulsion) force be with you: Soft robotic exosuits for post-stroke gait recovery. ReWalk Robotics Invitational Dinner at the AAPM&R annual meeting. San Antonio, TX. 2019
1. Bipedal locomotion: Insights for technology developers. MedRhythms Inc. Boston, MA. 2019

RESEARCH FUNDING

Ongoing Research Support.....

NIH R01AG067394 (MPIs: Awad, Tron), 09/2019–05/2023

SCH: Multimodal, Task-Aware Movement Assessment and Control: Clinic to Home

Goal: The goal of this study is to develop a multi-modal sensor system capable of monitoring movement behavior and quality, identifying movement dysfunctions, and facilitating in-the-home interventions.

Role: PI

NIH UH2AR076731 (PI: Walsh), 09/2019–09/2024

Development, evaluation, and translation of robotic apparel for alleviating low back pain

Goal: The goal of this study is to develop robotic apparel with integrated biofeedback components to reduce exertion, encourage safe and varied movement strategies, and promote recovery.

Role: PI-Subcontract

NSF 1925085 (PI: Walsh, Awad, Ellis, Kuindersma), 09/2019–08/2022

NRI: INT: Wearable Robots for the Community: Personalized Assistance using Human-in-the-loop Optimization

Goal: The goal of this study is to develop new control approaches to personalize soft robotic exosuit assistance delivered during walking.

Role: PI-Subcontract

BU-OTD Ignition Award (PI: Awad), 06/2021–05/2022

The reNeu propulsion neuroprosthesis for gait restoration after neurological injury

Goal: The goal of this study is to advance toward clinical translation a novel propulsion neuroprosthesis.

Role: PI

MedRhythms Research Contract (PI: Ellis), 05/2021–04/2022

Feasibility and preliminary effects of a music-based digital therapeutic for persons with Parkinson disease

Goal: The goal of this study is to evaluate in people with Parkinson's disease the effects of gait training using music-based, rhythm-modulation using real-time measurements of gait.

Role: Co-I

BU-IHSIP Summer Research Award (PI: Awad), 06/2021–09/2021

Stepping into new digital paradigms: Using gait data for movement phenotyping, diagnosis, and prognosis

Goal: The goal of this study is to develop and refine a wearable sensor system capable of providing laboratory-grade movement data in clinical settings.

Role: PI

AHA 18TPA34170171 (PI: Awad), 07/2018–06/2021

Robotic Exosuit Augmented Locomotion (REAL) training in the clinic and community

Goal: The goal of this study is to study how a soft robotic exosuit can augment gait training after stroke.

Role: PI

NIH R01HD088619 (PI: Walsh), 09/2016–05/2021

Development of a modular soft exosuit platform suitable for community-based neurorehabilitation

Goal: The goal of this study is to develop a modular exosuit platform for assisting the paretic limb during walking.

Role: Co-I

MedRhythms Inc Research Contract (MPIs: Awad, Nolan, Bonato, Putrino, Jayaraman), 06/2019–07/2021

Post-stroke walking speed and community ambulation conversion, a pivotal study

Goal: The goal of this study is to evaluate the efficacy of the MedRhythms Stride Plus mHealth intervention in preparation for an FDA application submission.

Role: PI

AHA 18IPA34170487 (PI: Awad), 07/2018–06/2020 (NCE)

Task-aware movement assessment: Smart control of assistive technologies and automated diagnostic testing

Goal: The goal of this study is to develop a distributed, multi-modal, diagnostic sensor platform.

Role: PI

Completed Research Support.....

Wyss Institute Validation Project Award (PI: Awad), 07/2019–07/2020

reNeu: A next-generation neuroprosthesis for gait-restoration after stroke

Goal: The goal of this study was to develop a propulsion neuroprosthesis to enhance post-stroke walking.

