

Laura McPherson, PT, DPT, PhD

June 27, 2026

Contact Information

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Present Position

11/2019 – present Assistant Professor of Physical Therapy and Neurology (*investigator track*)
Faculty, Program in Neurosciences
Affiliate Faculty, Department of Biomedical Engineering
Washington University School of Medicine, St. Louis, MO

Education

Undergraduate

8/2002 – 5/2006 **Bachelor of Engineering**
Vanderbilt University, Nashville, TN (Biomedical Engineering;
Neuroscience (minor))

Graduate

9/2009 – 4/2012 **Doctor of Physical Therapy**
Northwestern University Feinberg School of Medicine, Chicago, IL

9/2006 – 12/2014 **Ph.D. in Biomedical Engineering**
Northwestern University, Evanston, IL

Dissertation title: Quantification of Abnormal Coupling Between
the Paretic Upper Arm and Hand of Individuals with Chronic Hemiparetic
Stroke Using Neurophysiological and Biomechanical Measurements

Advisor: Julius P.A. Dewald, PT, PhD

Post-graduate training

1/2015 – 8/2015 **Post-doctoral fellowship**, Neurophysiology
Northwestern University Feinberg School of Medicine, Chicago, IL

Academic and Promotion History

9/2006 – 5/2014 **Graduate Research Assistant**
Department of Physical Therapy and Human Movement Sciences
Northwestern University Feinberg School of Medicine, Chicago, IL

9/2012 – 5/2015	Contract Educator Doctor of Physical Therapy Program Northwestern University Feinberg School of Medicine, Chicago, IL
12/2014 – 8/2015	Research Associate Department of Physical Therapy and Human Movement Sciences Northwestern University Feinberg School of Medicine, Chicago, IL
8/2015 – 10/2019	Assistant Professor Department of Physical Therapy (primary, tenure-earning) Department of Biomedical Engineering (secondary) Florida International University, Miami, FL
11/2019 – present	Assistant Professor Program in Physical Therapy, Department of Neurology Faculty, Program in Neurosciences Affiliate Faculty, Department of Biomedical Engineering Washington University School of Medicine Washington University in St. Louis, St. Louis, MO
1/2023 – present	Courtesy Assistant Professor The Institute for Integrative and Innovative Research (I ³ R) University of Arkansas, Fayetteville, AR

Employment History

5/2012 – 5/2015	Physical Therapist (part-time, inpatient rehabilitation) Rehabilitation Institute of Chicago/Shirley Ryan Ability Lab, Chicago, IL
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Professional Licensures and Certifications

5/2012 – 8/2020	Physical Therapist License #070019408, Illinois (inactive)
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Honors and Awards

2006	Arnold Palmer Senior Design Project Prize, Finalist Department of Biomedical Engineering, Vanderbilt University
2009	United States Naval Research Laboratory Student Travel Fellowship, Robotics: Science and Systems Conference Workshop, Seattle, WA
2012	Northwestern University Graduate School Conference Travel Grant
2012	Dean of Feinberg School of Medicine DPT/PhD Scholar Award Feinberg School of Medicine, Northwestern University
2013	Mary Lou Barnes Award, Outstanding Promotion of Doctoral Studies II Scholarship Application in Neurology, Foundation for Physical Therapy

2012 – 2014	NIH T32 Pre-doctoral Trainee, Interdisciplinary Graduate Education in Movement & Rehabilitation Sciences
2013 – 2014	Senior Graduate Student, Department of Physical Therapy and Human Movement Sciences, Northwestern University
2014	Outstanding Student Presentation Award 9 th International Motoneuron Meeting, Halifax, Canada
2014	International Finalist, Student Paper Competition International Conference of the IEEE Engineering in Medicine and Biology Society
2014	Nominated, Best Dissertation Award, Department of Biomedical Eng. Northwestern University, Evanston, IL
2015	Early Career Professional Award American Physical Therapy Association Academy of Neurology
2016	Traveling Fellows Award American Physical Therapy Association Section on Research
2017	Young Alumnus of the Year Northwestern University Physical Therapy Alumni Association
2018	Best Podium Presentation by an Assistant Professor 11 th International Motoneuron Meeting, Boulder, CO
2024	Selected as a Top 50 Abstract (out of 568 accepted) Association for Clinical and Translational Science Annual Meeting

Editorial and Review Responsibilities

Guest Editor

2020	<i>Journal of Electromyography and Kinesiology</i> Special Issue: International Motoneuron Society: from motor unit discharge to motor control
2023	<i>Frontiers in Sports and Active Living</i> Topic: Chronic adaptations and acute adjustments in the behavior of the neuromusculoskeletal system in health and pathology

Ad Hoc Manuscript Reviews

2009 – present	<i>Journal of Neurophysiology, Clinical Neurophysiology, Journal of Biomechanics, Experimental Brain Research, Journal of Neural Engineering, Gait and Posture, Annals of Biomedical Engineering, Journal of Electromyography and Kinesiology, Journal of Back and</i>
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Musculoskeletal Rehabilitation, PLOS One, Neurorehabilitation and Neural Repair, Journal of Physiology

Abstract Review for National and International Meetings

2014 – present American Physical Therapy Association Combined Sections Meeting,
Academy of Physical Therapy Education and Academy of Neurology;
IEEE Engineering in Medicine and Biology Society

Extramural Grant Review

2026 Reviewer of Pilot Grant for Neuro-PRECISE: Center for Advancing
Precision Neural Circuit-Based Rehabilitation, P50HD118628

Intramural Grant Review

2024 – present Grant reviewer for the Institute of Clinical and Translational Sciences
Clinical and Translational Research Funding Program (CTRFP) (1x/year)

2025 – present Grant reviewer for the Institute of Clinical and Translational Sciences KL2
Career Development Award (2x/year)

Community Service Contributions

Washington University in St Louis School of Medicine Committee and Administrative Service:

2019 – present Member, Research Advisory Committee, Program in Physical Therapy
2020 – present Member, Curriculum Renewal Committee, Pharmacology Thread co-leader,
Program in Physical Therapy
2020 – present PhD program applicant reviewer, Movement Science Program
2023 – present DPT learner coach, Program in Physical Therapy
2023 – present Medical Scientist Training Program applicant reviewer (as needed)

Washington University in St Louis Committee and Administrative Service:

2023 Dakota Kamm, Movement Science PhD Program
2023 Allison Haussler, Movement Science PhD Program
2023 Rachel Hawthorn, Biomedical Engineering PhD Program
2025 Adrian Rivera, Biomedical Engineering PhD Program
2026 Carol Ortiz-Menendez, Biomedical Engineering PhD Program
2026 Reviewer for Summer Undergraduate Research Guided Experience (SURGE)

Other University Committee and Administrative Service:

Florida International University (Miami, FL):

Fall 2015	<u>Intercollegiate</u> : Judge, Senior Design Competition, Department of Biomedical Engineering
2015 – 2016	<u>Intercollegiate</u> : Co-Chair, DPT/PhD in Biomedical Engineering Combined Degree Program Committee, Departments of Physical Therapy and Biomedical Engineering
2015 – 2019	<u>Department</u> : Member, Admissions Committee, Department of Physical Therapy
2015 – 2019	<u>Department</u> : Member, Curriculum Committee
2015 – 2019	<u>Department</u> : Member, Research Committee
2016 – 2018	<u>College</u> : Member, Technology Committee, Nicole Wertheim College of Nursing and Health Sciences
2017 – 2019	<u>College</u> : Member, Dissertation Advisory Status and Graduate Faculty Status Committee, Nicole Wertheim College of Nursing and Health Sciences
2017 – 2019	<u>Department</u> : Co-chair, Media and Public Relations Committee, Department of Physical Therapy
2018 – 2019	<u>College</u> : Member, Research Council, Nicole Wertheim College of Nursing and Health Sciences
2018 – 2019	<u>College</u> : Member, Curriculum Committee, Nicole Wertheim College of Nursing and Health Sciences
2018 – 2019	<u>Department</u> : Member, Committee for Promotion of Student Professional and Affective Behaviors, Department of Physical Therapy

