

Vivian Mak

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Education

Olin College of Engineering

Bachelors of Science in Engineering: Robotics | GPA: 3.83

May 2027
Needham, MA

- **Relevant Coursework:** Computational Robotics, Robot Dynamics, Software Design, Linear Algebra and Differential Equations, Modeling and Simulation, Principles of Integrated Engineering, Electronic Prototyping

Experience

Climate Robotics for Expeditionary Science and Technology (CREST) Lab

Jan 2025 - Present

Computer Vision Subteam Member

- **Collaborating with scientists** to develop software for deep ocean exploration and coastal ecosystem characterization
- Developing methodologies to analyze temporal dynamics in deep ocean system using **cross-camera calibration, structure for motion, 3D reconstruction**, and **semantic segmentation** with coral reef and hydrothermal vent imagery

Olin Electric Motorsports | Formula SAE Electric

Sept 2023 - Present

Accumulator Subteam Lead | Battery Design

- Leading a team of 10 engineers, organizing subteam meetings, managing project timelines, mentoring 5 new members, and ensuring HV safety (**HV Trained**)
- Coordinating integration of electrical and other mechanical systems, ensuring compatibility, and preventing interferences during the design and assembly processes
- Specifying, designing, and manufacturing a 400V battery pack using **SOLIDWORKS** to power a Formula style EV, focusing on in-house **DFM/A** mechanical packaging optimization by reducing weight by 20%

Projects

Fleet Robotics

Nov 2024 - Dec 2024

Computational Robotics Course Project

- Developed a **decentralized path planning** fleet control system utilizing **multi-agent** communication for collision avoidance in **ROS2**
- Created the **monocular visual odometry** pipeline to a **sensor fusion** node to fuse internal and visual odometry for accurate pose estimates

Visual Perception for Autonomous Vehicles

Jan 2024 - Present

Independent Study Research

- Developed an autonomous vehicle navigation algorithm in **CARLA** simulator, achieving precise lateral and longitudinal **PID** error correction that enabled successful simulation of 2 driving scenarios without collisions
- Implementing a visual collision warning system in a simulated 3D drivable space, using edge detection to find lanes and visual RANSAC to perform object recognition in with **OpenCV**

3D Gaussian Splatting (NeRF - Neural Radiance Field)

Oct 2024

Computational Robotics Course Project

- Implemented a **deep learning**-based **computer vision** to recreate photo realistic depictions of 3D physical scenes with novel viewpoints by encoding 2D image captures with odometry data

Robot State Estimation and Localization

Oct 2024

Computational Robotics Course Project

- Implemented a particle filter algorithm in **ROS2 Python** to perform state estimation and localization utilizing **LiDAR** laser scan sensor data to estimate the robot's true position on a map
- Used **Rviz2** to simulate the environment and visualize the particle cloud and projected laser scans

3D Scanner Robot

Sept 2024

Principles of Integrated Engineering Course Project

- Used the **Arduino** to read distance data from an infrared sensor mounted on a custom pan and tilt mechanism
- Established real time connection between Arduino and **MATLAB** to visualize 3D scan with a particle cloud

Skills

Fabrication: CNC Router, CNC Mill, Hand Tools, Laser Cutting, 3D Printing

Software: Python, C++, Java, Arduino, MATLAB, Git, Linux, ROS2, OpenCV, Gazebo, Rviz2, CARLA

CAD/CAM: SOLIDWORKS, Fusion360, OnShape, PDM

Languages: Mandarin, Cantonese

Personal Interests: Fire Performance Arts, Photography, Home Cafe, Sculpting