Role: PI

ReWalk Robotics Ltd Research Contract (PI: Walsh), 03/2018–01/2020

Development of Stroke and MS Specific Soft Exosuits

Goal: The goal of this project was to perform research and develop stroke and multiple sclerosis soft exosuits.

Role: PI-subcontract

BU-CTSI Integrated Pilot Grant (PI: Awad), 09/2018–08/2019

Brain-machine interface for the individualized prescription of assistance from a soft robotic exosuit

Goal: The goal of this study is to pilot the integration of soft robotic exosuits with fNIRS neuroimaging.
Role: PI

MedRhythms Inc Research Contract (PI: Awad), 07/2018–07/2019

Feasibility and preliminary effects on poststroke locomotion of music-based rhythm modulation

Goal: The goal of this study was to evaluate the effects of gait training using music-based, rhythm-modulation based on real-time measurements of gait.

Role: PI

NIH KL2TR001411 (PI: Center), 04/2017–03/2019

Wearable sensors for measuring propulsive force generation during walking after stroke

Goal: The goal of this study was to develop sensor-based methods to assess paretic propulsion during walking.

Role: project PI and K12 scholar

ReWalk Robotics Ltd Research Contract (MPIs: Awad, Esquenazi, Francisco, Nolan, Jayaraman), 02/2018–01/2019

Multi-site, interventional, non-comparative, single-arm trial to evaluate the safety of the ReWalk Restore device in subjects with mobility impairments due to ischemic or hemorrhagic stroke

Goal: The goal of this multi-site study was to evaluate the safety, reliability, and feasibility of using the ReWalk Restore during post-stroke gait training in preparation for an FDA application submission.

Role: PI

BU CTSI Integrated Pilot Grant (PI: Awad), 01/2017–01/2018

Integrating computer vision with wearable sensors to improve the assessment and delivery of targeted locomotor interventions and technologies

Goal: The goal of this project was to determine the feasibility of merging external vision and bodyworn sensors for gait detection.

Role: PI

AHA 15POST25090068 (PI: Awad), 07/2015–06/2017 (*early termination 08/16 due to faculty position)

Next generation robotics: A soft exosuit for community-based rehabilitation after stroke

Goal: The goal of this project was to develop and test a soft wearable robot that interfaces with the paretic limb of persons poststroke.

Role: PI

Sponsored Trainee Funding.....

Sargent College Student Research Award (Anna Roto), 05/2021–05/2022

Enhancing exercise intensity with a soft robotic exosuit: Effects on brain-derived neurotrophic factor and learning

Role: Sponsor and advisor

Boston University Undergraduate Research Opportunities Program (Nora Chan), 06/2021–09/2021

Robotic Exosuit Augmented Locomotion (REAL) gait training after stroke

Role: Sponsor and advisor

Boston University Undergraduate Research Opportunities Program (William Swift), 06/2021–09/2021

Turn detection with wearable inertial sensors

Role: Sponsor and advisor

NSF Research Traineeship (NRT): UtB: Neurophotonics (Regina Sloutsky), 07/2020–06/2022

Cortical adaptations to walking with a soft robotic exosuit

Role: Sponsor and advisor

American Heart Association 19PRE34430087 (Anna Roto), 01/2019–12/2020

Soft robotic exercise intervention for enhancing neuroplasticity after stroke

Role: Sponsor and advisor

Boston University Undergraduate Research Opportunities Program (Josh Singh), 06/2020–09/2020

Electromyography processing to detect muscle fatigue in stroke patients

Role: Sponsor and advisor

Boston University Undergraduate Research Opportunities Program (Ashlyn Aiello), 10/2017–05/2018

Real-time analysis of muscle dynamics using ultrasound for physical therapy applications

Role: Sponsor and advisor

Boston University Undergraduate Research Opportunities Program (Arianna DiGregorio), 06/2017–08/2017

Modulating the economy and stability of hemiparetic walking using rhythmic auditory stimulation