Service to Other Universities:

Doctoral Student Co-advisor

2015 – 2021	Altamash Hassan, Department of Biomedical Engineering, Northwestern University Co-advisor: Jules Dewald, PT, PhD
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Member of Dissertation Committee

2018 – 2023	Anil K. Thota, MS, Department of Biomedical Engineering, Florida International University Primary Advisor: Ranu Jung, PhD
2021 – 2026	Arianna Ortega Sanabria, Department of Biomedical Engineering, University of Arkansas Primary Advisor: Ranu Jung, PhD

External Reviewer of Doctoral Dissertation

7/2022	Morteza Rouhani, School of Mathematical and Statistical Sciences, Arizona State University
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Advisors: James Abbas, PhD and Sharon Crook, PhD

4/2023 Chris Taylor, School of Health Sciences and Rehabilitation Sciences, Temple University

Advisor: Christopher Thompson, DPT, PhD

Community Outreach & Volunteer Service:

5/2025 Career Day presenter, Mallinckrodt Academy of Gifted Instruction, St. Louis Public Schools. Presented an overview of my career (research, teaching, patient care) to individual grade levels from pre-Kindergarten through fifth grade. Tailored presentation and discussion to the needs of each grade level.

Membership in Professional Societies

2008 – present Society for Neuroscience
2012 – present American Physical Therapy Association
2014 – present International Motoneuron Society
2015 – 2019 Florida Physical Therapy Association
2016 – present Society for the Neural Control of Movement
2017 – present International Society of Motor Control
2019 – present Missouri Physical Therapy Association
2024 – present American Heart Association

National Panels, Committees, Boards

American Physical Therapy Association

2016 – 2019 Member, Research Committee, Academy for Physical Therapy Education
2017 – 2020 Member, Frontiers in Rehabilitation, Science, and Technology (FiRST) Council, Sensing and Robotics Workgroup

American Heart Association

2024 – present Member, Stroke Rehabilitation and Recovery Committee of the Stroke Council, American Heart Association
2025 – 2026 Member, Stroke Rehabilitation and Recovery Peer Review Committee, American Heart Association

International Conference Symposium Moderator:

02/2027 Reframing the Stroke Plasticity Window, International Stroke Conference, Houston, TX

Teaching

Major External Invited Presentations, including Professorships and Lectures

1/2015 “Towards improved patient function: how basic science and advanced technologies can inform rehabilitation.” Florida International University Nicole Wertheim College of Nursing and Health Sciences Seminar Series, Miami, FL.

- 12/2015 “Introduction to clinical research for physical therapists,” Memorial West Hospital, Pembroke Pines, FL.
- 10/2015 “Motor unit coherence among muscles of the flexion synergy in individuals with chronic hemiparetic stroke.” Society for Neuroscience Pre-Conference Meeting on Rhythmic Motor Circuits, Chicago.
- 4/2016 “Evidence for altered sensorimotor integration after stroke: analysis of motor unit behavior.” Annual Society for Brain Mapping and Therapeutics World Congress, Miami, FL.
- 1/2018 “Toward improved patient function: Elucidating central nervous system pathophysiology by decoding motor unit population discharge.” University of Florida Rehabilitation Sciences Seminar Series. Gainesville, FL.
- 6/2018 “Distribution of neuromodulatory inputs among upper limb muscles.” 11th International Motoneuron Meeting, Boulder, CO.
- 1/2019 “From motor units to motor impairments: guiding targeted rehabilitation interventions.” Washington University in St. Louis Program in Physical Therapy. St. Louis, MO.
- 3/2019 “90% of the game is half mental: the neuromechanics of baseball.” Thirst for Science community engagement event. Miami, FL.
- 6/2019 “High-density EMG neuro-biomarkers for improving rehabilitation therapies.” Rehab Week Workshop, Toronto, CA.
- 4/2021 “Pathological inhibition post-stroke may limit motor unit rate modulation during voluntary contractions in a muscle-dependent manner.” National Center of Neuromodulation for Rehabilitation Operant Conditioning Special Interest Group meeting. Virtual.
- 7/2021 “Changes in excitatory synaptic input alone are insufficient to explain disruptions in motor unit rate modulation post-stroke.” Motor Unit Group Seminar Series, hosted by the International Motoneuron Meeting. Virtual.
- 10/2023 “Pathophysiology of voluntary motor commands in patients with multiple sclerosis identified using reverse engineering of motor unit population discharge.” International Society for Electromyography and Kinesiology Around the World Event. Virtual.
- 10/2024 “Pathophysiology of voluntary motor commands in people with multiple sclerosis.” Society for Neuroscience Motor Systems Pre-Conference Symposium. October 4, 2024.
- 12/2025 “My career path as a DPT/PhD dual-degree graduate.” Seminar and discussion to students in the Northwestern University DPT/PhD in Engineering dual-degree program.
- 3/2026 “Multiple sclerosis.” Guest Lecture for the undergraduate/graduate Clinical Motor Neuroscience course at the University of Minnesota.

Washington University Presentations & Lectures

Date	Title	Audience	Role
March 5, 2024	Characterizing voluntary motor commands at the level of the spinal motoneuron to inform novel, mechanistically based interventions for people with neurological injury	Washington University Program in Physical Therapy Seminar Series	Presenter
May 7, 2025	Transitioning from Translational Research to Translational Science: Real-World Examples.	7 th Annual Institute for Clinical and Translational Sciences Symposium	Panelist
March 31, 2026	Grants Research Administrator & PI Perspectives	KL2 Scholars	Co-Presenter

Internal Presentations & Lectures at University [e.g. previous places of employment]:

9/2012	“Quantification of the flexion and extension synergies at the hand in chronic hemiparetic stroke.” Second Annual Movement and Rehabilitation Sciences Training Day, Northwestern University, Chicago, IL
8/2014	“Motor unit firing patterns during abnormal multi-joint coupling in chronic hemiparetic stroke.” Fourth Annual Movement and Rehabilitation Sciences Training Day, Northwestern University, Chicago, IL
11/2017	Invited presenter and panelist. “Women in Research Panel and Dinner,” Society for Women Engineers, Florida International University Chapter.
5/2016	“Biomarkers, genetics, motor units, and robotics: the future of neurorehabilitation,” Stroke Rehabilitation: Promoting Recovery Across the Continuum of Care. Florida International University Nicole Wertheim College of Nursing and Health Sciences/West Gables Hospital 3 rd Annual Stroke Symposium, Miami, FL.

