Vedant K. Naik

Undergraduate Student
Electrical and Computer Engineering Department
Michigan State University

East Lansing, MI
+1 (562) 350-5719
vedant@roboticvedant.com
roboticvedant.com

Education

BS, Electrical Engineering, Michigan State University, East Lansing **2022 – 2026**
GPA: 4.0/4.0

Activities: Honors College, Tau Beta Pi, MSU Solar Racing Team, PoliMOVE-MSU Autonomous Racing Team

Research Experience

Undergraduate Researcher Aug 2023 – Present
Smart Microsystems Lab, Michigan State University
(Advisor: Dr. Xiaobo Tan)

- Developed a robotic blimp system with 4-thruster control, onboard IMU, WiFi, and LoRa, and a micro-ROS architecture for distributed control.
- Designed and simulated control algorithms for blimp robot platform using a custom physics-based simulator for rapid virtual prototyping.
- Modeled a nonlinear strain sensor using a Time Delayed Neural Network (TDNN), achieving $R^2 > 0.98$ and $> 2\,\text{kHz}$ inference. Resulting in a journal publication [0].
- Designed an 8-channel pneumatic pressure sensor board for development of pneumatic controller with application to soft robotic actuators [0].

Student Research Assistant Oct 2024 – Feb 2025
PoliMOVE-MSU Autonomous Racing Team

- Built LiDAR-based opponent detection using PointPillars for real-time tracking at 180 mph.
- Engineered ground truth dataset pipelines for LiDAR sensor data, improving detection robustness across race scenarios.

Student Technical Assistant Nov 2022 – May 2023
Facility for Rare Isotope Beams (FRIB), Michigan State University

- Built a data analysis application to process carbon charge stripper results, reducing analysis time by 60%.
- Designed a 275 psig pressure apparatus to support R&D for future high-power beamlines.

Industry Experience

Firmware Integration Engineering Intern Aug 2025 – Dec 2025
Tesla Motors, Palo Alto, California

- Led cross-functional debugging with Motor Controls, Hardware, and Firmware teams to resolve drive-inverter firmware issues and improve system safety and service routine reliability.
- Expanded PIL infrastructure with 2+ motor models and a model-generation pipeline to extend drive-inverter firmware test suites to additional motor variants, improving control evaluation and regression readiness.

- Supported Drive Inverter firmware configurations for a new Drive Unit program, enabling downstream teams to begin validation on schedule and reducing integration delays.

ADAS Sensor Hardware Engineer Intern May 2025 – Aug 2025
Lucid Motors, Newark, California

- Engineered a camera data collection system for easy debugging and data collection across all AD cameras, also providing an I^2C interface for the camera to communicate with the host computer for rapid prototyping and testing.
- Developed the testing setup for the depth estimation sensing system for the next generation of Lucid vehicles, utilizing a cost-effective way to repurpose existing camera packaging locations.
- Root caused and resolved 5+ production camera issues by analysing the camera sensor level signals and contributed to resolving ISP issues by analysing the raw camera data and collaborating with the external ISP vendor, image sensor manufacturer, module integrator, and internal teams.

Embedded Systems Intern May 2024 – Aug 2024
Intrepid Control Systems, Troy, Michigan

- Integrated IMU, GPS, and DoIP features into Zynq-based automotive firmware using Xilinx SDK.
- Implemented TC10 and gPTP support in low-level Ethernet drivers.
- Automated network traffic tests using Ixia load module, reducing testing time by $> 80\%$.

Leadership and Extracurricular

MSU Solar Racing Team Aug 2022 – Present

- Led electric drive systems and vehicle integration efforts for the solar car, coordinating with cross-functional team members.
- Developed and validated control firmware for a prototype 3-phase inverter, serving as a proof-of-concept for a custom PMSM motor controller.
- Mentored and trained freshman and sophomore electrical engineering students in embedded systems and motor control fundamentals.

Inventions

Publications

[1] Y. Mei, X. Zhou, V. Naik, A. Gao, and X. Tan, "Bipneu: Design and control of a bipolar-pressure pneumatic system for soft robots," *IEEE/ASME Transactions on Mechatronics*, 2026, To appear.

[2] V. Naik, P. Fairchild, and X. Tan, "Nonlinear compensation of stretchable strain sensors with application to proprioceptive sensing of soft robotic arm," *Smart Mater. Struct.*, Feb. 2025. DOI: 10.1088/1361-665X/adb2c7

Academic Interests

Modeling and Control: Nonlinear system modeling, system identification, control theory, optimal and model predictive control, data-driven and reinforcement learning-based control
Robotics: Soft robotics, bio-inspired robotics and related fields
Autonomous Vehicles: Perception and control, sensor fusion

Honors and Awards

2026: Board of Trustees Award – Recognized for academic excellence (4.0 GPA); coverage in the MSU Board of Trustees, College of Engineering, and Honors College releases.

2025: Tau Beta Pi Scholarship for 2025-26 – Awarded for academic excellence, leadership, service, and potential contributions to engineering.

2025: Ray Giffels Scholarship – College of Engineering scholarship awarded to Juniors and Seniors.

2025: Dean's Showcase of Stars (Gold) – Recognized for involvement in the College of Engineering at MSU.

2025: First Place URAF Engineering Award – Top engineering project in undergraduate research forum at Michigan State University.

2025: Dean's List Spring 2025 – Academic excellence recognition.

2024: Dean's Showcase of Stars (Silver) – Recognized for involvement in the College of Engineering at MSU.

2024: Dean's List Fall 2024 – Awarded to undergraduates with good academic standing.

2024: Dean's List Spring 2024 – Awarded to undergraduates with good academic standing.

2023: Walter R. Yates Memorial Scholarship – Merit-based scholarship for engineering students.

2023: Dean's List Fall 2023 – Awarded to undergraduates with good academic standing.

2023: Dean's List Spring 2023 – Awarded to undergraduates with good academic standing.

2022: International Tuition Grant – Merit-based financial aid for international students.

2022: Dean's List Fall 2022 – Awarded to undergraduates with good academic standing.