

Alexandra J. Miller

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EDUCATION

Johns Hopkins University, Baltimore, Maryland

Ph.D., Mechanical Engineering, August 2025

- Advisor: Jeremy D. Brown

M.S.E., Robotics, May 2023

Worcester Polytechnic Institute, Worcester, Massachusetts

B.S., Mechanical Engineering, May 2020

EXPERIENCE

Graduate Research Assistant, Freidrich-Alexander Universität

Sept 2023 - Aug 2024

Chair of Autonomous Systems and Mechatronics

Advisor: Prof. Dr.-Ing. habil. Philipp Beckerle

- We published a perspective paper in Frontiers in Robotics and AI on implementing social and affective touch to increase trust and connection in human-robot interaction.
- I plan to conduct two user studies. The first will investigate the efficacy of two grasp training methods on improving prosthesis grasp accuracy and general embodiment. The second will be conducted “in the wild” and explore whether social touches felt through the prosthesis will evoke the same emotional response as when experienced with the natural hand.

Graduate Research Assistant, Johns Hopkins University

June 2020 – August 2025

Department of Mechanical Engineering, Haptics and Medical Robotics Laboratory

Advisor: Jeremy D. Brown, Ph.D.

- Built hardware to explore utility of affective haptic feedback in upper-limb prosthetics
- Assisted in conducting amputee and non-amputee user studies to test neural efficiency of semi-autonomous controller and haptic feedback
- Assisted in developing survey to assess prosthesis user experience
- Conducted user studies to explore effects of teleoperator transmission dynamics on operator performance

Graduate Research Assistant, Worcester Polytechnic Institute

Oct 2019 – May 2020

Department of Mechanical Engineering, Medical and Manufacturing Innovation Laboratory

Advisor: Yihao Zheng, Ph.D.

- Worked to create a three-dimensional reconstruction from a two-dimensional freehand ultrasound scan of a hemodialysis fistula

Intern, DEKA Research and Development Corporation

May 2019 - Aug 2019

Manchester, New Hampshire

- Designed new assistant handle for the iBot wheelchair using Solidworks
- Conducted Engineering Verification Testing on the iBot
- Trained iBot users and their families in safe iBot operation and stair climbing

Co-Owner, Drehbanc Pens
Grantsville, Maryland

July 2018 – Aug 2020

- Developed marketing materials and work with customers to provide custom products
- Turned products on wood lathe

Intern, Office of Technology Commercialization
Worcester Polytechnic Institute

August 2017 – May 2020

- Collaborated with inventors to generate marketing writeups for licensable products

Intern, Pillar Innovations
Grantsville, Maryland

June 2018 – August 2018

- Created CAD models for job quotes utilizing Autodesk Inventor and Solidworks
- Aided in quoting jobs for Frito Lay, Hino, and Northrop Grumman

Intern, ITI Trailers and Truck Bodies
Meyersdale, Pennsylvania

June 2017 – August 2017

- Organized part inventory using Infor VISUAL software
- Learned to MIG weld-beginner level

PROJECTS

Onsite Plastic Recycling, Major Qualifying Project, WPI

Aug 2019 – May 2020

- Designed and fabricated a small material recovery facility for municipalities to sell shredded, cleaned, and densified EPS
- Conducted onsite research at a local refuse & recycling site

Automation Solution for Pleated Filter Cartridge Assembly at MilliporeSigma, Advanced Engineering Design Class, WPI

Oct 2019 – Dec 2020

- Prototyped and tested bench-top model to demonstrate automation feasibility of pleated filter cartridge insertion
- Presented research and model to company representatives

Assistive Boccia Ball Ramp, Rehabilitation Engineering Class, WPI

Jan 2019 – Mar 2020

- Headed a team of 4 to design and build a boccia ramp for wheelchair users
- Collaborated with Assistive Technology Coordinator at Easter Seals in Worcester, MA to customize ramp for him while maintaining adjustability for other boccia players

Investigating Cultural Infrastructure, Hangzhou, China, WPI

Aug 2018 – Dec 2018

- Researched cultural infrastructure in Worcester, MA to use as a control for subsequent investigation of Hangzhou
- Interviewed 12 stakeholders and anonymously surveyed 395 Xihu and Xiasha District citizens to evaluate perspectives of infrastructure
- Devised a list of recommendations for Xiasha's government to enhance its cultural infrastructure

Assistive Door Opener, Introduction to Engineering Design Class, WPI

Mar 2018 – May 2018

- Led marketing efforts (e.g. sell sheet, user instructions, video advertisement) as part of a team to develop original key enabler and door attachment for individuals with inhibited upper limb performance
- Surveyed medical professionals, caregivers, and those with inhibited upper limb performance to gather design feedback
- Tested device with individual with essential tremor