Courses

Northwestern University

Doctor of Physical Therapy Program, Feinberg School of Medicine

Cohorts of 80 – 95 students

2009, 2012	Neuroscience II (Teaching Assistant)
2013 – 2015	DPT Synthesis Research Project (Contract Educator, 5 students/year)
2013 – 2015	Kinesiology I (Contract Educator)

2014 – 2015	Kinesiology II (Contract Educator)
2015	Examination and Evaluation II (Contract Educator)

Florida International University

Doctor of Physical Therapy Program

Cohorts of 55 – 65 students; typically, 50 – 80% of students were underrepresented minorities

2015 – present	DPT Capstone Research Project (Project Advisor, 10-13 students/year)
2016 – 2018	Applied Clinical Neuroanatomy (Lecture and lab coordinator; Instructor for all lectures; Developed all course materials.)
2016	Dimensions of Professional Practice Seminar I (Guest Lecturer)
2016, 2018	Annual Interprofessional Workshop (Faculty Moderator, >500 students)
Spring 2018	Advanced Pathologic Movement Analysis (Co-Instructor)

Biomedical Engineering Program

2015 – 2016	Undergraduate Senior Design Project (Faculty Advisor, 5 students)
2017 – 2018	Undergraduate Senior Design Project (Project Co-Sponsor, 4 students)
Fall 2018	Applied Clinical Neuroanatomy for MS in BME, PhD in BME, and Orthotics and Prosthetics students (Instructor for all lectures, 9 students)

Washington University

Program in Physical Therapy

DPT curriculum:

Fall 2020	Neuroscience (2 guest lectures)
Spring 2021	DEA III (1 discussion session)
2021 – 2025	Module 1 (Use of pre-recorded materials related to Neuroscience)
2024 – present	Module 7/8, Journal Club lead for 30 students each Spring
2024 – present	Faculty coach for small group of student learners
2023 – present	Faculty Tester for Negotiation Assessment, each semester
2026	Faculty moderator for Clinical Experience II Clinical Question Small Group Assessment of Learning

Movement Science Program PhD curriculum:

Spring 2020	Program Seminar (Led 1 discussion session)
2022	
2024	
2026	
	Biocontrol of Movement
Fall 2020	Gave two lectures and led one discussion session
Fall 2022	Used pre-recorded video modules for two lectures and led one discussion section

Fall 2024 Served as Course Director and Primary Instructor
Fall 2026

Mentorship & Sponsorship Record

Served as **faculty research mentor and/or sponsor** for:

Undergraduate Learners:

2018 – 2019	Emily (Baragar) Baer Major: Biomedical Engineering (FIU) Role: Research mentor Current position: Product Development Engineer II, LifeNet Health
2022 – 2023	Anirudh Manika Major: Biomedical Engineering Role: Research mentor Current position: PhD student, University of Washington
2023 – 2024	Rin Iimi Major: Biomedical Engineering Role: Research mentor Current position: MS student, ETH Zurich
2025 – 2026	Shruthi Madhugiri Major: Biomedical Engineering Role: Research mentor Outcome: Poster presentation at Wash U Undergraduate Research Symposium and manuscript in progress Current position: MS student, UC Berkeley
Summer 2025	Henry Ye ASPIRE Program Scholar Major: Biology Role: Research mentor Outcome: Oral Presentation for ASPIRE program Current position: Undergraduate at Washington University
Summer 2026	Juhi Arora ASPIRE Program Scholar Major: Neuroscience Role: Research mentor and career development mentor Outcome: Oral Presentation for ASPIRE program, manuscript in progress Current position: Undergraduate at UT Austin

Graduate Learners:

Master's learner:

Spring 2018 Andre Lorenz-Chu
Program: FIU Biomedical Engineering (Professional Track)
Role: Research mentor
Current position: Senior Supplier Quality Assurance Engineer I, Arthrex

PhD students:

2016 – 2021 Altamash Hassan, BS
Program: Northwestern University Biomedical Engineering
Role: Co-Advisor with Jules Dewald, PT, PhD
Outcomes: Three published papers, two manuscripts in progress, numerous conference abstracts
Current position: Senior Manager, Strategy & Business Knowledge, Global Rare Diseases, Chiesi USA

2018 – 2023 Anil K. Thota, MS
Program: FIU Biomedical Engineering
Advisor: Ranu Jung, PhD
Role: Dissertation Committee Member

2021 – 2022 Jessica Barth, MS, OTR/L
Program: Wash U Movement Sciences
Advisor: Catherine Lang, PhD
Role: Dissertation Committee Member

2021 – 2026 Arianna Ortega Sanabria
Program: University of Arkansas Biomedical Engineering
Advisor: Ranu Jung, PhD
Outcomes: One manuscript under review, one manuscript in progress, numerous conference abstracts
Role: Dissertation Committee Member

2022 – 2024 Tanner Reece, BS, MS
Program: Wash U Movement Sciences
Role: Advisor
Outcomes: One published paper, one manuscript in progress. Two conference abstracts.
Current position: Left program after two years to pursue a position in industry.

2025 – present Rachel Hawthorn
Program: Wash U Biomedical Engineering
Advisor: Ismael Seanez, PhD
Role: Dissertation Committee Member

Doctor of Physical Therapy learners:

2013 – 2015	Scott Heinichen, Megan McLerran, Kelsey Rose, Amanda Winters, Kristen Schulz Program: Northwestern University Physical Therapy Role: Research Project Advisor Outcomes: Poster presentation at APTA Combined Sections Meeting and Annual Departmental Research Day
Fall 2015	Leisy Hernandez, Christina Glenn, Emely Carpio, Nandini Rampersaud, Jon Magnuson, Christine Plaza, Jocelyn Cheung, Alixandra Lakow, Michael Tang, Krista Beach Program: FIU Physical Therapy Role: Research Project Advisor Outcomes: Poster presentation at Annual Departmental Research Day
2016 – 2017	Desaly Gonzalez, Marcus Jackovitz, Domenica Caleca, Andrea Reynoso, Hugo Botero, Katie Hutchinson, Austin Win, Victoria Fernandez, Kellie John, Laura Sanchez Program: FIU Physical Therapy Role: Research Project Advisor Outcomes: Poster presentation at Annual Departmental Research Day
2015 – 2017	Laura Sanchez Velez Program: FIU Physical Therapy Role: Research assistantship mentor and career development mentor Outcomes: One published paper
2017 – 2018	Ana Espinal, Jorge Carreno, Shyam Zaveri, Pablo Vega, Richard Varghese, Roy Diaz, Monica Gonzalez, Emily Nelson, Anthony Nunez, Jeff Maurer, Michelle Garcia-Casals Program: FIU Physical Therapy Role: Research Project Advisor Outcomes: Poster presentation at Annual Departmental Research Day and Society for Neuroscience Annual Meeting
2018 – 2019	Erin Venditti, Jessica Stabler, Ashley Wilcock, Rachel Bubbel, Hector Galvez, Sijin Lee, Jemma Lopez, Jessica Lopez, Melissa Lopez, Samantha Noble, Zach Routman, Shana Saffer, Danika St. Louis Program: FIU Physical Therapy Role: Research Project Advisor Outcomes: Poster presentation at Annual Departmental Research Day
2021 – 2024	Kiera Olson Program: Wash U Physical Therapy Role: Research assistantship mentor Current position: Physical Therapist, UCHHealth, Denver, CO
2022 – 2024	Bari Schunicht Program: Wash U Physical Therapy Role: Research assistantship mentor

Current position: Physical Therapist, NeuroLogic Rehabilitation and Wellness, Colorado Springs, CO

2023 – 2026 Krystal Panagiotaros
 Program: Wash U Physical Therapy
 Role: Research assistantship mentor
 Outcome: Manuscript in progress
 Current position: Physical Therapist, WashU Medicine Physical Therapy

2024 – present Rui Gong
 Program: Wash U Physical Therapy
 Role: Research assistantship mentor

Post-doctoral fellows:

2016 – 2017 Nicole Rendos, PhD, LAT, ATC, CSCS
 FIU Department of Physical Therapy
 Current position: Assistant Professor, Division of Physical Therapy, Emory School of Medicine, Atlanta, GA.

