Alexander "Sasha" Wilkinson

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Skills

Software **Proficient:** Python, C, C++, ROS/ROS2, OpenCV, PCL, NumPy, PANDAS, Matplotlib, MongoDB, Docker, Linux (Debian, Ubuntu, Arch), Windows, Git, LaTeX
Familiar: Javascript/Typescript, R, Kotlin

Hardware CAD (SolidWorks, Fusion), rapid prototyping, 3D printing. Working knowledge of circuit design, machining, welding, woodworking.

Education

2017-2022 Bachelor's in Computer Science w/ Robotics minor at **UMass Lowell** Cum Laude

Work Experience

Research Assistant, UMass Lowell HRI Lab Feb 2018 - Present

Scooter project *(ROS, Python, Linux, OpenCV, PCL, MongoDB, R)*

- Developed spatial augmented reality (SAR) system for an assistive robotic manipulator, using a projector to display robot intent in the real world. (ISRR 2019 [1], VAM-HRI 2023 [2]).
- Led a team of 4 undergraduate students developing a graphical user interface and a tangible user interface for assistive manipulators. (Paladyn JBR 2021 [3]).
- Applied SAR system to improve explainability of manipulators (AI-HRI 2020 [4]) and provided an open-source implementation for mobile robots (HRI 2022 [5]).
- Executed human-subjects study evaluating UI modalities in assistive tech. (ICRA 2025 [6]).

Human-robot teaming study *(ROS, Python, Linux, Kotlin, MongoDB, Docker)*

- Implemented spatial augmented reality (SAR) system for a Fetch mobile manipulator, with significant improvements over prior work in planning and visual clarity of projection.
- Designed human-subjects study to evaluate the effects of SAR system on human and robot throughput in a shared workspace. Developed Android app to assign goals to participants.

Intern, Rethink Robotics Nov 2015 - Aug 2017

Project Agile *(ROS, Python, MQTT, Intera 5, JavaScript)*

- Designed and deployed custom electronics, software for a novel PLC replacement solution, bridging Sawyer robot with a variety of automation equipment.
- Developed hardware and software for remotely actuating physical buttons on legacy hardware when electrical interfacing was not possible.

Sawyer *(Intera 5, SolidWorks, Machining, 3D printing)*

- Performed functional testing of Intera 5, a novel visual/kinesthetic programming system.
- Designed and fabricated demo fixtures for manipulation robots, showcasing robot capabilities at trade shows and events.

Network infrastructure *(Ansible, Linux, Python, Bash, Cisco IOS)*

- Developed automation tools for provisioning network infrastructure, significantly reducing manual configuration time.

Selected projects

Low-cost myoelectric assistive grasping device *(Arduino, electronics, 3D printing)* 2018

- Volunteered with eNable Lowell to develop a motorized myoelectric addon to a low-cost 3D printed assistive grasping device designed for children with limb differences.

NLP Discord bot *(Python, MongoDB)* 2015 - Present

- Wrote Python-based Discord bot using MongoDB, enabling NLP tasks like sentiment analysis and user-style sentence generation using Markov chains. Deployed on home server with Docker.

Publications

[1] A. Sinclaire, A. Wilkinson, B. Kim, and H. A. Yanco, "Comparison of user interface paradigms for assistive robotic manipulators," in *2025 IEEE International Conference on Robotics and Automation (ICRA)*, IEEE, 2025.

[2] A. Wilkinson, A. Sinclaire, and H. Yanco, "Spatial augmented reality user interface for assistive robot manipulation," in *ACM/IEEE HRI 2023 Workshop on Virtual, Augmented, and Mixed Reality for Human-Robot Interactions (VAM-HRI)*, 2023.

[3] A. Wilkinson, M. Gonzales, P. Hoey, D. Kontak, D. Wang, N. Torname, A. Sinclaire, Z. Han, J. Allspaw, R. Platt, *et al.*, "Design guidelines for human–robot interaction with assistive robot manipulation systems," *Paladyn, Journal of Behavioral Robotics*, vol. 12, no. 1, pp. 392–401, 2021.

[4] Z. Han, J. Parrillo, A. Wilkinson, H. A. Yanco, and T. Williams, "Projecting robot navigation paths: Hardware and software for projected AR," in *2022 17th ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, IEEE, 2022, pp. 623–628.

[5] Z. Han, A. Wilkinson, J. Parrillo, J. Allspaw, and H. A. Yanco, "Projection mapping implementation: Enabling direct externalization of perception results and action intent to improve robot explainability," in *AAAI Fall Symposium on The Artificial Intelligence for Human-Robot Interaction (AI-HRI)*, 2020.

[6] D. Wang, C. Kohler, A. ten Pas, A. Wilkinson, M. Liu, H. Yanco, and R. Platt, "Towards assistive robotic pick and place in open world environments," in *The International Symposium of Robotics Research*, Springer, 2019, pp. 360–375.