

Vedarsh Mishra

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Education

Boston College

B.S. Applied Physics & Computer Science

- GPA: 3.59 | QuestBridge National Match Scholar, Full Scholarship Recipient | Harvard AI Safety Fellow

Chestnut Hill, MA

Expected May 2028

Engineering Experience

Hatchery Makerspace, Boston College

Electronics Engineering Lead

Chestnut Hill, MA

Jan. 2025 – Present

- Debug embedded/electromechanical prototypes from breadboard through integration across PWM/GPIO, serial communication, sensor wiring, grounding, actuator behavior, thermal issues, and **power-delivery faults**; perform oscilloscope/multimeter diagnostics, soldering, connectorization, and Raspberry Pi/Arduino bring-up.
- Built electronics certification modules training 100+ students in circuits, soldering, Raspberry Pi, Arduino, sensors, and structured hardware debugging; reduced onboarding time by $\sim 40\%$ while supporting rapid-prototyping and hardware-integration workflows.

MechaEagles Motorsport & Aero, Boston College

Founder & Systems Engineer

Chestnut Hill, MA

Dec. 2024 – Present

- Founded BC's first Baja SAE/high-power rocketry organization; scaled from 7–8 members to **160+ applicants and 60–70 selected** while building fabrication, avionics, test, documentation, safety, and subsystem-ownership infrastructure.
- Built a rocket attitude-control test rig using **STM32F722, ICM42688P IMU, 60A 4-in-1 ESC, 4 $\times$ RS2205 2300KV motors, and 14.8V 4S LiPo**; integrated sensing, power, actuation, telemetry, and bench-test interfaces into one hardware stack.
- Logged IMU/RPM telemetry at **2 kHz** and executed 0–70% throttle characterization; measured motor time constant $\tau = 0.28$ s vs. **0.25 s model prediction (12% error, within <15% threshold)**, closing the loop between first-principles model and test data.

Washington University in St. Louis

Mars Crater Detection & Geospatial ML Research

Remote

May 2026 – Aug. 2026

- Built a Python geospatial pipeline linking Mars CTX imagery to crater latitude/longitude, diameter, and model-ready tiles; automated annotation/image alignment, debugged coordinate transforms, and exported **GIS-ready detections**.
- Trained **Faster R-CNN ResNet-50** for small-crater detection across debris-covered Martian terrain; evaluated IoU, diameter error, geolocation accuracy, and failure cases to separate model error from data/coordinate-pipeline error.

Jupiter Lightning Detection Research

Planetary Image Analysis / Cassini Imaging Data

Remote

2026

- Processed **221 Cassini images**, reducing 196,233 bright regions $\rightarrow$ 12,611 candidates $\rightarrow$ **106 prioritized lightning events**; localized **42 high-priority detections** with latitude/longitude coordinates for follow-up planetary analysis.

Selected Engineering Projects

Autonomous Vision-Guided Robotics Cart

Embedded Systems, Computer Vision & Hardware Integration

Spring 2026

- Built fifth-generation 4WD platform around **Raspberry Pi 3B, 4 $\times$ Feitech FS90R servos (6V, 130 RPM, 50 Hz PWM), Pi Camera 3, WAGO distribution, and 3.3V GPIO**; Pi owned camera/GPIO/inference while a FastAPI/MJPEG dashboard handled diagnostics and data capture.
- Calibrated 640 $\times$ 480 ChArUco intrinsics ($f_x = 493.67$, $f_y = 493.52$) to **HFOV 65.9 $^\circ$, 0.34 px reprojection error**; corrected a wrong-lens calibration causing **$\sim 17\%$ range bias** and used ArUco geometry as ground truth for monocular YOLO-Pose range estimation.
- Collected **6,748 frames / 449.5 s with 93.5% ArUco lock**; reduced 73% stop-heavy data to 1,296 balanced rows and mirror-augmented to **2,592 BC samples**; deployed 4 $\rightarrow$ 64 $\rightarrow$ 64 $\rightarrow$ 2 NumPy policy at **5 Hz** on Pi.
- Led **RCA on brownouts, overheating, and PWM jitter** after repeated Pi failures; separated **5V compute from dual ~ 6 V servo rails**, tied grounds through WAGO distribution, added heat sink, and stabilized high-current start/turn/reverse events.

NASA L'SPACE Mission Concept Academy

Lead Systems Engineer & Project Manager

Sep. 2024 – Apr. 2025

- Developed 6-wheel rocker-bogie lunar rover architecture using **2000-series Al chassis, NiTi superelastic tires, LiDAR/stereo vision, and IMU navigation**; owned bogie geometry, pivot placement, wheel concepts, clearance, mechanical interfaces, and mobility trades.
- Managed mechanical constraints of **≤ 180 kg subsystem, ≤ 70 kg chassis, ≤ 30 kg suspension, ≥ 25 kg science payload, and ≤ 0.15 mph traverse**; translated science objectives into requirements, interface definitions, traceability, and verification logic.
- Led 14-member multidisciplinary team through **MCR/SRR/MDR/PDR**; delivered **160+ page NASA-style PDR** covering subsystem architecture, trades, interfaces, FMEA/risk, budgets, schedule, cost, and verification planning.

SafeByte

Embedded Computer Vision & Systems Integration

Apr. 2026

- Integrated Raspberry Pi camera, OCR, barcode recognition, nutrition/allergen data, and browser UI into an end-to-end wearable scanner; shipped a functional hardware/software prototype in **24 hours** and won **1st Place overall**.

VEX Robotics Competition

Co-Captain / Mechanical Design, Drivetrain & Autonomous Systems

2021 – 2024

- Designed **360 RPM tank drive with 3:4 external gearing, 600 RPM cartridges, and 3.25-in wheels**; iterated 11W 600 RPM intake, 42 RPM slapper, wings, and elevation from CAD, match data, and subsystem testing.
- Built **70 PSI pneumatic elevation** and shifted center of gravity forward after failed trials, reducing elevation time to **0.3–0.8 s across five tests**; tuned autonomous routes to **25 points** and helped achieve 174 driver / 154 autonomous skills, 83% qualification win rate, Design Award, and 2 $\times$ VEX Worlds.

Technical Skills

Embedded/Avionics: STM32F722, Raspberry Pi, Arduino, ICM42688P, GPIO, PWM, ESC Telemetry, Soldering, KiCad | **Lab:** Oscilloscope, Multimeter, Bench Power Supplies, Hardware Bring-Up, Debugging

Machining/Fabrication: Manual Mill, Lathe, Tormach CNC Mill, CNC Router, 3D Printing, Hand Tools | **CAD/Aerospace:** SolidWorks, Fusion 360, OpenRocket, Betaflight

Software/ML: Python, C++, C, JavaScript, Git, PyTorch, Faster R-CNN, OpenCV, YOLO, ArUco, OCR, NumPy, Pandas, QGIS