2017 – 2019 Changki Kim, PhD
 FIU Department of Physical Therapy
 Current position: Assistant Professor, Department of Kinesiology, University of Alabama, Tuscaloosa, AL.

2023 Lynn McCane, MS, PhD
 Wash U Program in Physical Therapy
 Current position: Post-doc at Spaulding Rehabilitation Hospital

Other Learners:

2023 – 2025 Skyler Simon, BS (Senior Research Technician)
 Current position: DPT student, Northwestern University

2024 – present Daniel Free, PhD (Staff Scientist)

Research

Present Extramural Grants:

1) HT94252410580	McPherson LM	10/2024-09/2026
DOD CDMRP Multiple Sclerosis Research Program		
Exploration Hypothesis-Generation Award		\$250,000 (TC)
<i>Subclinical pathophysiology of motor processing in people with multiple sclerosis</i>		
Role: Principal Investigator		
Effort Support: 20% FTE		

- 2) Longer Life Foundation **McPherson LM** 10/2025 – 09/2026
 Developmental Research Award \$50,000 (DC)
A novel neurophysiological biomarker for MS disease progression
 Role: Principal Investigator
 Effort: 20.5% FTE

- 3) R01NS125863-01A1 **Heckman CJ** 03/2022 – 02/2027
 NIH/NINDS \$3,907,537 (TC)
Supercomputer-based Models of Motoneurons for Estimating Their Synaptic Inputs in Humans
 Role: Co-Investigator (PI of Subaward to Washington University)]
 Effort: 20% FTE

- 4) Parkinson Disease Foundation **MacKinnon C** 08/2025 – 07/2027
 Impact Award \$200,000 (TC)
The effects of vagus nerve stimulation on intrinsic lower leg spinal motoneuron excitability in Parkinson's disease
 Role: Co-Investigator (PI of subaward)
 Effort: 5% FTE

Present Intramural Grants:

None

Submitted Applications:

- 1) **McPherson LM** 2026 – 2029
 National MS Society \$600,000 (TC)
Development of a novel neurophysiological biomarker of disease progression in multiple sclerosis
 Role: Principal Investigator
 Effort: 30% FTE

- 2) R01 **McPherson LM** 2027 – 2032
 NIH \$ 4,362,419 (TC)
Development of a novel neurophysiological biomarker of disease progression in multiple sclerosis
 Role: Principal Investigator
 Effort: 50% FTE

- 3) Longer Life Foundation **McPherson LM** 10/2026 – 09/2027
 Second year of funding
 Developmental Research Award \$50,000 (DC)
A novel neurophysiological biomarker for MS disease progression
 Role: Principal Investigator

Effort: 20.5% FTE

Past Extramural Funding:

- 1) H133G070089 **Dewald** 2007 – 2011
NIDILRR \$586,576 (TC)
Overcoming Gravity Induced Arm and Hand Dysfunction to Restore Functional Reaching Following Stroke
Role: Graduate Research Assistant
- 2) T32 EB009406 **Dewald** 2012 – 2014
NIH/NICHHD/NIBIB \$520,284 (DC)
Interdisciplinary Graduate Education in Movement and Rehabilitation Sciences
Role: Pre-doctoral trainee
- 3) R01 HD039343 **Dewald** 2013 – 2018
NIH/NICHHD \$1,130,019 (DC)
Effect of Neural Constraints on Movement in Stroke
Roles: Graduate Research Assistant (2013 – 2014); Research Associate (2015); Subaward PI (2016 – 2018)
- 4) Foundation for Physical Therapy **Miller** 2012 – 2013
Promotion of Doctoral Studies II Scholarship \$15,000 (DC)
Neural Coupling Between the Paretic Shoulder and Hand in Chronic Hemiparetic Stroke
Role: Principal Investigator (as Laura C. Miller)
- 5) American Physical Therapy Association **McPherson** 2016
Section on Research Traveling Fellows Award \$2000 (DC)
Role: Principal Investigator
- 6) R01 EB027584 **Jung, Abbas (m-PI)** 2018 – 2024
NIH/NIBIB \$763,755 (TC)
CRCNS: Improving Bioelectronic Selectivity with Intrafascicular Stimulation
Role: Co-Investigator (PI of Subaward to Washington University)
- 7) American Heart Association **McPherson JG** 2019 – 2021
Innovative Project Award \$181,818 (DC)
Restorative Neuroplasticity in Brainstem Motor Pathways to Enhance Rehabilitation Post-Stroke
Role: Co-Investigator
- 8) KL2 **McPherson** 2022 – 2024
NIH CTSA, Institute of Clinical and Translational Sciences, Washington University
Neural mechanisms of motor heterogeneity in multiple sclerosis \$200,000 (TC)
Role: Principal Investigator

Past Intramural Funding:

- 1) Coulter Foundation SEED Grant 2018 – 2019
(mPIs: **Laura McPherson**, Jacob McPherson, Zachary Danziger)
Florida International University \$60,000 (DC)
Non-invasive Decoding of Neuromuscular Activity for Rehabilitation and Prosthetic Control
Role: Co-Principal Investigator
- 2) Small Grants Program **McPherson** 2020 – 2024
McDonnell Center for Systems Neuroscience
Washington University \$80,000 (DC)
Factors influencing the detection of accurate and reliable motor unit population recordings in humans
Role: Principal Investigator
- 3) **McPherson** 2024 – 2025
Third year continuation of NIH-funded KL2 award
Institute of Clinical and Translational Sciences (ICTS) and Program in
Physical Therapy, Washington University
Neural mechanisms of motor heterogeneity in multiple sclerosis \$125,275 (DC)
Role: Principal Investigator
- 4) Washington University ICTS **McPherson** 2024 – 2025
Clinical and Translational Research Funding Program \$50,000 (DC)
Subclinical pathophysiology of voluntary motor processing in people with multiple sclerosis
Role: Principal Investigator
- 5) Washington University ICTS **McPherson** 2025 – 2026
Clinical and Translational Research Funding Program Supplement \$25,000 (DC)
Voluntary Motor Commands Throughout the Adult Lifespan: Open Dataset and Age/Sex Interactions
Role: Principal Investigator

Bibliography (§ indicates trainee or junior faculty member mentored by Dr. McPherson)

Original, peer reviewed articles in refereed journals

*Prior to 8/2015 I published under my maiden name (Miller LC)

- 1) Keller NR, Diedrich A, Appalsamy M, **Miller LC**, Caron MG, McDonald MP, Shelton RC, Blakely RD, Robertson D. Norepinephrine transporter-deficient mice respond to anxiety producing and fearful environments with bradycardia and hypotension. *Neuroscience*. 2006. 139: 931-946. doi.org/10.1016/j.neuroscience.2006.01.008
- 2) **Miller LC**, Ruiz Torres R, Stienen AHA, Dewald JPA. A wrist and finger force sensor module for use during movements of the upper limb in chronic hemiparetic stroke. *IEEE Trans Biomed Eng*. 2009. 56: 2312-2317. doi: 10.1109/TBME.2009.2026057.

