

# Avanthika Vuppala

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Interests: Aerospace Systems Design, Propulsion, Advanced Materials, Robotics, Sustainable Design, Thermal Systems

## EDUCATION

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### Rutgers University

New Brunswick, NJ

*Bachelor of Science in Aerospace Engineering, Minor in Computer Science*

*Sept 2023 – May 2027*

Relevant Coursework: Statics, Dynamics, Mechanics of Materials, Thermodynamics, Fluid Mechanics, Heat Transfer, Differential Equations, Mechatronics, CAD in Mechanical Engineering, Dynamic Systems and Controls, Aerospace Structures, Aerospace Materials

## EXPERIENCE

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### Undergraduate Research Assistant

Feb 2025 – Present

*Hybrid Micro/Nanomanufacturing Laboratory - Rutgers University*

*New Brunswick NJ*

- Improved structural reliability of energetic materials by synthesizing and characterizing 10+ MINET composite formulations with controlled pore architectures, applying material and system optimization principles
- Analyzed system performance trends by conducting 20+ tests and evaluating 200+ data points to assess stiffness, strength retention, and fracture behavior, focusing on performance optimization and data-driven analysis
- Enabled material system development and validation by generating experimental data and maintaining structured technical documentation

### Research Internship

Jun 2025 – Aug 2025

*Advanced Controls Lab - Rutgers University*

*New Brunswick, NJ*

- Developed ROS2-based software systems in Python and C++ for autonomous navigation, implementing object-oriented design and real-time control logic
- Integrated sensors and implemented localization and path planning algorithms, enabling real-time system monitoring and dynamic system behavior analysis
- Debugged and tested software modules, improving system performance and ensuring reliable execution of navigation and control algorithms

### Science Team Lead

Jan 2025 – Apr 2025

*NASA L'SPACE Proposal Writing and Evaluation Experience Academy*

*Remote*

- Led development of a spacecraft refueling concept by coordinating a 7-member multidisciplinary team and supporting system-level design decisions
- Translated mission objectives into system requirements and contributed to system architecture development using a Science-Technology Traceability Matrix
- Evaluated subsystem interactions and supported mission-level decision making by analyzing system performance and conducting trade studies

## PROJECTS

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### On-Site Refueling Device - Universal Magnetic Docking Interface

Jan 2025 – Apr 2025

- Designed a spacecraft refueling system architecture using a self-aligning magnetic docking interface to improve system reliability
- Defined system requirements and supported integration planning with a multidisciplinary engineering team
- Conducted design trade studies to optimize docking performance and reduce mechanical complexity

### Portable Refracting Telescope and Tripod System Design

Dec 2025

- Designed and prototyped a 65 lb load-bearing tripod system using SolidWorks and FEA, evaluating real-world load conditions, manufacturability, and structural and thermal system behavior
- Performed finite element analysis (FEA) to validate structural stability under multiple load cases and evaluate load paths, applying engineering calculations and system modeling techniques
- Created multi-level CAD assemblies and fabrication drawings, evaluating material selection, manufacturing processes, and design optimization for performance and efficiency

## TECHNICAL SKILLS

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**Engineering:** SolidWorks, Siemens NX, AutoCAD, MATLAB, Arduino, Python, C++

**Analysis:** CAD Modeling, FEA, Mechanical Testing, Engineering System Modeling, Thermal Analysis

**Tools:** Git, Linux, VS Code, Microsoft Office, Google Workspace