# Sebastian Baldini

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I am a Robotics Engineering Major in my senior year of my undergraduate and first year of masters degree. I am looking for Internships and Co-ops in Engineering and Robotics Fields

## Education

**Worcester Polytechnic Institute**

**Master of Science** | Robotics Engineering Aug 2024 - December 2025

**Bachelor of Science** | Robotics Engineering | 3.5 GPA Aug 2021 - May 2025

## Work Experience

**Drone Controls and Simulation Lead** Aug 2024 - Present

PEAR Lab WPI

* Programming trajectories for drone interception of flying objects
* Integrating and improving on internal simulation tools for improved use of perception with drones
* Debugging of ROTS systems for drone control and motion planning

**Undergrad Researcher** Aug 2024 - Present

Soft Robotics Lab WPI

* Prototyping novel custom embedded sensors and encoders for robotic applications
* Researching soft body alternatives for modern mechanical systems and sensors
* Maintaining lab equipment and assisting others in developing and manufacturing soft body components

**Prototyping Lab Assistant** Aug 2024 - Present

WPI Makerspace

* Operating and managing the 3d printers, CNC routers and laser cutters for students at WPI

**Robotic Weapon Systems and Testing Intern** May 2024 - Aug 2024

Sig Sauer, Exeter NH

* Worked on advanced mechanical and electrical design for automated weapon systems
* Programmed custom computer vision tools with high-speed video for testing and evaluation
* Assembled and soldered parts based on mechanical and electrical diagrams

**Undergrad Research Assistant** Aug 2023 - May 2024

Robotic Materials Group WPI

* Lead undergrad researcher on novel encoding utilizing multi-material FDM printing
* Developing soft robotic quadrupedal robot to traverse while being highly resistant to physical damage
* Investigating flexible conductive filaments for future applications in sensing and robotics

**Intern Production Assistant** May 2022 - Aug 2022

Millenium Slate | Granville, NY

* Operated and assisted in prototyping new industrial production lines
* Assisted in PLC debugging and FANUC robotic arm programming

## Leadership Experience

**Control Electronics Lead |** AIAA WPI Aug 2023 - Jan 2024

AIAA WPI

* Lead the development of current control box system
* Drafted additional improvements to jet engine test standing including custom 6 degree force sensing
* Designed new test stand for jet engine fuel systems and sensor array processing

**Merit Badge University Organizer |** Alpha Phi Omega Jul 2023 - Nov 2023

* Ran and organized a merit badge university for 100+ boy scouts to earn merit badges

## Project Experience

**Game Design Neural Network Project** December 2024 – Current

* Developing a version of the board game Stratego in python
* Training a neural network to determine optimal strategies

**Arm Velocity Control** November 2024 – December 2024

* Programmed a robotic arm with velocity control in MATLAB
* Debugged firmware issues to improve the performance of the system

**Face Following Webcam** December 2023 – May 2024

* Creating a custom solution to motorize a camera to track a user’s face
* Utilizing OpenCV and Ultralytics video processing and object detection algorithms
* Implemented multithreading on a microcontroller to optimize communication and motor control

**Team Lead, Intro AI Class Project:** November 2023 - December 2023

* Lead my team in the development of a lecture attendance tracking software using computer vision
* Developed functional UI to intake photos and videos of lecture halls to return current attendance
* Made prototype of backend to create database to store and analyze attendance data over time

**Industrial Robotics Class Project:**  November 2023 – December 2023

* Programmed a 6-DOF ABB arm with PLC control to manipulate and stack objects
* Utilized offline and online programming to simulate the robot before real world testing
* Learned how to optimize motion paths to avoid singularities to ensure consistent motion

**ROS Robot with LiDAR Path Planning and Exploration:** November 2023 – December 2023

* Programmed a robot utilizing Robot Operating System (ROS) to explore an unknown map
* Implemented the A\* algorithm to explore new frontiers and unexplored regions of the field
* Utilized LiDAR sensor to create a 2D map and use it to solve the kidnapping problem

**Robotic Arm Programming and CV Integration:** August 2023 – October 2023

* Derived the Forwards and Inverse Kinematics for a robotic arm to gain greater control over its motion
* Programmed its motion to smoothly move objects around the workspace
* Connected the arm to a camera to detect object and move to grab and organize them

**Multi-Robot Communication and Maze Navigation:** March 2023 - May 2023

* Programmed three robotics to autonomously navigate a maze together
* Utilized MQTT to communicate between the three bots to complete tasks
* Used sensors to locate buttons and read QR codes with information on unknown parts of the map

**Autonomous Pseudo-Solar Panel Replacement:** August 2022 – October 2022

* Designed a custom gripper and 4-bar to pickup and place solar-panel like objects
* Programmed the robot to navigate and complete the task autonomously
* Assessed the maximum carry weight of the 4-bar based on gear ratios and motor power

**Custom Brushless Motor Controller:** January 2021 - May 2021

* Worked with classmates to research and assemble a custom brushless motor controller
* Programmed custom Arduino code to accept read interrupts to efficiently run a brushless motor
* Designed custom PCB and tested make functional model on a breadboard

## Core Skills

Solidworks, C++, Python, Multi-Material 3D Printing, Robot Dynamics, Computer Vision,

Programming Languages : C, C, Python, Java, Rust, MATLAB, HTML, CSS , Linux CLI