- 3) Stienen AH, Moulton TS, **Miller LC**, Dewald JPA. Wrist and Finger Torque Sensor for the quantification of upper limb motor impairments following brain injury. *IEEE Int Conf Rehabil Robot*. 2011. 2011:5975464. doi: 10.1109/ICORR.2011.5975464.
- 4) **Miller LC**, Dewald JPA. Involuntary paretic wrist/finger flexion forces and EMG increase with shoulder abduction load in individuals with chronic stroke. *Clin Neurophysiol*. 2012. 123: 1216-1225. doi: 10.1016/j.clinph.2012.01.009.
- 5) **Miller LC**, Thompson CK, Negro FN, Heckman CJ, Farina D, Dewald JPA. High-density surface EMG decomposition allows for recording of motor unit discharge from proximal and distal flexion synergy muscles simultaneously in individuals with stroke. *Conf Proc IEEE Eng Med Biol Soc*. 2014. 2014:5340-5344. doi: 10.1109/EMBC.2014.6944832.
- 6) Wilson JM, Thompson CK, **Miller LC**, Heckman CJ. Intrinsic excitability of human motor units in biceps brachii versus triceps brachii. *Journal of Neurophysiology*. 2015. 113:3692-3699. doi: 10.1152/jn.00960.2014.
- 7) **McPherson LM**, Negro F, Thompson CK, Sanchez L, Heckman CJ, Dewald JP, Farina D. Properties of the motor unit action potential shape in proximal and distal muscles of the upper limb in healthy and post-stroke individuals. *Conf Proc IEEE Eng Med Biol Soc*. 2016. 2016: 335-339. doi: 10.1109/EMBC.2016.7590708.
- 8) McPherson JG, **McPherson LM**, Thompson CK, Ellis MD, Heckman CJ, Dewald JP. Altered neuromodulatory drive may contribute to exaggerated tonic vibration reflexes in chronic hemiparetic stroke. *Frontiers in Human Neuroscience*. 2018. 12. doi: 10.3389/fnhum.2018.00131.
- 9) Thompson CK, Negro F, Johnson MD, Holmes MR, **McPherson LM**, Powers RK, Farina D, Heckman CJ. Robust and accurate decoding of motoneuron behavior and prediction of the resulting force output. *Journal of Physiology*. 2018. 596: 2643-2659. doi: 10.1113/JP276153.
- 10) **McPherson LM**, Dewald JPA. Differences between flexion and extension synergy-driven coupling at the elbow, wrist, and fingers of individuals with chronic hemiparetic stroke. *Clinical Neurophysiology*. 2019. 130: 454-468. doi: 10.1016/j.clinph.2019.01.010.
- 11) Thompson CK, Johnson MD, Negro F, **McPherson LM**, Farina D, Heckman CJ. Exogenous neuromodulation of spinal neurons induces beta-band coherence during self-sustained discharge of hind limb motor unit populations. *Journal of Applied Physiology*. 2019. 127:1034-1041. doi: 10.1152/japplphysiol.00110.2019.
- 12) Hassan AS[§], Kim EH, Khurram OU, Cummings M, Thompson CK, **Miller McPherson LM**, Heckman CJ, Dewald JPA, Negro F. Properties of motor units of elbow and ankle muscles decomposed using high-density surface EMG. *Conf Proc IEEE Eng Med Biol Soc*. 2019. 2019: 3874-3878. doi: 10.1109/EMBC.2019.8857475.
- 13) Hassan AS[§], Thompson CK, Negro F, Cummings MQ, Powers RK, Heckman CJ, Dewald JP, **McPherson LM**. Impact of parameter selection on estimates of motoneuron excitability

using paired motor unit analysis. *Journal of Neural Engineering*. 2020. 17:1. doi: 10.1088/1741-2552/ab5eda.

- 14) Wilson JM, Thompson CK, **McPherson LM**, Zadikoff C, Heckman CJ, MacKinnon CD. Motor unit discharge variability is increased in mild-to-moderate Parkinson's disease. *Frontiers in Neurology*. 2020. 11:477. doi: 10.3389/fneur.2020.00477.
- 15) Regnacq L, Giraud R, Ortega Sanabria A[§], Thota A, Roversi L, Rouhani M, **McPherson L**, Abbas J, Jung R, Romain O, Renaud S, Bornat Y, Kolbl F. Evaluation of stimulation performances for safe and efficient peripheral nervous system stimulation. *Conf Proc IEEE Biomedical Circuits and Systems* 2021. doi: <https://hal.archives-ouvertes.fr/hal-03542068>
- 16) Hassan AS[§], Fajardo ME, Cummings M, **McPherson LM**, Negro F, Dewald JP, Heckman CJ, Pearcey GE. Estimates of persistent inward currents are reduced in upper limb motor units of older adults. *The Journal of Physiology*. 2021. 599:4865-4882. doi: 10.1113/JP282063.
- 17) **McPherson LM**, Dewald JP. Abnormal synergies and associated reactions post-hemiparetic stroke reflect the muscle activation patterns of brainstem motor pathways. *Frontiers in Neurology*. 2022. doi: 10.3389/fneur.2022.934670.
- 18) Benedini M, Cabral HV, Cogliati M, Orizio C, Bissolotti L, **McPherson LM**, Negro F. High-density surface electromyography allows for longitudinal assessment of the neural drive to muscle in individuals with acute stroke. *Conf Proc IEEE Methodology for eXtended Reality, Artificial Intelligence and Neural Engineering (MetroXAINe)* 2023. doi: 10.1109/MetroXRAINE58569.2023.10405698.
- 19) **McPherson LM**, Reece TM[§], Beauchamp JA, Lohse KR. Relationships among motor unit discharge parameters used to estimate synaptic inputs to motoneurons. *Conf Proc IEEE Eng Med Biol Soc*. 2024. doi: 10.1109/EMBC53108.2024.10782880.
- 20) Regnacq L, Thota AK, Ortega Sanabria A[§], **McPherson L**, Renaud S, Romain O, Bornat Y, Abbas JJ, Jung R, Kolbl F. Fascicle-selective kilohertz-frequency neural conduction block with longitudinal intrafascicular electrodes. *Journal of Neural Engineering*. 2025; doi: 10.1088/1741-2552/adc62a.
- 21) Bandela S, **McPherson L**, Harvey RL, Awosika O, Aggarwal D, Liu CY, Raghavan P, Goldberg MP, on behalf of the American Heart Association Stroke Council; Council on Cardiovascular and Stroke Nursing; Council on Basic Cardiovascular Sciences; Council on Lifestyle and Cardiometabolic Health. Early recognition and intervention for poststroke spasticity: A scientific statement from the American Heart Association. *Stroke*. 2026. 57:e146-e159. doi: 10.1161/STR.0000000000000515.
- 22) **McPherson LM**, Lohse KR, Simon SM[§], Free DB[§], Beauchamp JA, Negro F, Naismith RT, Cross AH. Reverse engineering of motor unit discharge in multiple sclerosis reveals heterogeneity of voluntary motor commands. *eLife*. 2026. *In press*.