Role: Sponsor and advisor

Boston University Undergraduate Research Opportunities Program (Amogh Chandupatla), 06/2017–08/2017

Coordinated IMU-FES system to activate the ankle plantarflexors during poststroke walking

Role: Sponsor and advisor

SELECT MEDIA COVERAGE

SIRIUSXM 110: Doctor Radio, Rehabilitative Medicine Show - Interview with Dr. Jonathan Whiteson

NeurologyLive: Soft robot exosuit helps people improve their walking after suffering a stroke
neurologylive.com/view/restore-exosuit-proves-reliable-for-poststroke-gait-rehabilitation

Digital Trends: ReStore Exo-Suit Proves Reliable for Post-Stroke Gait Rehabilitation
digitaltrends.com/news/robot-exosuit-helps-stroke-patients

BU Inside Sargent: Move Over, Iron Man
bu.edu/research/articles/medical-exosuit-helps-stroke-patients-walk-again

Futurity: Robotic exosuit fixes stride after stroke
futurity.org/robotic-exosuit-stroke-recovery-1497992

Boston Metro: Boston researchers develop a robotic suit to help stroke patients walk
metro.us/news/local-news/boston/robotic-suit-help-stroke-patients-walk

JAMA: Biotech Innovations: Lightweight exosuit could help patients walk after stroke
jamanetwork.com/journals/jama/article-abstract/2653715?redirect=true

Neurology Today: Robotic Assist Devices Show Gains in Walking for Post-Stroke Hemiparesis
journals.lww.com/neurotodayonline/Fulltext/2017/11020/Neurotech_Robotic_Assist_Devices_Show_Gains_in.10.aspx

SERVICE

Editorships.....

2021–Present: Associate Editor, PLoS ONE

2019–Present: Associate Editor, IEEE Open Journal of Engineering in Medicine and Biology

2015–Present: Associate Editor, Journal of NeuroEngineering and Rehabilitation

Professional Association Service.....

02/2021: Group leader, Academy of Neurologic Physical Therapy Early Career Workshop

2019–Present: Research Committee, Academy of Neurologic Physical Therapy, APTA

2018–Present: FiRST Council, American Physical Therapy Association (APTA)

2016–Present: Educational Session and Abstract Reviewer, Academy of Neurologic Physical Therapy, APTA

08/16: Ad-hoc Abstract Reviewer, Section on Research, American Physical Therapy Association

Other Professional Service.....

06/21: Ad-hoc Member, Musculoskeletal Rehabilitation Sciences Study Section, National Institutes of Health

02/21: Ad-hoc Member, Musculoskeletal Rehabilitation Sciences Study Section, National Institutes of Health

2015–Present: Ad-hoc Manuscript Reviewer for >15 clinical, engineering, and rehabilitation journals

08/17: Co-Chair of Thematic Session on Poststroke Biomechanics, American Society of Biomechanics

08/17: Ad-hoc Committee Member, Brain Injury: TBI & Stroke Merit Review, US Department of Veterans Affairs

08/15: Ad-hoc Proposal Reviewer, US Army Research Office

Boston University Doctor of Physical Therapy Program.....

07/17–09/18: Taskforce Chair, DPT/PhD Combined Program Development Taskforce

2016–Present: Professional student advising (>15 DPT students)

Boston University Rehabilitation Sciences Doctoral Program.....

2016–Present: PhD Admissions, Applicant Reviewer

09/2020–12/2020: PhD Steering Committee, Member

Boston University College of Health and Rehabilitation Sciences: Sargent College.....

06/17–05/18: Member, Graduate Education Committee

University of Delaware College of Health and Rehabilitation Sciences.....

2013–2014: Senator, Faculty Senate

2013–2014: Senator, Graduate Student Senate

2012: Student Steering Committee, 9th Annual Biomechanics Research Symposium

University of Delaware Doctor of Physical Therapy Program.....

