Pranav Narayan

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EDUCATION

University of Maryland, College Park - University Honors — College Park, MD
B.S., Aerospace Engineering - Honors; B.S., Computer Science — GPA: 3.99 — Expected May 2026

TECHNICAL EXPERIENCE

Aerospace Engineering Intern - Controls and Simulation
Textron Systems - Air Systems — Jun. 2025 - Aug. 2025

- Optimized nonlinear UAV lateral guidance controller, implementing dual gain scheduling to cut crosswind overshoot by 60% and settling distance by 3000 ft in simulation
- Assessed controller robustness against 700 ft crosswind disturbances and 20% gain perturbations, generating trajectory envelopes for flight test margins
- Corrected longitudinal stability modeling in Simulink, reducing elevator trim prediction error vs flight data from 40% to 15%
- Mapped inconsistent sign conventions in controller reference frames across fixed-wing/VTOL flight modes by analyzing simulated trajectory and heading error data

Undergraduate Researcher, Honors Thesis
Machine Learning for Dynamical Systems Lab — Jan. 2024 - Present

- Developing LQR control for spacecraft rendezvous in Basilisk, achieving settling times under 0.25 orbits with thrust budgets under 25 N
- Devised fault simulation scenarios in Basilisk - reaction wheel friction, thruster misfire, sensor faults - generating telemetry datasets for fault detection validation in proximity and pointing operations
- Designed Random Forest fault detection architecture for satellite telemetry, achieving 90%+ detection accuracy and 85%+ LIME and SHAP attribution alignment with known subsystem failure modes
- Validated Python Neural ODE orbital dynamics modeling, matching within 1% of 2BP predictions

Controls Engineer
Robotics at Maryland — Sept. 2024 - Aug. 2025

- Developed a depth control PID controller for a 6DOF USV to improve track acquisition, integrating into an Extended Kalman Filter navigation pipeline fusing IMU, DVL, and vision data
- Built Behavior Trees in C++ to replace if-statement autonomy stack, enabling rapid strategy updates

Power and Thermal Systems Lead, Satellite Fabrication
Students for the Exploration and Development of Space – SEDS@UMD — Sept. 2022 - Present

- Led phase-change material (PCM) R&D for NASA CSLI proposal, designing a ground setup replicating the LEO thermal environment and producing a first-author publication at AIAA SciTech 2026
- Derived analytical relationships for CubeSat beta angle geometry to support orbit-attitude coupling analysis for thermal domain validation of ground-based PCM setup

President
Students for the Exploration and Development of Space - SEDS@UMD — Dec. 2023 - Dec. 2025

- Secured $30,000+ annual funding and coordinated external and university partnerships for space projects

SELECTED PROJECTS

Tethered Mars Lander-Rover Control System

- Designed lead-compensated controller with prefilter to manage tether dynamics, achieving 0.1% overshoot, <2 degree tether angles, and 60s settling time in Monte Carlo analysis

Hypersonic Waverider Trajectory Optimization

- Developed an adaptive constraint approach for waverider angle-of-attack optimization, achieving 6000+ km supersonic flight range in MATLAB simulation

TECHNICAL SKILLS

Python, MATLAB, C++, ROS2, Linux, Git, Docker, Simulink, Basilisk, Thermal Desktop, Solidworks