*** Seven other manuscripts in final preparation**

Pre-prints not yet published in peer reviewed journal:

- 1) Beauchamp JA, Hassan AS, **McPherson LM**, Negro F, Pearcey GEP, Cummings M, Heckman CJ, *Dewald JP. 2023. Motor unit firing rate modulation is more impaired during flexion synergy-driven contractions of the biceps brachii in chronic stroke. *medRxiv*. doi: 10.1101/2023.11.22.23298905.
- 2) Benedetto AT, Jenz ST, Farley MT, Heit BS, Beauchamp JA, Sangari S, **McPherson LM**, Heckman CJ, Perez MA, Pearcey GEP. 2026. Muscle-specific motor unit firing characteristics in elbow flexors and extensors after cervical spinal cord injury. *bioRxiv*. doi: 10.64898/2026.06.03.729825. **Under review at Journal of Physiology.**
- 3) Ortega Sanabria A, Regnacq L, Thota AK, Holmes A, Asbee JM, Renauld S, Klobl F, Bornat Y, Robinson S, **McPherson LM**, Abbas JJ, Jung R. Selective Activation of Nerve Fiber Subpopulations with Intrafascicular Stimulation. *bioRxiv*. doi: 10.64898/2026.05.27.727943. **Under review at Journal of Neural Engineering.**
- 4) Pourreza E, Cabral HV, Hu N, Inglis JG, Desmons M, Delis I, **McPherson LM**, Negro F. Neural coupling between spinal motor neurons of the first dorsal interosseous during individual index finger flexion and pinch tasks. *bioRxiv*. doi: 10.64898/2026.04.09.717449. **Under review at Journal of Neural Engineering.**

Abstracts

Doctor of Physical Therapy student underlined.

MS or PhD student advisee *underlined with asterisk.

Post-doctoral fellow trainee double-underlined.

- 1) **Miller LC**, Dewald JPA (2008). "Quantification of finger/wrist flexion forces as a function of limb loading in chronic hemiparetic stroke and the effects of finger/wrist extensor stimulation." *Society for Neuroscience Annual Meeting*, Washington, DC.
- 2) **Miller LC**, Dewald JPA (2009). "Wrist/finger flexion forces and EMG as a function of shoulder abduction loading in chronic hemiparetic stroke." *Robotics: Science and Systems Conference Workshop: Understanding the Human Hand for Advancing Robotic Manipulation*, Seattle.
- 3) **Miller LC**, Stienen AHA, Dewald JPA (2009). "Finger/wrist flexor and biceps activity increases as a function of limb loading and reach in chronic hemiparetic stroke." *Society for Neuroscience Annual Meeting*, Chicago.
- 4) **Miller LC**, Dewald JPA (2011). "Wrist/finger flexion forces and EMG increase with shoulder abduction loading in chronic hemiparetic stroke." *American Physical Therapy Association Combined Sections Meeting*, New Orleans.
- 5) **Miller LC**, Dewald JPA (2012). "Quantification of the flexion and extension synergies at the wrist and fingers of individuals with chronic hemiparetic stroke." *American Physical Therapy Association Combined Sections Meeting*, Chicago.

- 6) **Miller LC**, Dewald JPA (2012). "Differential effects of shoulder abduction and adduction on involuntary behavior of the paretic hand in chronic hemiparetic stroke." *Society for Neuroscience Annual Meeting*, New Orleans.
- 7) **Miller LC**, McGill KC, Dewald JPA (2013). "Evidence of neural coupling between muscles of the paretic upper extremity in chronic hemiparetic stroke." *American Physical Therapy Association Combined Sections Meeting*, San Diego.
- 8) **Miller LC**, Dewald JPA (2013). "Effects of shoulder torque on hand function in stroke: implications for control of assistive devices." *Biomedical Engineering Society Annual Meeting*, Seattle. Platform presentation.
- 9) **Miller LC**, Negro F, Heckman CJ, Farina D, Dewald JPA (2013). "Evidence of common motor unit modulation among muscles of the flexion synergy in chronic hemiparetic stroke." *Society for Neuroscience Annual Meeting*, San Diego.
- 10) **Miller LC**, Wilson JM, Gorassini M, Farina D, Dewald JPA, Heckman CJ (2013). "Estimation of persistent inward currents in proximal vs. distal muscles in the upper extremity." *6th International IEEE EMBS Conference on Neural Engineering*, San Diego.
- 11) **Miller LC**, Dewald JPA (2014). "Effects of shoulder abduction/adduction torque on hand opening and closing in chronic hemiparetic stroke." *American Physical Therapy Association Combined Sections Meeting*, Las Vegas.
- 12) **Miller LC**, Negro F, Heckman CJ, Farina D, Dewald JPA (2014). "Evidence of common motor unit modulation among muscles of the flexion synergy in chronic hemiparetic stroke." *NIBIB Training Grantee Meeting*, Bethesda, MD.
- 13) **Miller LC**, Negro F, Heckman CJ, Farina D, Dewald JPA (2014). "Motor unit firing patterns during abnormal multi-joint coupling in chronic hemiparetic stroke." *The 9th International Motoneuron Meeting*, Halifax, Canada. Platform presentation. Winner of Outstanding Student Presentation.
- 14) **Miller LC**, Thompson CK, Negro FN, Heckman CJ, Farina D, Dewald JPA (2014). "High-density surface EMG decomposition allows for recording of motor unit discharge from proximal and distal flexion synergy muscles simultaneously in individuals with stroke," *36th International Conference of the IEEE Engineering in Medicine and Biology Society*, Chicago. Two platform presentations (scientific symposium and symposium for International Finalists for Student Paper Competition).
- 15) **Miller LC**, Dewald JPA (2014). "Associated reactions in paretic wrist and finger flexors are greater in response to activation of proximal vs. distal joints of the non-paretic limb in individuals with chronic stroke." *Society for Neuroscience Annual Meeting*, Washington, DC.
- 16) **Miller LC**, Negro F, Heckman CJ, Farina D, Dewald JPA (2015). "Motor unit coherence among muscles of the flexion synergy in individuals with chronic hemiparetic stroke." *Biomedical Engineering Society Annual Conference*, Tampa.
- 17) **Miller LC**, Negro F, Heckman CJ, Farina D, Dewald JPA (2015). "Motor unit coherence among muscles of the flexion synergy in individuals with chronic hemiparetic stroke." *Society for Neuroscience Annual Meeting*, Chicago.
- 18) **Hurley DM**, **Hruby SA**, **Joshi I**, **Kang H**, Thompson CK, **Miller LC**, Sanchez N, Powers RK, Negro F, Farina D, Dewald JPA, Heckman CJ (2015). "Mapping the discharge of motor unit populations in the human lower extremity." *Society for Neuroscience Annual Meeting*, Chicago.

