

Education

Northeastern University, Boston, MA

Bachelor of Science in Mechanical Engineering, Minor in Math, GPA: 3.2

Dec '23

Master of Science in Robotics, ME Concentration, Major GPA: 3.2

Dec '25

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

Skills

Sensing & Prototyping: Sensor Fusion, IMU/GPS, ToF, Raspberry Pi, Arduino, 3D Printing (DLP/FDM);

Robotics: Git, Python, ROS 2, C#, Linux, RL, PID Control; **CAD/CAE:** SolidWorks, Creo, ANSYS (FEA), MATLAB/Simulink.

Work Experience

Shark Ninja

Needham, MA

Mechanical Test Engineer Co-op

Jan - Jun '23

- 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

Chaoyang, Beijing

Mechanical Design & Production Engineering Intern

Jul - Dec '21

- Constructed PCB test fixtures; validated circuit performance through firmware flashing, Linux debugging, and soldering rework in post-production testing.
- Optimized 2D/3D CAD models for PCBA enclosures in AutoCAD and Creo, to ensure Design for Manufacturing (DFM) compliance and geometric tolerance.

Project Experience

Micro/Nano Biomechanical Characterization Lab | Research Assistant

Jun '22 - Dec '25

- Engineered 3D-printed compliant linkage with dual-IMU sensor fusion to reconstruct real-time 3D inclusion trajectories under misaligned indentation; identified Southwell-type lateral instability at critical depth (~19 mm), revealing behaviors undetectable in prior 2D FEA models.
- Co-authored publication in European Journal of Mechanics - A/Solids (DOI: 10.1016/j.euromechsol.2024.105343).
- Automated indentation testing on hydrogel-inclusion phantoms via Raspberry Pi/Python/PID-controlled X-Y stage, reducing per-sample cycle time by 5× and enabling systematic sweeps across offset distances (0–5 mm).
- Designed multi-geometry indenters (spherical, flat-punch) in SolidWorks and fabricated via DLP 3D printing to characterize geometry-dependent force-displacement responses in soft matrices.

GPS/IMU Driver Development & Sensor Fusion | Robotics Sensing and Navigation

Sep - Dec '25

- Developed an inertial odometry pipeline with least-squares magnetometer calibration (hard/soft-iron correction)

and a complementary filter fusing gyroscope and magnetometer heading estimates, reconstructing vehicle trajectories within X m of GPS ground truth over a 2+ km urban route.

- Characterized gyroscope stochastic errors (Angle Random Walk, Bias Instability, Rate Random Walk) via Allan Variance analysis on a 5-hour stationary dataset.
- Engineered a ROS 2 device driver for the VectorNav VN-100 IMU over USB serial, configuring register-level 40 Hz sampling and publishing synchronized IMU/MagneticField messages with custom message types; collaborating with a 3-member team via Git for driver integration and field data collection.

Disaster Relief Drones Simulation | *Foundations of Artificial Intelligence*

Jan - May '25

- Architected an autonomous drone deployment framework using Q-learning reinforcement learning and A* pathfinding to restore LTE network coverage in simulated disaster environments; achieved 100% area coverage across grid sizes 7×7 to 20×20.
- Designed multi-objective reward function balancing coverage, overlap, and resource efficiency; reduced drone redundancy by 30% compared to random placement and trained policies over 20,000 episodes using epsilon-greedy exploration.

ToF Cameras and Vibrational Smart Glass | *Assistive Robotics*

Sep - Dec '24

- Built a wearable obstacle-detection prototype for visually impaired users, integrating Arducam ToF depth camera and dual micro-disc vibration motors on a custom resin 3D-printed glasses frame driven by Raspberry Pi 4B.
- Implemented Python-based real-time depth pipeline with tri-zone ROI obstacle localization and PWM-controlled distance-graded haptic feedback (20/10/5 Hz at <0.3/0.5/1.0 m), achieving 30% improvement in user feedback accuracy with dual-motor configuration.

6-DOF Robotic Arm Trajectory Control | *Mechatronic Systems*

Sep - Dec '24

- Designed a 6-DOF robotic arm control system in MATLAB/Simulink using Nonlinear Model Predictive Control (NMPC) with a Gaussian Process-augmented state-space model to capture nonlinear dynamics and reject stochastic disturbances, achieving precise trajectory tracking in dynamic environments.

Composite Pressure Vessel FEA | *MechE Computation and Design*

Jan - May '22

- Performed FEA in ANSYS Workbench to model fibrous composite layups in a high-pressure liquid tank, verifying that peak von Mises stress remained within safety margins of material yield strength under designated internal pressures.

Tethered-Sphere Flow Sensor Modeling | *Fluid Mechanics*

Sep - Dec '21

- Modeled a tethered-sphere flow-velocity sensor in MATLAB by deriving force-balance governing equations with Reynolds-dependent drag coefficients; characterized operational limits via parametric sensitivity analysis to optimize deployment across varying river flow conditions.