Get Up 'N' Go Walker Stabilizer, Northern Garrett High School

Aug 2015 – Aug 2018

- Invented an attachment to stabilize a standard walker during sitting and standing transitions
- Interviewed and surveyed medical professionals and walker users
- Fabricated working prototype and tested device in nursing homes
- Obtained a provisional patent
- Created [sell sheet and video](#) to share with companies and contacted potential licensees

SELECTED HONORS AND AWARDS

Fulbright EU-NATO Seminar Attendee, 2024
 Fulbright Germany Grantee, 2023/2024
 Inclusion@Robotics Science and Systems Fellow, JHU, 2021
 NSF Graduate Research Fellowship Program Honorable Mention, JHU, 2021
 First Place Strage Innovation Award, 2018
 Honorary Member, National Academy of Inventors, 2018
 Foisie Scholarship (*full tuition*), 2016-2020
 Global Scholar, 2016
 Northrop Grumman Engineering Scholarship, 2016
 Intel International Science and Engineering Fair (ISEF) Fourth Place Grand Award in Engineering: Mechanics, 2016
 ISEF China Association for Science and Technology Special Award, 2016
 Finalist, First Place in Senior Division Engineering and Robotics, 2016
 Pittsburgh Foundation Merit Scholarship, 2016
 Pittsburgh Biophysical Research Group Annual Woods Prize, 2016
 Webb Law Firm Merit Award, 2016
 FIRST Robotics Competition Dean's List Award, 2015

PUBLICATIONS

- J1 Thomas, N., **Miller, A. J.**, Ayaz, H., and Brown J. D., Haptic shared control improves neural efficiency during myoelectric prosthesis use. *Sci Rep* 13, 484 (2023).
- J2 Cansev ME, **Miller A.J.**, Brown J.D., Beckerle P. Implementing social and affective touch to enhance user experience in human-robot interaction. *Frontiers in Robotics and AI*, 2024
- C1 **A. J. Miller**, G. Carolina Bettelani, S. Fani, M. Bianchi and J. D. Brown, "On the Utility of Affective Feedback in Prosthesis Embodiment," 2021 IEEE World Haptics Conference (WHC), Montreal, QC, Canada, 2021, pp. 874-874
- C2 N. D. Riazat, **A. J. Miller**, and J. D. Brown, "An Open-Source Ungrounded Hapkit for Educational Applications," 2021 IEEE World Haptics Conference (WHC), Montreal, QC, Canada, 2021, pp. 1155-1155

PRESENTATIONS

1. Fulbright Research Exchange, Vrije Universiteit Brussel, February 26, 2024
2. Haptic shared control improves neural efficiency during myoelectric prosthesis use. IEEE World Haptics Conference, Delft, Netherlands, July 10, 2023 (*poster presentation*)
3. Women in STEM Panel, Queen Elizabeth High School in Zimbabwe, Polygence, March 31, 2023 (*remote presentation*)
4. My STEM Journey, Queen Elizabeth High School in Zimbabwe, Polygence, March 25, 2022 (*remote presentation*)
5. Diversity In STEM Symposium, Monta Vista Robotics Team, Polygence, April 9, 2022 (*remote presentation*)

MENTORING

Research Mentor, Johns Hopkins University

Rasheedat Ekiyoyo – REU Undergraduate Student, Jun 2022 – Aug 2022

R'Reeyah Mabry – Baltimore Polytechnic High School Student, Mar 2022 – Aug 2022

Sithmi Jayasundara – Undergraduate Student, Jan 2022 – May 2023

Polygence Mentor, Remote Work

Jackson M. – Oct 2023

Ethan K. – Oct 2023

Yash B. – Sept 2023

Harish B. – Aug 2023

Marley S. – Aug 2023

Nikhil S. – Aug 2023

Vindhya I. – Aug 2023

Riley M. – Jul 2023

Yangho S. – Jun 2023– Jul 2023

Aadhvika K. – Jun 2023

Alexander M. – May 2023

Haripriya V. – Apr 2023

Anirudh R. - Jun 2022 – Jun 2023

Henry H. – Jun 2022 – Aug 2023

Anshu J. - Jun 2022 – Oct 2022

Johanna E. – Jan – Jul 2022

Queen Elizabeth Girls High Students, Harare Zimbabwe – Jan 2022 – Aug 2022

PROFESSIONAL DEVELOPMENT

FastForward U Spark Accelerator (*Student Venture*)

Johns Hopkins University

Jan-May 2023

Seasonal School on Rehabilitation and Assistive Technologies based on Soft Robotics (*Student*)

IEE

June 2021

ISSUED PATENTS

U.S. Provisional Patent 62/378,828, "Stabilizer for Walker and Walker having the Same," Aug 24, 2016