- 19) Wilson JM, Thompson CK, **Miller LC**, Mackinnon C, Heckman CJ (2015). "Paradoxical changes in intrinsic motoneuron excitability between flexors and extensors in Parkinson's disease." *Society for Neuroscience Annual Meeting*, Chicago.
- 20) Thompson CK, Negro F, Johnson MD, Holmes MR, **Miller LC**, Farina D, Heckman CJ (2015). "Decorrelated neural drive to muscle from highly consistent inputs of specific sensory pathways in the *in vivo* cat." *Society for Neuroscience Annual Meeting*, Chicago.
- 21) **McPherson LM**, Negro F, Heinichen S, McLerran M, Rose K, Winters A, Schulz K, Thompson CK, Heckman CJ, Farina D, Dewald JPA (2016). "Coherence among motor units of flexion synergy muscles in individuals with chronic hemiparetic stroke." *American Physical Therapy Association Combined Sections Meeting*, Anaheim, CA.
- 22) Heinichen S, McLerran M, Rose K, Schulz K, Winters A, Thompson CK, **Miller McPherson LC**, Heckman CJ, Dewald JPA (2016). "Estimation of motor unit discharge characteristics in proximal and distal arm muscles in healthy controls and individuals post-stroke." *American Physical Therapy Association Combined Sections Meeting*, Anaheim, CA.
- 23) **McPherson LM**, Thompson CK, Negro F, Heckman CJ, Farina D, Dewald JPA (2016). "Analysis of motor unit behavior in proximal and distal upper limb muscles in healthy and post-stroke individuals." *Neural Control of Movement Annual Conference*, Montego Bay, Jamaica. Team platform presentation: "Control of the motoneuron: insights from the discharge of motor unit populations."
- 24) **McPherson LM**, Negro F, Thompson CK, Heckman CJ, Farina D, Dewald, JPA (2016). "Differences in motor unit discharge characteristics among proximal and distal muscles of the upper limb in individuals with chronic hemiparetic stroke." *International Society of Electrophysiology and Kinesiology Conference*, Chicago. Symposium presentation.
- 25) **McPherson LM**, Negro F, Thompson CK, Sanchez L, Heckman CJ, Dewald JP, Farina D (2016). "Properties of the motor unit action potential shape in proximal and distal muscles of the upper limb in healthy and post-stroke individuals." *38th International Conference of the IEEE Engineering in Medicine and Biology Society*, Orlando. Platform presentation.
- 26) **McPherson LM**, Negro F, Thompson CK, Farina D, Heckman CJ, Dewald JPA (2016). "Motor unit discharge characteristics differ among proximal and distal muscles of the upper limb in healthy and post-stroke individuals." *Society for Neuroscience Annual Meeting*, San Diego.
- 27) **McPherson LM**, Negro F, Thompson CK, Rendos NK, Farina D, Heckman CJ, Dewald JPA (2017). "Motor unit rate modulation differs among proximal and distal muscles of the upper limb in healthy and post-stroke individuals." *Progress in Motor Control Meeting*, Miami.
- 28) **McPherson LM**, Wilson JM, Rendos NK, Powers R, Heckman CJ, Thompson CK (2017). "The distribution of motoneuron excitability among upper extremity motor pools." *Society for Neuroscience Annual Meeting*, Washington, D.C.
- 29) Garmirian LR, **McPherson LM**, Acosta AM, Dewald JA (2018). "Atrophy and voluntary activation of paretic elbow muscles in individuals with chronic hemiparetic stroke: preliminary findings." *American Physical Therapy Association Combined Sections Meeting*, New Orleans.
- 30) Kim C, Perez MA, **McPherson LM** (2018). "Characterizing neural control of precision and power grip tasks using motor unit coherence." *University of Miami Neural Engineering Research Symposium*, Miami, FL.

- 31) Hassan A*, Cummings M, Heckman CJ, **McPherson LM**, Dewald JPA (2018). "Motor unit firing patterns in stroke." *11th Meeting of the International Motoneuron Society*, Boulder, CO. Platform presentation.
- 32) Kim C, Perez MA, **McPherson LM** (2018). "Characterizing neural control of precision and power grip tasks using motor unit coherence." *11th Meeting of the International Motoneuron Society*, Boulder, CO.
- 33) Hassan A*, Cummings M, Heckman CJ, **McPherson LM**, Dewald JPA (2018). "Rate modulation and further evidence for changes in persistent inward currents during isometric dynamic torque tasks in chronic hemiparetic stroke." *International Society of Electromyography and Kinesiology Conference*, Dublin, Ireland. Symposium presentation.
- 34) **McPherson LM**, Kim C, Rendos N, Chu A*, Espinal A, Zaveri S, Carreño J, Vega P, Varghese R (2018). Differences in motor unit discharge characteristics between ankle plantarflexors and dorsiflexors during steady contractions. *Society for Neuroscience Annual Meeting*, San Diego.
- 35) Kim C, Perez MA, **McPherson LM** (2018). "Motor unit coherence indicates changes in corticospinal influence during different hand motor tasks." *Society for Neuroscience Annual Meeting*, San Diego.
- 36) Hassan AS*, Kim EH, Khurram OU, Cummings M, Thompson CK, **McPherson LM**, Heckman CJ, Dewald JPA, Negro F (2019). "Properties of motor units of elbow and ankle muscles decomposed using high-density surface EMG." *41st International Conference of the IEEE Engineering in Medicine and Biology Society*, Berlin. Platform presentation.
- 37) Thompson CK, **McPherson LM**, Negro F (2019). "High-Density EMG neurobiomarkers for Improving Rehabilitation Therapies." Hosts of Pre-Congress Workshop, Rehab Week Congress, Toronto, CA.
- 38) Thompson CK, Kmiec T, Kumar P, **McPherson LM**, Negro F (2019). "Within and across day repeatability of estimates of human spinal motoneuron excitability." *Society for Neuroscience Annual Meeting*, Chicago, IL.
- 39) Negro F, Martinez-Valdes E, **McPherson LM**, Thompson CK, Cudicio A, Yavuz U (2019). "The need for accurate decomposition methods for the precise estimation of the neural drive to muscle." *Society for Neuroscience Annual Meeting*, Chicago, IL.
- 40) **McPherson LM**, Hassan AS*, Negro F, Cummings M, Powers RK, Dewald JP, Heckman CJ, Thompson CK (2019). "Factors influencing estimation of motoneuron excitability using analysis of motor unit populations." *Society for Neuroscience Annual Meeting*, Chicago.
- 41) Hassan AS*, Cummings MQ, Thompson CK, Negro F, Powers RK, Heckman CJ, **McPherson LM**, Dewald JP (2019). "The relationship between stroke-induced changes in motor unit firing behavior and the expression of motor deficits." *Society for Neuroscience Annual Meeting*, Chicago.
- 42) **McPherson LM**, Thompson CK, Hyngstrom A, Heckman CJ, Negro F (2020). "Symposium: International Motoneuron Society: from motoneuron activity to motor control." *International Society for Electromyography and Kinesiology*, virtual congress.
- 43) **McPherson LM**, Negro F, Thompson CK, Lohse K, Powers RK, Farina D, Heckman CJ, Dewald, JP (2021). "Pathological inhibition limits motor unit rate modulation during voluntary contractions in a muscle-dependent manner post-stroke." *American Society for Neurorehabilitation Annual Meeting*, virtual.

