Avanthika Vuppala

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EXPERIENCE

Undergraduate Research Assistant   New Brunswick, NJ
Hybrid Micro/Nanomanufacturing Laboratory (HMNL)   Feb 2025 - Present
• Improve energetic material structural reliability by synthesizing and characterizing 10+ MINET composite formulations with controlled pore architectures for a DARPA-funded propulsion program.
• Quantify mechanical performance trends by conducting 20+ tests and analyzing 200+ data points to evaluate stiffness, strength retention, and fracture behavior.
• Support next-generation solid propellant development by generating validated experimental data and maintaining structured technical documentation informing material selection and combustion response.

Science Team Lead   Remote
NASA L'SPACE Proposal Writing and Evaluation Experience Academy   Jan 2025 - Apr 2025
• Defined a feasible microgravity refueling science concept by leading development of the On-Site Refueling Device using magnetic docking with a 7-member multidisciplinary team.
• Translated mission science into engineering requirements by authoring a 30-page proposal with success criteria, TRL assessments, and a Science-Technology Traceability Matrix.
• Validated multidisciplinary system feasibility by performing heritage system reviews and technology trade studies with four engineering subteams.

Science Team Member   Remote
NASA L'SPACE Mission Concept Academy   Sept 2024 - Dec 2024
• Enabled lunar subsurface habitability investigation by contributing to a dual-rover mission concept as part of a 14-member multidisciplinary team supporting coordinated surface and pit-entry exploration.
• Aligned payloads with mission science goals by defining six priority measurements mapped to LiDAR, ground-penetrating radar (GPR), and NIR spectroscopy instruments.
• Advanced PDR-level system integration by supporting payload incorporation into rover CAD designs with defined interface, power, and data requirements.

PROJECTS

Adjustable Telescope and Tripod System   Dec 2025
• Achieved stable structural performance under 65 lbf loading (SF = 2.0) by designing and validating mechanical assemblies in SolidWorks using analytical calculations and FEA.
• Created multilevel CAD assemblies and detailed component drawings to support mechanical assembly, standardized documentation, tooling considerations, and clear communication of design intent for fabrication and integration.
• Improved system reliability and serviceability by evaluating load cases, materials, and manufacturability constraints.

SolidWorks Vending Machine Design and Animation   May 2025
• Developed a 50+ component mechanical system by designing and organizing complex SolidWorks assemblies and subassemblies, demonstrating proficiency in solid modeling and mechanical system integration.
• Generated structured CAD assemblies and supporting drawings to illustrate mechanical assembly sequences, component relationships, drawing organization, and motion constraints for clear technical communication.
• Communicated system operation and design functionality through motion studies and animations, supporting training-style visualization and documentation of mechanical behavior.

EDUCATION

RUTGERS UNIVERSITY   New Brunswick, NJ
Bachelor of Science in Mechanical and Aerospace Engineering   Expected: May 2027
• **Relevant coursework:** Statics, Dynamics, Mechanics of Materials, Thermodynamics, Fluid Mechanics, Differential Equations, Mechatronics, CAD in Mechanical Engineering, Introduction to Aerospace Engineering

SKILLS

• **Technical:** SolidWorks, Siemens NX, MATLAB, Arduino; CAD modeling, 2D and 3D drawing creation, mechanical assemblies, finite element analysis (FEA), mechanical testing, data analysis, design documentation, trade studies, technical writing
• **Tools:** Microsoft Office (Excel, Word, PowerPoint), Google Workspace