

SHAY R. PINHEY, Ph.D.

Date: June 22, 2026

Address: Washington University in St. Louis Physical Therapy, 4444 Forest Park Ave, St. Louis, MO 63108

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PRESENT POSITION

Postdoctoral Research Scholar at Washington University in St. Louis Program in Physical Therapy

EDUCATION

Doctor of Philosophy in Biomechanics and Movement Science

Aug 2022 - Summer 2026

University of Delaware - Newark, DE

Advisor: Elisa Arch, PhD

Dissertation Title: Passive Dynamic Ankle-Foot Orthosis Stiffness, Acclimation, and Utilization Affect Walking Energetics for Individuals Post-Stroke

Master of Science in Biomedical Engineering

Sept 2019 - June 2021

Northwestern University - Evanston, IL

Advisors: Steven Gard, PhD; Matthew Major, PhD

Thesis Title: Investigating Risk of Secondary Condition Development in Transfemoral Prosthesis Users on the Basis of Sex

Publication: Effects of Walking Speed on Mechanical Work on the Body Center of Mass in Transfemoral Prosthesis Users

Bachelor of Science in Engineering (Biomechanical Emphasis)

Aug 2015 - May 2019

Hope College - Holland, MI

Mathematics Minor

EXPERIENCE

Research Assistant

Fall 2023 – Spring 2026

Department of Kinesiology and Applied Physiology

University of Delaware - Newark, DE

Research Technologist II

Winter - Summer 2022

Physical Medicine and Rehabilitation

Northwestern University - Chicago, IL

Research Assistant

Fall 2021 - Winter 2022

Human Agility Lab

Northwestern University - Chicago, IL

MANUSCRIPTS

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1. Skigen, JT; Koller, CA; Reisman, DS; McKee, Z; **Pinhey, SR**; Henderson, A; Wilken, JM; Arch, ES. "Passive-dynamic ankle-foot orthoses change post-stroke lower extremity constituent work profile." *Journal of Biomechanics*, December 2024. <https://doi.org/10.1016/j.jbiomech.2024.112414>
 2. Skigen, JT; Koller, CA; Nigro, L; Reisman, DS; McKee, Z; **Pinhey, SR**; Henderson, A; Wilken, JM; Arch, ES. "Customized passive-dynamic ankle-foot orthoses can improve walking economy and speed for many individuals post-stroke." *J NeuroEngineering Rehabil* 21, 126 (2024). <https://doi.org/10.1186/s12984-024-01425-7>
 3. Chen, E; Shafer, A; Stack, A; **Pinhey, SR**; Gordon, KE. "Persons with Unilateral Transtibial Amputations Modulate Ipsilateral Hip and Contralateral Ankle Joint Work to Accelerate and Decelerate Walking.", *Journal of Prosthetics and Orthotics*, July 2024, DOI:10.1097/JPO.0000000000000521
 4. **Pinhey, SR**; Murata, H; Hisano, G; Ichimura, D; Hobara, H; Major, MJ "Effects of walking speed and prosthetic knee control type on external mechanical work in transfemoral prosthesis users.", *Journal of Biomechanics*, March 2022, <https://doi.org/10.1016/j.jbiomech.2022.110984>

FUNDED PROJECTS

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1. University of Delaware Kinesiology and Applied Physiology Dissertation Grant
Exploring Key Factors that May Affect Walking Energetics with Passive-Dynamic Ankle-Foot Orthoses
Principal Investigator: Shay R. Pinhey, MS
 2. Department of Defense USAMRAA Orthotics & Prosthetics Outcomes Research Program Grant

Identifying the Optimal Patient Specific Dynamic Ankle-Foot Orthosis Bending Stiffness in an Evidence-Based Manner that can be Implemented by Clinical Providers

