Lincoln M. Roth

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EXPERIENCE

LeafLabs | *Member of Technical Staff* May 2025 — Present

» Developed firmware (**ZephyrOS**) for a consumer medical device. Implemented **IEC 62304**-based development processes and testing infrastructure for 510(k) submission.

» Developed production test infrastructure for a custom screen calibration device, and **scaled to 1,000+ units** for a major streaming platform. Designed reusable bed-of-nails test software platform, designed PCBs for the test equipment, and coordinated with the customer, CM, and contractor teams.

» Supported business development through technical scoping, project estimation, SOW authoring, and internal process improvements.

Second Order Effects | *Firmware Engineer* May 2022 — May 2025

» Led firmware projects across **fusion, satellite, medtech, and aerospace** clients. Directly responsible for **$1M+** in contract revenue through project leadership and ownership of major subsystems.

» Architected and owned all firmware for **radiation-hardened space-rated SSD**. Implemented data striping, block management, and application-tuned error correction, achieving maximum bandwidth to NAND flash. Developed high-speed test system to benchmark and validate performance. Managed 2 engineers throughout the project.

» Led firmware development for **EtherCAT-based sensing/compute platform** with 3-engineer team. Built CLI application for telemetry control via UART and fiber-optic EtherCAT. Rescued underperforming project (**+$500k** to profitability) by clarifying requirements with client and refocusing scope on deliverable outcomes.

» Established firmware team practices: revised Software Development Plan, created training materials and onboarding documentation, provided technical review and mentorship across projects.

ASML | *Mechatronics Intern* June 2021 — August 2021

» Developed mechatronics systems for improved reliability and function on machines responsible for manufacturing 70% of the world's computer chips.

» Created diagnostic tools in Matlab/Simulink to analyze dynamic behavior 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

MLH (Major League Hacking) Fellow | *Software Engineering Intern* June 2020 — August 2020

Rutgers Solar Car Club | *Mechanical Lead* July 2019 — May 2023

EDUCATION

Rutgers University—New Brunswick (Engineering Honors Academy) New Brunswick, NJ

B.S. in Mechanical Engineering and Computer Science (Double Major)

» Special Coursework: Robot Learning (**Graduate**), Computational Robotics, AI, Dynamic Systems & Controls

PROJECTS

High-torque density actuator for quadruped robotics

» Designed and built a custom servomotor optimized for rapid robotics prototyping. Used hobby BLDC motors in quasi-direct drive configuration with high-power motor control platform and FOC. Achieved fast, high-precision motion in modular form factor, enabling faster iteration on subsequent projects. | *Embedded C, SOLIDWORKS, KiCAD*

Digital Chess Board

» Built chess board using NFC transceivers and custom PCB to detect piece positions and record games in real-time. Designed sensing matrix, developed firmware for piece identification and move validation, and created host software interface for game playback, analysis, and live streaming. | *C, PCB Design (KiCAD), Bluetooth, Python, SOLIDWORKS*

Firefighting Robot | github.com/phscrc/ogrebot

» Designed, built, and programmed an autonomous 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. | *ROS1, Gazebo, Python, Robotics*

SKILLS

Computer Engineering: C/C++, Python, Embedded Systems (FreeRTOS, ZephyrOS), Linux, Vivado/Vitis, MATLAB/Simulink, Git/Github/Gitlab

Electrical Engineering: Microcontrollers (ARM(STM, TI, NXP), Espressif (ESP32), Atmega), Xilinx MCUs/FPGAs (Artix7, ZYNQ+, Kintex), EtherCAT, Ethernet, KiCAD, Altium Designer, Soldering/Rework (SMD)

Mechanical Engineering: SolidWorks, FEA/FEM, CFD, Control Theory, ANSYS, Fusion360, COMSOL