Neil Shah (US Citizen)

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EDUCATION

Georgia Institute of Technology (GT), Atlanta, GA August 2024 - Present

B.S. in Physics, *B.S. in Aerospace Engineering* (Double Major), *Minor in Japanese;* GPA: 3.87

Relevant Coursework: Thermodynamics & Fluid Fundamentals, Jet and Rocket Propulsion, Space Flight Operations, Statics, Dynamics, Mechanics of Deformable Bodies, Aerodynamics, Introduction to Aerospace Vehicle Performance, Principles and Applications of Material Science, Differential Equations, Complex Analysis, Mathematical Physics, Electrodynamics, Quantum Mechanics I, Classical Mechanics I

Study Abroad - University of Limerick, Limerick, Ireland May 2025 - July 2025

- Completed 4 advanced courses in Aerospace Engineering, strengthening expertise in propulsion, orbital mechanics, and aerodynamics
- Developed adaptability and cross-cultural collaboration skills in an international environment, preparing to contribute effectively to multidisciplinary and fast-moving teams

LEADERSHIP

Team Lead, *NASA Lunar Navigation Challenge*, Atlanta, GA September 2024 – December 2024

- Coordinated and led a 4-member interdisciplinary undergraduate team to 3rd place out of 86 entries
- Researched optical navigation and lunar south pole environmental conditions to inform design choices for an emergency, powerless handheld device for astronauts on the lunar south pole
- Modeled a gyroscope, sundial, and thermometer in a complete integrated device with an enclosure; adhered to strict weight and size constraints to make the device easier to use in a spacesuit (**SolidWorks**)
- Co-wrote a 12-page white paper detailing device design & usage, material selection, manufacturing, and limitations

EXPERIENCE

Undergraduate Research Assistant, *Planetary Exploration Lab*, Atlanta, GA November 2024 – Present

- Modeling quantum conductance of single-biomolecule transmission through Electronic Life-detection Instrument for Europa (ELIE) to characterize the accuracy of the instrument and drive improvements (**Python**, **Linux**)
- Conducted literature review over 15+ papers on nano-actuators, identifying 2 approaches for miniaturization of ELIE to raise Technology Readiness Level beyond TRL 4 (**Literature Review**)

Yellow Jacket Space Program (YJSP), Atlanta, GA January 2025 – Present

- Analytically sized and designed a 23,000 RPM centrifugal electric fuel pump for YJSP's spaceshot rocket as part of a 5-member team, collaborating with the Engine Development team to account for external constraints to the pump
- Extensively researched centrifugal pumps to inform baseline design choices in the impeller, performing hand calculations to account for expected design efficiencies and cavitation concerns (**Hand Calcs**)

GT Experimental Rocketry (GTXR), Atlanta, GA July 2024 – January 2025

- Programmed a recursive solid rocket motor simulator to optimize the design of solid rocket fuel grains for a 4-inch diameter experimental motor (**MATLAB**)
- Designed, modeled, and simulated a Bell nozzle using a **Python** open-source nozzle contour tool, **SolidWorks**, and **Ansys Fluent** to improve the efficiency and thrust of GTXR's historically conical nozzle designs
- Developed motor casing & forward closure (**SolidWorks**) and performed mechanical & thermal analyses (**Ansys**) on the entire motor to validate design and material choices
- Mixed and molded solid rocket propellant into BATES grains, executing rigorous safety procedures

FIRST Robotics Competition, Dunwoody High School August 2023 – May 2024

- Overhauled the programming team by implementing a command-based architecture in **Java**, drastically improving the modularity of subsystems in the robot
- Implemented PID control for the omnidirectional drivetrain and raisable arm by performing system identification on each subsystem, allowing robot operators to maneuver and score points simultaneously

PROJECTS

GT High Power Rocketry, Atlanta, GA August 2024 – Present

- Modeled, manufactured, and safely launched a 61-inch high-powered rocket to 1900 feet in November 2024 (**OpenRocket**, **SolidWorks**)
- Designed 2nd rocket with avionics bay, composite materials, dual-deploy parachute system, and flight cameras - expected to launch in October 2025 (**SolidWorks**)

Private Pilot License, Atlanta, GA September 2018 – Present

- Conducted 60+ hours of ground training and 65+ hours of flight time, including 10 hours of solo flight, in a Piper Archer II (primary aircraft) and Cessna 172 (secondary aircraft)

Supersonic Jet Engine Group Project, *AE 4451: Jet and Rocket Propulsion*, Limerick, Ireland July 2025

- Modeled turbine engine cycles and their individual components in **MATLAB** with a modular, object-oriented approach
- Developed general equations for turbomachinery, nozzles, combustors, and bleed air to simulate diverse engine architectures for a novel supersonic jet engine
- Implemented a nonlinear & multivariable optimizer in **MATLAB** and optimized for a low-fuel-consumption and high efficiency engine while ensuring thrust requirements were met at all altitudes and flight conditions
- Conducted engine design discussions with teammates regarding system-level parameters (pressure ratios, bleed ratios, afterburner usage, etc.)
- Recommended and compared optimal engine configurations for multiple flight conditions in a final technical report, communicating tradeoffs and a suggestion for an improved engine outside of initial design constraints

Satellite Orbit Determination Project, *AE 3330: Intro. to Aerospace Vehicle Performance*, Limerick, Ireland June 2025

- Programmed **MATLAB** solver to convert radar range and range rate observations into position/velocity state vectors and orbital elements in the Earth-Centered Inertial (ECI) frame
- Implemented Newton–Raphson iteration to solve Kepler's problem and propagate the orbit forward one week, predicting spacecraft position/velocity
- Compared analytical propagation with **GMAT** simulation including perturbations (oblateness, drag, solar radiation pressure, lunar/solar effects), quantifying dominant sources of error

Habitat & Suit Design, *Southeast Analog***,** Atlanta, GA September 2025 – Present

- Collaborating with a newly made analog astronaut team on the conceptual design of EVA suits and surface habitats for Martian and lunar environments

COMMUNITY INVOLVEMENT

FIRST Robotics Competition Mentor, Dunwoody, GA May 2024 - Present

- Serving as a mentor for my former robotics team, Wildcat5e, with a focus on team longevity and recruitment
- Frequently conduct discussions with experienced team mentors and students to identify gaps in expertise and other issues; create systems and plans for the team to approach difficulties while maintaining their ability to solve problems themselves

Clarkston Community Center, *Robotics Instructor*, Clarkston, GA May 2024 - July 2024

- Developed 3 robotics curricula for several age ranges and 40+ students from disadvantaged schools
- Devised a budget plan for a sub-$50 allowance to purchase 2 robots and materials for custom-made engineering kits
- Instructed core concepts in programming (Scratch/Python), system control, and engineering design

SKILLS & INTERESTS

Technical: MATLAB, Python, Java, Version Control & Git, Linux, Visual Studio, SolidWorks, Ansys, OpenRocket, GMAT
Other: Literature Reviews, Technical Communication, Project/Team Management, Systems Engineering, Data Analysis, Simulations
Languages: English (Native), Spanish (Proficient), Mandarin (Beginner)
Interests: Human/Robotic Space Exploration, High Energy Physics, Planetary Science, Astrobiology, In-Space Propulsion Systems