Principal Investigator: Elisa S. Arch, PhD

Role: PhD Student Research Assistant

PRESENTATIONS

1. World Congress of Biomechanics. Vancouver, BC, Canada 2026. Pinhey, SR; Reisman, DS; Arch, ES.
Poster: "Does PD-AFO utilization affect the mechanical cost of walking for individuals post-stroke?"
2. American Academy of Orthotists and Prosthetists Annual Meeting. Nashville, TN 2026. Pinhey, SR; Reisman, DS; Arch, ES.
Podium: "Do Post-Stroke Passive Dynamic Ankle-Foot Orthosis Users Optimize Walking Outcomes After Self-Guided Device Exploration?"
3. American Society of Biomechanics. Pittsburgh, PA 2025. Pinhey, SR; Reisman, DS; Arch, ES.
Poster: "Do Walking Outcomes Improve After Self-Exploration of Walking with a Passive Dynamic Ankle-Foot Orthosis for Individuals Post-Stroke? A Pilot Study"
4. American Society of Biomechanics. Madison, WI 2024. Pinhey, SR; Arch, ES.
Poster: "Altering Passive-Dynamic Ankle Foot Orthosis Stiffness Affects Cost of Transport in Individuals Post-Stroke."
5. American Society of Biomechanics. Knoxville, TN 2023. Pinhey, SR; Skigen, J; McKee, Z; Arch, ES.
Poster: "Does Altering PD-AFO Stiffness Affect Ankle Mechanics in Individuals Post-Stroke: A Pilot Study."
6. American Society of Biomechanics. Knoxville, TN 2023. Pinhey, SR; Chen, E; Shafer, A; Stack, A; Gordon, KE.
Poster: "Joint work compensations in unilateral transtibial prosthesis users during gait acceleration and deceleration."
7. American Society of Biomechanics East Coast Regional Meeting. Reading, PA 2023. Pinhey, SR; Skigen, J; McKee, Z; Arch, ES.
Poster: "Does Altering PD-AFO Stiffness Affect Ankle Mechanics in Individuals Post-Stroke: A Pilot Study."
8. American Society of Biomechanics. Virtual meeting 2021.
Pinhey, SR; Murata, H; Hisano, G; Ichimura, D; Hobara, H; Major, MJ
Podium: "Unilateral transfemoral prosthesis users rely on their sound limb to drive changes in external body center of mass work during walking."
9. American Academy of Orthotists and Prosthetists Annual Meeting. Virtual Meeting 2021. Pinhey, SR; Murata, H; Hisano, G; Ichimura, D; Hobara, H; Major, MJ
Poster: "Unilateral transfemoral prosthesis users rely on their sound limb to drive changes in external body center of mass work during walking."
10. International Society for Prosthetics and Orthotics World Congress. Virtual Meeting 2021. Pinhey, SR; Murata, H; Hisano, G; Ichimura, D; Hobara, H; Major, MJ
Podium: "Effects of walking speed on external mechanical work on body center of mass in transfemoral prosthesis users."

TEACHING AND MENTORSHIP

Guest Lecture, Governor's School for Excellence

Summer 2025

University of Delaware - Newark, DE

What is Biomechanics?

Guest Speaker, Freshman Seminar in Kinesiology

Fall 2024

University of Delaware - Newark, DE

KAAP105-Freshman Seminar in Kinesiology

Graduate Student Panel

Guest Lecture, Biomechanics 1

Spring 2024

University of Delaware - Newark, DE

KAAP426-Biomechanics 1

Applying Biomechanics

Guest Lectures, Biomechanical Analyses with Visual3D

Spring 2024

University of Delaware - Newark, DE

KAAP628-Biomechanical Analyses with Visual 3D

V3D Model Building-Part 2 Kinetic and Kinematic Signals

Designed Post-Lecture Activity

Teaching Assistant, Department of Kinesiology and Applied Physiology**Fall 2022 - Spring 2023**

University of Delaware - Newark, DE

KAAP 400-Research Methods

KAAP 310-Human Anatomy and Physiology I & II Lab

Teaching Assistant, Department of Kinesiology**Spring 2019**

Hope College - Holland, MI

KIN383-Biomechanics

Teaching Assistant, Department of Engineering**Fall 2016, Fall 2018**

Hope College - Holland, MI

ENGS100-Introduction to Engineering Lab

Student Mentees

Spring 2025-Summer 2026: Micah Stoogenke, Biomedical Engineering (Class of 2028); Katie Frampton, Human Physiology (Class of 2028)

Summer 2023-Spring 2025: Cristin Earley, Kinesiology and Exercise Science (Class of 2025)

SERVICE, TECHNICAL PROFICIENCIES, & PROFESSIONAL MEMBERSHIPS

Service:

- **American Society of Biomechanics - University of Delaware Chapter** **2022-2026**
Founding Member (2022)
Secretary (2023-2024)
Vice President (2024-2025)
Treasurer (2024-2026)
- **Community Connectors: Graduate Student Outreach at UD** **2023-2026**
Founding Member (2023)
Treasurer (2024-2025)
- **Girl Scouts Exploration Day Volunteer** **2025**
Facilitated biomechanics and robotics activity for elementary school students
- **National Biomechanics Day Volunteer** **2023-2025**
Facilitated orthotic and prosthetic demonstration and activity for high school students
- **Test Prep Chicago Standardized Testing Tutor** **2021-2022**
- **Northwestern University Biomedical Engineering Graduate Student Organization** **2019-2021**
Social Committee Chair (2020-2021)
- **Hope College Residential Life** **2016-2019**
Resident Assistant (2016-2019)
Program Assistant (2018-2019)

Technical Proficiencies:

- **Qualisys Motion Capture** (Gothenburg, Sweden)
- **Visual 3D** (HAS-Motion, Kingston, Ontario, Canada)
- **Matlab** (MathWorks Inc, Natick, MA, USA)

Professional Memberships:

- **American Society of Biomechanics (ASB)** **2019-Present**