

Lincoln M. Roth

☎ (609) 721-1511 ✉ lincoln.roth@rutgers.edu 🌐 lincolnroth.com 📍 Princeton, NJ
[linkedin.com/in/lincoln-roth](https://www.linkedin.com/in/lincoln-roth) | github.com/lincolnmroth | devpost.com/lincolnmroth

EDUCATION

Rutgers University—New Brunswick

New Brunswick, NJ

B.S. in Mechanical Engineering and Computer Science, minor in Mathematics

May 2023

- » GPA: **3.64** | Dean's List | Engineering Honors Academy
- » Coursework: Dynamics Systems & Controls, Dynamics, Design of Mechanical Components, Mech Materials, Mechanical Properties of Materials, Fluid Mechanics, Thermodynamics Statics, Robot Learning (**Graduate**), Computational Robotics, Artificial Intelligence, Data Structures, Linear Algebra, Calculus 1-5

EXPERIENCE

ASML | *Mechatronics Intern*

June 2021 — August 2021

- » Developed mechatronics systems for improved reliability and function on machines responsible for manufacturing 70% of the worlds computer chips. Worked on the internal robot arms (SCARA and standard) as well as all Reticle Handling components, both in vacuum and out of vacuum.
- » Created **diagnostic tools in Matlab/Simulink** to analyse dynamic behaviour of the Reticle Handling system which then allowed faster robot movements while minimizing vibrations. Interfaced with internal control structure to create **control systems for vibration compensation and response**.

Rutgers Aresty Undergraduate Research Center | *Undergraduate Researcher*

September 2020 — May 2021

- » Used parallel processing and **CUDA acceleration with MATLAB** to improve processing speed of a 3D insect flight simulator used for development of micro-aerial robots. This allows for over **50x increases in program speed** greatly reducing computational costs associated with simulation.

MLH (Major League Hacking) Fellow | *Software Engineering Intern*

June 2020 — August 2020

- » Contributed to Adafruit's CircuitPython, a Python version for micro controllers, through the inaugural class of MLH Fellows. Worked with a cohort of other developers as well as an industry professional mentor, allowing for rapid growth within the Open Source community.
- » Worked on Glider, a live, mobile code editor using React Native for the app, embedded C for the microcontroller, as well as Bluetooth Low Energy (BLE) for the live code updates. Made biweekly pull requests, featuring over a dozen different commits. Stubbed out the entire BLE aspect for a **5x decrease in development time** as well as increased the accessibility of the app to any potential user. Also added many features and bug fixes, such as dark mode and increased device support.

Rutgers Solar Car Club | *Mechanical Lead*

July 2019 — Present

- » Lead a subteam responsible for designing, analyzing, validating, manufacturing and testing the mechanical components for a solar powered race car. Taught members the fundamentals of mechanical design and analysis, as well as designed the suspension, drivetrain components, and the brakes and steering systems.

WINLAB | *Research Intern*

June 2017 — August 2019

- » Built a vehicle control system using OpenCV for localization and closed-loop control vehicles to control a system of vehicles in a small-scale autonomous vehicle testbed.

PROJECTS

SuperServo - Robotics-specific prototyping actuator

August 2020

- » Designed and built a high-torque density custom servomotor specifically designed for rapid robotics development. Used hobby BLDC motors in a quasi-direct drive setup paired with a high power motor control platform and FOC control. Allowed for very fast, high precision motion, in a modular form factor greatly reducing the needed work on many other projects. | *Microcontrollers, EAGLE, CAD, C, Control Systems*

Parallel Computing Drone Swarm (PennApps XVIII) | devpost.com/software/drone-swarm

February 2019

- » Built a modular robotics swarm system, designed for disaster relief situations. MQTT-based communication system allows easy collaboration between a theoretically infinite number of small, simple, cheap "drones", which could allow for low-cost and high performance deployment in many applications. | *Arduino, MQTT, Python, Robotics*

Firefighting Robot | github.com/phsrc/ogrebot

February 2020

- » Built a firefighting robot for the Trinity International Robot Contest. The robot was built to autonomously navigate a maze to find and extinguish a fire. The robot used custom servos for locomotion, a 2D Lidar and an IMU for localization, as well as a host of other sensors and actuators for detecting and extinguishing the flame. | *ROS, Gazebo, Python, Robotics*

SKILLS

Mechanical Engineering: SolidWorks, FEA/FEM, CFD, Forward/Inverse Kinematics, Control Theory, ANSYS, Fusion360

Electrical Engineering: EAGLE CAD, Altium Designer, Microcontrollers (STM32, ESP32, Atmega), Soldering (SMD)

Computer Engineering: MATLAB/Simulink, Python, C/C++, ROS/Gazebo, Machine Learning, Embedded Systems, Linux