- 44) Ortega A*, Thota AK*, Bornat Y, Kölbl F, Romain O, Renaud S, **McPherson LM**, Abbas J, Jung R (2021). "Improving nerve fiber selectivity of intrafascicular stimulation." LatinX Biomedical Engineering Symposium, virtual.
- 45) Abbas J, Jung R, Bornat Y, Kölbl F, **McPherson LM**, Thota AK, Regnacq L, Ortega A*, Rouhani M, Romain O, Crook S, Renaud S (2021). Improving selectivity with intrafascicular stimulation: computational and experimental studies. 7th Annual BRAIN Initiative Investigators Meeting, virtual.
- 46) Regnacq L, Giraud R, Ortega Sanabria A*, Thota A*, Roversi L, Rouhani M, **McPherson L**, Abbas J, Jung R, Romain O, Renaud S, Bornat Y, Kolbl F (2021). Evaluation of stimulation performances for safe and efficient peripheral nervous system stimulation. 2021 IEEE Biomedical Circuits and Systems Conference (BioCAS): "Restoring Vital Functions by Electronics: Achievements, Limitations, Opportunities, and Challenges," Berlin, Germany.
- 47) Pearcey GE, Hassan AS*, Fajardo ME, Cummings M, Negro F, **McPherson LM**, Dewald JP, Heckman CJ (2022). Effects of aging on persistent inward currents of human motoneurons. International Society for Electromyography and Kinesiology 2022 Congress. Quebec City, Canada.
- 48) Ortega Sanabria A*, Thota AK*, Regnacq L, Rouhani M, **McPherson LM**, Abbas JJ, Bornat Y, Kolbl F, Jung R (2022). Selective activation of nerve fiber subpopulations with intrafascicular stimulation. Society for Neuroscience Annual Meeting. San Diego, CA.
- 49) Ortega Sanabria A*, Rouhani M, Thota AK*, Regnacq L, **McPherson LM**, Kolbl F, Bornat Y, Jung R, Abbas JJ (2022). Improving selectivity for bioelectronic therapies with intrafascicular stimulation (BioTIFS). Collaborative Research in Computational Neuroscience (CRCNS) PI Meeting, Atlanta, GA.
- 50) Reece TR*, McCane LM, McPherson JG, Negro F, Naimsith R, Cross AH, **McPherson LM** (2023). Motor unit population behavior of involuntary muscle spasms during voluntary contractions in a patient with multiple sclerosis. Progress in Clinical Motor Control II Meeting, Chicago, IL.
- 51) **McPherson LM**, Reece TR*, McCane LM, Lohse KR, Negro F, Lang C, Naismith R, Cross AH (2023). Pathophysiology of voluntary motor commands in patients with multiple sclerosis identified using reverse engineering of motor unit population discharge. Progress in Clinical Motor Control II Meeting, Chicago, IL.
- 52) Reece TR*, McCane LM, McPherson JG, Negro F, Naimsith R, Cross AH, **McPherson LM** (2023). Motor unit population behavior of involuntary muscle spasms during voluntary contractions in a patient with multiple sclerosis. Society for Neuroscience Annual Conference, Washington DC.
- 53) **McPherson LM**, Reece TR*, McCane LM, Lohse KR, Negro F, Lang C, Naismith R, Cross AH (2023). Pathophysiology of voluntary motor commands in patients with multiple sclerosis identified using reverse engineering of motor unit population discharge. Society for Neuroscience Annual Conference, Washington DC.
- 54) Ortega A*, Rouhani M, Thota AK*, Asbee J, Regnacq L, Bornat Y, Kolbl F, **McPherson LM**, Abbas J, Jung R (2023). Selective activation of nerve fiber subpopulations with intrafascicular stimulation depends on size of electrode active site. Society for Neuroscience Annual Conference, Washington DC.

- 55) Ortega A*, Rouhani M, Thota AK*, Asbee J, Regnacq L, Bornat Y, Kolbl F, **McPherson LM**, Abbas J, Jung R (2023). Selective activation of nerve fiber subpopulations with intrafascicular stimulation depends on size of electrode active site. LatinXinBME Symposium, Seattle, WA.
- 56) **McPherson LM**, Reece TR*, Simon S, Lohse K, Negro F, Lang C, Naismith R, Cross A (2024). Pathophysiology of voluntary motor commands in patients with multiple sclerosis identified using reverse engineering of motor unit population discharge. Association for Clinical and Translational Science Annual Meeting, Las Vegas, NV. *Selected as Top 50 Abstract (out of 568 accepted).
- 57) **McPherson LM**, Reece TR*, Simon S, Lohse K, Negro F, Lang C, Cross A (2024). Pathophysiology of voluntary motor commands in patients with multiple sclerosis identified using reverse engineering of motor unit population discharge. 6th Annual Washington University Institute for Clinical and Translational Sciences Symposium, St. Louis, MO.
- 58) **McPherson LM**, Reece TR*, Simon S, Free D, Lohse K, Cross A (2024). Heterogeneity of pathophysiological voluntary motor commands in patients with multiple sclerosis. Society for Neuroscience Annual Meeting, Chicago, IL.
- 59) Simon S, Free D, Reece TR*, Lohse K, Cross A, ***McPherson LM** (2024). Longitudinal assessment of voluntary motor commands to spinal motoneurons in patients with multiple sclerosis. Society for Neuroscience Annual Meeting, Chicago, IL.
- 60) Free D, Reece TR*, Simon S, Pearcey G, Beauchamp D, Jenz S, Fajardo M, Heckman C, Lohse K, **McPherson LM** (2024). Latent variables underlying motor unit firing patterns in a diverse set of muscles. Society for Neuroscience Annual Meeting, Chicago, IL.
- 61) Beauchamp JA, Hassan AS, **McPherson LM**, Plaisier T, Pearcey GEP, Negro F, Urdy S, Heckman CJ, *Dewald JP (2024). Monoaminergic contributions to post-stroke motor impairments. Society for Neuroscience Annual Meeting, Chicago, IL.
- 62) Ortega Sanabria A*, Regnacq L, Asbee L, Thota AK, Abbas JJ, McPherson LM, Jung R (2024). Neuromodulation of nerve fiber activation via intrafascicular stimulation: effects of non-rectangular waveform shapes. Society for Neuroscience Annual Meeting, Chicago, IL.
- 63) Pearcey GEP, Beauchamp J, Jenz S, Fajardo M, **McPherson LM**, Heckman CJ (2024). Diverse motor unit firing patterns reflect divergent motor command structure across human arm muscles. Society for Neuroscience Annual Meeting, Chicago, IL.
- 64) **McPherson LM**, Simon S, Reece T*, Free D, Lohse K, Naismith R, Cross A (2025). Heterogeneity of pathophysiological voluntary motor commands in patients with multiple sclerosis. American Physical Therapy Association Combined Sections Meeting, Houston, TX.
- 65) Simon S, Free D, Reece T*, Lohse K, Naismith R, Cross A, **McPherson LM** (2025). Subclinical pathophysiology of motor processing in people with multiple sclerosis. American Physical Therapy Association Combined Sections Meeting, Houston, TX.
- 66) **McPherson LM**, Lohse K, Simon S, Free D, Naismith R, Cross A (2025). Heterogeneity of pathophysiological voluntary motor commands in patients with multiple sclerosis. 14th International Symposium on Gait and Balance in Multiple Sclerosis. Denver, CO.
- 67) **McPherson LM**, Lohse K, Simon S, Free D, Beauchamp JA, Negro F, Naismith R, Cross A (2025). Heterogeneity of pathophysiological voluntary motor commands in patients with multiple sclerosis. International Motoneuron Meeting, Newfoundland, CA.

- 68) Ortega Sanabria A*, Holmes A, Regnacq L, Asbee J, Irby D, Lowery J, **McPherson LM**, Jung R, Abbas JJ (2025). Enhancing selectivity of neuromodulation with intrafascicular stimulation of the vagus nerve. Society for Neuroscience Annual Meeting, San Diego, CA.
- 69) Madhugiri S, Simon S, Free D, Naismith R, Cross A, **McPherson LM** (2025). Pathophysiology of the voluntary motor command in multiple sclerosis is associated with clinical impairment. Washington University Undergraduate Research Symposium.
- 70) **McPherson LM**, Lohse K, Simon S, Free D, Beauchamp JA, Negro F, Naismith R, Cross A (2026). Voluntary motor commands to spinal motoneurons are associated with motor function in multiple sclerosis. International Society of Electromyography and Kinesiology Annual Meeting, Finland.