MEDHA YARAGORLA

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EDUCATION

PURDUE UNIVERSITY (01/2026 – 12/2028) – Direct Ph.D. **WEST LAFAYETTE, IN**

- Aeronautical and Astronautical Engineering (AAE) *(GPA: 3.75/4.0)*
- Student Member of AIAA, ASME, Combustion Institute

PURDUE UNIVERSITY (08/2022 – 12/2025) – Bachelor of Science **WEST LAFAYETTE, IN**

- Aeronautical and Astronautical Engineering (AAE) *(GPA: 3.65/4.0)*
- Attained Dean's List all semesters

RESEARCH

Aerothermodynamics of Micro Gas Turbines - Dr. Jay Gore
Purdue University (May 2026 - Present) **WEST LAFAYETTE, IN**

- Conducting a literature review of Micro Gas Turbines (MGTs) for defense relevant drones aligning with the growing interest of the U.S. Department of Defense
- Will develop computational models using a Large Eddy Simulation (LES) solver by the Air Force Research Laboratory (AFRL) to predict pre-vaporization, ignition characteristics, rich/lean blowoff, and instability-driven flameout
- Will build AI-based sub models within the National Jet Fuel Combustion Program (NJFCP) to augment the simulations
- Submitted a research proposal to AFRL for collaborative research focused on MGT modeling

Combustion Computations for Propulsion - Dr. Jay Gore, Dr. Prasanth Nair
Purdue University (August 2025 - Present) **WEST LAFAYETTE, IN**

- Performed 1D Cantera and 2D axisymmetric ANSYS Fluent simulations of five H_2/NH_3/Air counterflow diffusion flames
- Investigated the effects of fuel composition, strain rate, chemical kinetic mechanism, and transport modeling on flame structure and hydrogen diffusion
- Compared mixture-averaged, multicomponent, and thermal diffusion transport models to evaluate the effects of differential diffusion on hydrogen and ammonia flames
- Validated computed temperature and X_{H2}/X_{N2} profiles against DPCARS measurements and achieved excellent agreement (within 1%) between the predicted profiles and measured values
- Co-authored a technical paper accepted for presentation at CSSCI and IMECE and a poster accepted by the International Symposium on Combustion

Hypersonic HRAM Jet Propulsion - Dr. Jay Gore, Dr. Prasanth Nair
Purdue University (May 2025 - August 2025) **WEST LAFAYETTE, IN**

- Developed CAD models and CFD models in SolidWorks and CONVERGE CFD for hydrogen injection in a DLR scramjet combustor and detonation-wave propagation in an unrolled Rotating Detonation Engine (RDE)
- Analyzed hydrogen penetration, fuel-air mixing, and shock interactions, within the scramjet combustor
- Investigated the propagation of a single detonation wave through an unrolled RDE combustor under supersonic flow
- Simulated supersonic reacting flows using the compressible RANS turbulence model and the SAGE combustion model
- Used Adaptive Mesh Refinement (AMR) and Fixed Embedding for mesh optimization
- Conducted post-processing analysis in Tecplot 360 to evaluate pressure, velocity, density, and temperature profiles

PROJECTS

Senior Spacecraft Design - Mission to Saturn's moon Titan
Purdue University (August 2025 - December 2025) **WEST LAFAYETTE, IN**

- Designed a Pre-Phase A mission concept to Titan to study the composition of its methane lakes
- Evaluated the scientific instruments in Cassini–Huygens, Europa Clipper, and related missions for payload architecture
- Compared radioisotope thermoelectric generators (RTGs), advanced Stirling radioisotope generators (ASRGs), batteries, and solar arrays using power output, mass, reliability, and operating-environment constraints
- Developed power-output and radioactive-decay models in MATLAB and recommended an ASRG-based power system

Rocket Propulsion - Rocket Launch Project
Purdue University (November 2025 - December 2025) **WEST LAFAYETTE, IN**

- Designed a six-fin finocyl solid-propellant grain to satisfy mission thrust, burn-time, and launch requirements.
- Developed MATLAB simulations to model grain regression, thrust generation, and predicted apogee.
- Launched the rocket at Purdue's Dairy Farm, where the rocket reached an apogee of roughly 350 m

Zero-gravity experiment - Virgin Galactic (VG) Human Tended Module for Suborbital Flights - Dr. Steven Collicott
Purdue University (May 2025 - August 2025) **WEST LAFAYETTE, IN**

- Supported the development of a suborbital experiment investigating the stick-slip motion of green propellants in microgravity
- Considered experiment requirements including fluid containment, optical access, and payload structure
- Evaluated how liquid properties, plate spacing, surface interaction, and contact line behavior effects fluid motion in low-gravity conditions
- The designed payload is planned to be on board as part of the Purdue 1 mission with Virgin Galactic in 2027

Teaching Experience

ME 264: Introduction to Manufacturing for Mechanical Design TA **WEST LAFAYETTE, IN**
Purdue University (January 2026 – May 2026)

- Assisted students in the mechanical lab with manufacturing processes, material properties, measurements, operating equipment including CNC and manual mills/lathes, laser cutters, woodworking and sheet metal tools
- Guided students through design improvements for manufacturability (DFM), assembly (DFA) and cost efficiency
- Graded lab memos and project deliverables while providing constructive feedback to improve documentation, technical writing, and communication skills
- Mentored students to develop independent troubleshooting, problem solving, and hands-on manufacturing skills

CONFERENCES

Computations and Measurements of Temperature and X_{H2}/X_{N2} Mole Fraction Ratio in H_2/NH_3/Air Counterflow Diffusion Flames. Selected for:

- *Central States Section of the Combustion Institute (CSSCI)* - (5/17/26 - 5/19/2026) @ Purdue University, USA
- *International Symposium on Combustion (ISOC)* - (7/26/26 - 7/31/26) @ Kyoto, Japan
- *International Mechanical Engineering Congress and Exposition (IMECE)* - (11/8/26 - 11/12/26) @ Vancouver, Canada

SKILLS

Relevant Courses	**Tools**	**Soft Skills**
Computational Aerodynamics	MATLAB/Simulink	Technical Communication
Gas Dynamics	Python Programming Language	Research and Analytical Thinking
Combustion	CONVERGE CFD	Problem Solving
Rocket Propulsion	ANSYS Fluent	Adaptability
Air Breathing Propulsion	Tecplot 360	Project Management
Low Gravity Fluid Dynamics	SolidWorks	Detail Oriented
Aerodynamics	Siemens NX	Collaboration

CLUBS

Purdue Formula Society of Automotive Engineers (FSAE) (August 2023 – May 2024) **WEST LAFAYETTE, IN**
Chassis Team Member

Purdue Orbital Club (August 2022 - December 2022) **WEST LAFAYETTE, IN**
Nozzle and Ignition Team Member