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WORK EXPERIENCE

Rivian (via RV-Tech) **Palo Alto, CA**

Embedded Software Engineer (Intern) *June 2025 - August 2025*

- Pioneered an automated diagnostics system for embedded vehicle software, analyzing sensor data and system logs to detect regressions during CI and release testing. Eliminating manual triage and accelerated release validation.
- Deployed a root-cause analysis pipeline on AWS with LLM integration to correlate sensor recordings with connectivity logs.
- Integrated Databricks to centralize diagnostic telemetry and automate reporting across embedded programs and HIL systems.

Samsung Research America - Think Tank Team **Mountain View, CA**

Embedded Systems Engineer *August 2023 - December 2023*

- Prototyped an AI assistant earbud by designing a PCB around a Qualcomm processor and integrating Qualcomm REX RTOS.
- Built a low-latency Voice Activation Detection algorithm using FFT; integrated into the REX RTOS to reduce the latency.
- Designed a bidirectional voice pipeline under strict latency constraints to enable real-time conversational interaction.

Amazon Robotics **North Reading, MA**

Robotics Software Engineer (Intern) *May 2022 - August 2022*

- Developed a digital-twin of an Amazon warehouse station in Isaac Sim, simulating robots with rigid-body-dynamics and photorealism.
- Eliminated 100% of collision risks and operational costs of training facility by transitioning operator onboarding to simulation workflows.
- Extended Isaac Sim's source code by implementing VR integration, including custom 3D transformation functions and input interfaces.
- Engineered high-fidelity robot trajectory generation using trapezoidal velocity profiles and S-curves with jerk limits.

Tufts University **Medford, MA**

Research Engineer *December 2023 - May 2024*

- Integrated LiDAR into research platforms, developed STM32 firmware for real-time sensor interfacing, and mentored 2 students.

Research Engineer *2021 - December 2023*

- Built and deployed an automated sensor fabrication device for Tufts NanoLab, enabling on-demand production of quality tension sensors.
- Accelerated prototyping cycles from weeks to hours and ensured reproducible sensor characteristics critical for research.
- Designed an interrupt-based stepper motor controller and a real-time PID controller to regulate sensor tension in embedded C.
- Presented the project at MRS-Boston (Tufts News); published it as first author at MDPI (Publication Link)

SELECT PROJECTS

RL Robotics Autonomy System (Simulation & Sim-to-Real) – Northeastern University **Oct 2025 – Present**

- Leading the development of a MuJoCo-based simulation for evaluating RL control policies on high-DOF mobile manipulators, surface sim-to-real failure modes (localization drift, contact dynamics) on physical robots. Targeting publication at IROS.
- Designed an autonomy stack for Stretch 2 (with ROS2), implementing LiDAR-based SLAM (with AMCL), and autonomous docking.
- Implemented Jacobian-based inverse kinematics for high-DOF manipulation, enabling precise end-effector control for grasping tasks.

Precision Servo Control System with Force Feedback (Project Link)

- Developed an end-to-end real-time embedded system that converts DC motors into precision servos via closed-loop control.
- Implemented a 1kHz PID controller with $< 50\,\mu s$ latency and trapezoidal trajectory motion generator in C on STM32.
- Integrated current sensing for torque feedback; implemented high-frequency filtering and cyclic buffering to enable impedance control.
- Designed and fabricated a PCB featuring an H-bridge and UART/I2C; validated performance under sensor noise and fault conditions.
- Designed drop-in motor controller enabling rapid integration into robotic systems, eliminating months of development effort.

GTSAM with LM optimization and Loop Closure on trajectory Dataset (Project Link)

- Implemented 2D and 3D pose-graph SLAM in Python using GTSAM, applying Levenberg–Marquardt optimization to correct odometry drift and loop-closure constraints on benchmark datasets.

TECHNICAL SKILLS

- **AI and Robotics:** PyTorch, RL, MuJoCo, Isaac Sim, 2D/3D SLAM, GTSAM, Kalman Filter, Factor Graphs, Inverse Kinematics
- **Software & Simulation:** C/C++, Python, MATLAB, Git/Gitlab, ROS2, RTOS, PID/impedance control, MuJoCo, NVIDIA Isaac Sim, PyTorch, Unreal Engine, Unity, JavaScript, MicroPython, SQL, OpenGL
- **Hardware & Embedded:** STM32, ESP32, Motor drivers (brushed/brushless), PCB design (Altium, KiCad), Sensor integration (encoders, force sensors, IMUs), I2C, SPI, UART, CAN, Atmel, Xilinx FPGA, VHDL, SystemVerilog, Assembly

EDUCATION

Northeastern University **Boston, MA**

Master of Science in Robotics *2024 - May 2026*

- Reinforcement Learning, Feedback Control Systems, Geometric Deep Learning, Autonomous Field Robotics (3D SLAM, Kalman Filters, Sensor Fusion, GTSAM, Factor Graphs), Legged Robotics (Bipedal locomotion)

Tufts University **Medford, MA**

Bachelor of Science in Electrical and Computer Engineering *2019-2023*