Tyler Harp

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EDUCATION

Carnegie Mellon University, Pittsburgh, PA
Master of Science in Robotics | School of Computer Science | August 2025
- School of Computer Science, GPA 4.0/4.0

Bachelor of Science in Mechanical Engineering & Robotics | May 2023
- College of Engineering, GPA 3.97/4.0

RELEVANT EXPERIENCE

Robotics Graduate Researcher | AirLab | Fall 2023 - Present
- Creating a mapping pipeline system architecture for deployment in a sub-canopy flying drone for wildfire monitoring
- Developing mapping techniques for deep learning based depth estimation in ROS, employing OpenCV and PCL libraries

Robotics Software Engineer Intern | Symbotic | Summer 2024
- Led full production software deployment of a ROS and C++ based test stand for warehouse robot diagnostics
- Wrote Bash scripts and computer network functions for the test stand's laptop to support continuous deployment workflows
- Developed a proof-of-concept camera calibration system using OpenCV and AprilTags for onboard robot cameras

Robotics Software Engineer Intern | Gecko Robotics | Summer 2023
- Prototyped an Adaptive Extended Kalman Filter using Python and Pandas for wheel encoder data from NDT-inspection robots
- Implemented the EKF in real-time using C++ and ROS2 within a Docker container and Git repository on a Linux System

Mechatronics Engineer Intern | Advanced Optronics | Spring 2023 (Part-Time)
- Wrote C++ ESP Firmware for reading MEMS capacitive sensors for medical cochlear implant electrodes
- Created and iterated on custom PCBs for sensor reading hardware
- Wrote a Python client for parsing incoming data and running data analysis and visualization

Electromechanical Engineer Intern | Bowler Pons Solution Consultants | Summer 2021
- Prototyped a drone docking station for an autonomous security system using Arduino with various actuators and sensors
- 3D modeled, fabricated, and performed FEA on a LiDAR sensor mount for versatile installation

PROJECTS

Gaussian Splatting Mapping with Learning-based Depth Estimation | Spring 2024
- Designed a pipeline for integrating depth maps and camera poses into a Gaussian Splatting SLAM algorithm
- Evaluated GS-SLAM's ability to mitigate noise biases from state of the art monocular and stereo depth estimation models

CoralBot Autonomous Coral Reef Surveying Robot | Spring 2023
- Created an autonomous, IMU-guided boat to survey reef health metrics
- Programmed Python architecture on Raspberry Pi to control microcontroller actuation and data collection subsystems

Jenga-Stacking Robotic Arm Manipulation | Fall 2022
- Programmed a robotic arm in MATLAB to stack Jenga blocks in a uniform pattern using a feeder
- Applied Inverse Kinematics, Trajectory Planning, and Homogeneous Transforms to optimize arm motion and controls

C++ Roller Coaster Simulator | Spring 2021
- Developed a C++ Object Oriented 2D Roller Coaster Simulator with graphics and user interface
- Programmed a 4D state-space model of car interaction to create a physics based simulation

SKILLS

Software: Arduino, Bash, C++, Docker, EAGLE, Git, Linux, MATLAB, Python, ROS/ROS2, SolidWorks
Libraries: Eigen, Open3D, OpenCV, Pandas, PCL, PyTorch
Hardware: FDM 3D Printing, Manual Machining, Motor Control Systems, PCB Design, Rapid Prototyping, Soldering

RELEVANT COURSES

C++ for Engineers
Planning in Robotics
Computer Vision
Visual Learning & Recognition
Robot Kinematics & Dynamics
Robot Localization & Mapping

ADDITIONAL EXPERIENCE

Army Reserve 2nd Lieutenant, CBRN | 2023 - Present
Army ROTC Cadet, Assistant Head of Planning & Operations | 2023
Student-Athlete, Varsity Soccer Team, Carnegie Mellon | 2019-2023
CERLAB Research Assistant working on the Autonomous Welding Robot | 2021-2022

LEADERSHIP & HONORS

Distinguished Military Graduate, Top 20% of Cadets in the nation | 2023
Tau Beta Pi Executive Board Engineering Honor Society | 2021-2023
Pi Tau Sigma Executive Board Mechanical Engineering Honor Society | 2021-2023