

# Zihan Lin

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## Education

**Northeastern University**, Boston, MA Dec 2025

*Master of Science in Robotics*

Course: Robotics Sensing & Navigation, Foundations of AI, Mechatronics Systems, Control Systems Engineering, Robot Mechanics and Control, System Analysis and Control, Thermal System, Fluid Mechanics, Dynamics, Statics, EE.

**Northeastern University**, Boston, MA Dec 2023

*Bachelor of Science in Mechanical Engineering*

Dean's Honor List · Presidential Global Scholars · Dual Husky Scholars

## Skills

**Design & Prototyping:** SolidWorks, Creo, AutoCAD, 3D Printing (DLP/FDM), DFM.

**Simulation & Analysis:** MATLAB, Simulink, Simscape, ANSYS FEA (Mechanical & Thermal), Abaqus

**Programming & Tools:** Python, C#, Java, Linux/Bash, Git, Raspberry Pi, Arduino, Jupyter, VS Code;

**Robotics & Controls:** ROS 2, Sensor Fusion (IMU/GPS/ToF), PID Control, NMPC, RL, Motion Control;

**Lab & Test Equipment:** Oscilloscope, Signal Generator, Soldering, Sealed Test Chambers, Wind Tunnel Testing

## Project Experience

**Micro/Nano Biomechanical Characterization Lab** | *Lab Assistant* Jun 2022 - Dec 2025

- Designed and fabricated multi-geometry test indenters in SolidWorks via DLP 3D printing; created verification protocols to characterize force-displacement responses in soft matrices.
- Automated indentation testing via Raspberry Pi/Python/PID-controlled X-Y stage with serial communication to motor controllers, reducing per-sample cycle time by 5×.
- Engineered 3D-printed compliant linkage with dual-IMU sensor fusion for real-time trajectory reconstruction; co-authored publication in *European Journal of Mechanics - A/Solids*.

**GPS/IMU Driver Development & Sensor Fusion** | *Robotics Sensing and Navigation* Sep - Dec 2025

- Engineered a ROS 2 device driver for VectorNav VN-100 IMU over USB serial, configuring register-level 40 Hz sampling; developed sensor fusion pipeline with magnetometer calibration for vehicle trajectory reconstruction.

**Rescue Relief Drones Simulation** | *Foundations of Artificial Intelligence* Jan - May 2025

- Architected AI-driven UAV deployment framework integrating Q-learning ( $\epsilon$ -greedy, Bellman update) and A\* pathfinding to restore LTE coverage in disaster-zone grids; achieved 100% traversable-area coverage across 7×7–20×20 configurations over 20,000 training episodes.
- Designed multi-component reward function penalizing coverage overlap and drone redundancy, reducing active drone count versus random baseline while maintaining full-grid coverage.

**6-DOF Robotic Arm Trajectory Control** | *Mechatronic Systems* Sep - Dec 2024

- Designed a 6-DOF robotic arm control system in MATLAB/Simulink using NMPC with a Gaussian Process-augmented state-space model precise trajectory tracking and disturbance rejection.

## Work Experience

**Shark Ninja, Needham, MA** | *Test Engineer Co-op* Jan - Jun 2023

- Designed sealed test chambers, compressed-air nozzles, and fabric-attachment fixtures to validate Shark Air Purifier compress air system and wind tunnel.
- Troubleshoot testing protocol failures for Shark Uprights and Robotic Vacuums, improving test reliability.

**HiRain Technology, Beijing, China** | *Mechanical Design & Product Test Engineer Co-op* Jul - Dec 2021

- Constructed PCB test fixtures; validated circuit performance through firmware flashing, Linux debugging, and soldering rework. Optimized 2D/3D CAD models for PCBA enclosures in Creo and modified the manual.