2012–2014: DPT Admissions, Applicant Reviewer

TEACHING EXPERIENCE

Boston University.....

Evidence Based Practice 2 (HP662)

Primary Instructor

Movement Science Seminar (HP891)

Co-Instructor / Primary Instructor

Directed Readings/Research (RS910/11)

Primary Instructor

Doctoral Seminar in Rehabilitation Sciences (RS890)

Co-Instructor

Senior Design Project (BE465)

Team Advisor

Foundations for Rehabilitation Sciences (RS650)

Guest Lecturer (Neural Control of Movement)

Instrumentation for Analysis of Motion (HP737)

Guest Lecturer (Instrumented Treadmills)

Harvard University.....

Medical Device Design (ES227)

Team Advisor

University of Delaware.....

Neurologic Integrated Clinical Experience (PHYT822)

Clinical Instructor

Applied Physiology II (PHYT633)

Guest Lecturer and Laboratory Instructor

Electrotherapy (PHYT634)

Guest Lecturer and Laboratory Instructor

Spine Management (PHYT808)

Teaching Assistant

Human Anatomy (NURS101)

Cadaver Laboratory Assistant

Rutgers University.....

Exercise Physiology (EXSCI370)

Primary Laboratory Instructor

RESEARCH ADVISING

PhD Students.....

Anna Roto, Boston University, Primary Advisor

Andre Alvarez, Boston University, Primary Advisor

Ashley Collimore, Boston University, Primary Advisor

Ashlyn Aiello, Boston University, Primary Advisor

Regina Sloutsky, Boston University, Primary Advisor

Dheepak Arumukhom Revi, Boston University, Primary Advisor

Catherine Adans-Dester, MGH Institute of Health Professions, Committee Member

Ramon Sanchez, Boston University, Committee Member

Jaehyun Bae, Harvard University, Committee Member

Krithika Swaminathan, Harvard University, Committee Member

Brendan Quinlivan, Harvard University, Committee Member

Dabin Choe, Harvard University, Committee Member

Postdoctoral Research Fellows.....

Puneet Singh, Boston University, Primary Advisor

Franchino Porciuncula, Harvard University, Co-advisor

Richard Nuckols, Harvard University, Co-advisor

Lizeth Slood, Harvard University, Co-advisor

Postgraduate Research Fellows.....

Christian Matthews, Boston University, Primary Advisor

Ellie Lefkovich, Boston University, Primary Advisor

Ge Chen, Boston University, Primary Advisor

Dheepak Arumukhom Revi, Harvard University/Boston University, Co-advisor

Stephen Allen, Harvard University, Co-advisor

Pawel Kudzia, Harvard University, Co-advisor

Research Physical Therapists.....

Johanna Spangler, Boston University and Spaulding Rehabilitation Hospital, Primary Advisor

Regina Sloutsky, Boston University and Harvard University, Primary Advisor

Ben Farmer, Boston University, Primary Advisor

Teresa Baker, Boston University and Harvard University, Co-advisor

Doctor of Physical Therapy Students.....

Macauley O'Connor, Boston University, Primary Advisor

Jeffery Paskewitz, Boston University, Primary Advisor

Catie Ledwick, Boston University, Primary Advisor

Tori Torrisi, Boston University, Primary Advisor

Undergraduate Researchers.....

William Swift, Boston University, Primary Advisor

Nora Chan, Boston University, Primary Advisor

Joshua Singh, Boston University, Primary Advisor

Eduardo Cedona, Harvard University, Primary Advisor

Candy Qiu, Boston University, Primary Advisor

Brady Reynolds, Boston University, Primary Advisor

Amogh Chandupatla, Boston University, Primary Advisor

Arianna DiGregorio, Boston University, Primary Advisor

Fiona Doolan, Boston University, Primary Advisor

Christopher Schenck, Harvard University, Co-advisor

Kerri Wu, Harvard University, Co-advisor