

# Ryan Barry

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## Technical Skills

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**Languages:** Assembly, C/C++, MATLAB, PLC Ladder Logic, Python

**Frameworks:** CUDA, Git, Jupyter, Keras, NumPy, OpenCV, Pandas, PyTorch, ROS, Scikit-Learn, TensorFlow

**Software:** Altium Designer, AutoCAD, Creo, Inventor, LTSpice, MATLAB, SOLIDWORKS

**Hardware:** Microcontrollers, Motor/Sensor Control, PCB Design, SMT Soldering, TH Soldering, 3D Printing

## Professional Experience and Research

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**Researcher, RIT Adaptive Human-Robot Teaming Lab, Rochester, NY** *August 2023 – May 2024 (planned to resume)*

- Conducting research on applying Proximal Policy Optimization to quadrupedal robot navigation using 2D/3D camera data and 360° LIDAR.
- Integrated the PPO algorithm for real-time control, ongoing plans to refine the policy's convergence and performance.

**Robotics Graduate Teaching Assistant, Rochester Institute of Technology, Rochester, NY** *August 2023 – May 2024*

- Facilitated student learning of high-level robotics concepts and ROS through lab work and research projects.

**Software Technical Lead, RIT University Rover Challenge Team, Rochester, NY** *June 2023 – May 2024*

- Spearheaded software architecture development for autonomous and remote operation of a robotic rover.
- Directed a team of computer scientists to develop and test software for all subsystems of RIT's rover.
- Integrated a Python-based ROS application with embedded C++ code for peripheral control via Controller Area Network (CAN).

**Electrical Engineer, RIT Electric Vehicle Team, Rochester, NY** *August 2021 – May 2024*

- Designed PCBs for custom electric motorcycles (IMU, CAN data handler, and 3 phase motor controller).
- Led teams and mentored underclassmen in PCB design using Altium, and in research and development principles.

**Machine Learning R&D Intern, Penn State ARL, University Park, PA** *May 2023 – August 2023*

- Developed proof of concept synthetic data pipeline for active acoustic ML in unmanned undersea vehicles.
- Designed Python application for scenario development and interface with UUV simulation software.
- Developed an acoustic range and angle of arrival regression model to support transfer learning hypothesis.

**Product Engineering Co-op, The Raymond Corporation, Greene, NY** *January 2022 – July 2022*

- Programmed a PLC based robotic test fixture with a touch LCD to stress test forklift control handle cables.
- Researched and documented the adaptation of a software application to emulate CAN functionality for motor controllers on PCBs used in forklift test fixtures.

**Electrical Engineering Intern, Davis Standard LLC, Fulton, NY** *May 2021 – August 2021*

- Revised wiring schematic and electrical panel drawings in AutoCAD.
- Researched and developed proof of concept prototype for an industrial polymer extruder modeled after 3D Printers to be used for automated splice line placement along material necking border.

## Projects

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**Custom Hybrid Electric Wheelchair Attachment** *September 2024 – Present*

- Designing a non-invasive hub actuation system for low drag, hybrid manual and powered control of manual wheelchairs.

**Open-Source Universal Kinematic Libraries for Generic Robots** *September 2023 – Present*

- Developed Python and C++ libraries for forward and inverse kinematic calculations of any fixed-wheeled mobile robot.
- Developed Python and C++ libraries for forward and inverse kinematic calculations of any arm robot configuration.

**Air Hockey Robot** *October 2023 – December 2023*

- Designed 3 DOF robot to play air hockey via YOLOv8 object detection and LSTM trajectory prediction.

**Trajectory Matching Omnidirectional Mobile Robot** *February 2023 – April 2023*

- Designed and programmed an omnidirectional robot to serve as a modular research platform.
- Explored detection and tracking in mobile robotics, utilizing YOLOv8 to follow a free-floating balloon.

**Underwater Robot Control System** *November 2022 – April 2023*

- Designed and manufactured a motherboard PCB capable of managing power distribution, motor control, servo control, interfacing with two cameras, and integrating five sensors.

**Collaborative Robot Interactive Game** *February 2023 – April 2023*

- Developed a ROS based interactive ball and cup game for Baxter robot with DeepSORT and YOLOv6.

**Autonomous Nerf Blaster Mobile Robot** *November 2021 – December 2021*

- Designed an autonomous mobile robot with a modified Nerf blaster to track and shoot at a moving shield.

## Education

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**Rochester Institute of Technology, Rochester, NY**

Master of Science in Electrical Engineering

Cumulative GPA: 3.92

*Specialization in Robotics and AI/ML*

**Rochester Institute of Technology, Rochester, NY**

Bachelor of Science in Electrical Engineering, *Summa Cum Laude*

Cumulative GPA: 3.86

**Applicable Courses:** Robotic-Systems, Principles-of-Robotics, Advanced-Robotics, Intro-to-Artificial-Intelligence, AI-Explorations, Biorobotics/Machine-Learning, Deep-Learning, Robot-Perception