Marthala Narayana Reddy

EDUCATION

Program	Institution	CGPA / Percentage	Year of Completion
M. Tech in Engineering Design	JNTUH College of Engineering, Hyderabad	8.65 / 10	2022
B. Tech in Mechanical Engineering	PDPM IIITDM Jabalpur	7.0 / 10	2018
Intermediate (MPC)	APSWR Junior College	95.1%	2014
SSC	APSWR School	9.7/10	2012

MAJOR COURSE WORK IN ACADEMICS

- Advanced Mechanics of Solids
- Advanced Finite Element & Boundary Element Methods
- Advanced Mechanics of Machinery
- Fluid Mechanics & Heat Transfer
- Energy Conversion Devices
- Theory of Elasticity
- Vibrations of Mechanical Systems
- Mechanics of Laminated Composite Structures
- Advanced Robotics & Mechatronics
- MEMS – Micro Electro Mechanical Systems

COURSE WORK IN INDUSTRY

- Demystifying AI & Gen AI
- Applied AI for Engineering Systems
- Aerospace Structures and Design Optimization
- Computational Fluid Dynamics
- Data Science & Analytics
- Machine Learning & Deep Learning
- Dynamics and Control Systems
- Multidisciplinary Design Optimization (MDO) – integrated aero-structural-control system design

RESEARCH INTERESTS

- UAV and VTOL system design and flight dynamics
- Aero-structural optimization and composite lightweight structures
- CFD and FEA-based analysis for aerospace applications
- Robotics and control system development for autonomous platforms
- Advanced materials and manufacturing for aerospace and defence

PROFESSIONAL EXPERIENCE & PROJECTS   3 - Year's

LARSEN & TOUBRO PES LTD   **R&D DIVISION - AEROSPACE & RADARS**

1. **VTOL UAV Design and Analysis**
   - Conducted an extensive literature review on VTOL configurations and flight dynamics, followed by the design and development of a complete UAV system integrating aerodynamic, structural, and control subsystems.
   - Executed CFD simulations (ANSYS Fluent) for aerodynamic optimization and FEM analyses (ANSYS Mechanical) for composite structural validation and weight optimization.
   - Developed and validated a MATLAB/Simulink-based flight dynamics and control model; the prototype achieved successful endurance and stability performance through simulation and experimental testing.

2. **Maneuverable Expandable Aerial Target (MEAT) – Mach 0.6**
   - Conducted a comprehensive literature review on subsonic aerial target design, stability, and control before initiating the system configuration and structural layout.
   - Designed and developed a composite airframe structure optimized for weight and strength; performed CFD analysis (ANSYS Fluent) for aerodynamic validation and performance optimization at Mach 0.6.
   - Integrated propulsion and control systems using MATLAB/Simulink, and the prototype was successfully demonstrated, proving aerodynamic stability, maneuverability, and mission performance.

3. **Missile Canister Design and Analysis**
   - Performed an extensive literature review on composite pressure vessels and thermal protection systems before initiating the design phase.
   - Designed and optimized a lightweight composite missile canister; conducted CFD and coupled thermal–structural analyses (ANSYS Fluent & Mechanical) to evaluate launch-induced stresses and temperature effects.
   - The optimized configuration was validated through simulation and prototype testing, achieving significant weight reduction, strength enhancement, and reliability under launch conditions.

4. **Rocket Motor Casing for Space Application – DRDO & ISRO Joint Project**
   - Studied existing ISRO and NASA literature on composite rocket motor casings to understand high-pressure design and failure mechanisms.
   - Designed and analysed a composite rocket motor casing using FEA (ANSYS) for structural and thermal load conditions; contributed to Resin Transfer Moulding (RTM) process development for fabrication.
   - The casing concept was successfully validated through analytical and material characterization studies, demonstrating improved strength-to-weight ratio and manufacturing feasibility for space applications.

5. **Composite Design and Failure Analysis**
   - Conducted extensive literature review on composite material failure mechanisms including delamination, fiber misalignment, matrix cracking, and impact damage to improve structural reliability in aerospace applications.
   - Studied the influence of manufacturing parameters (curing pressure, fiber volume fraction, and layup sequence) on the mechanical performance and durability of composite laminates.
   - Proposed design improvements and process optimizations based on simulation and test data to enhance fatigue life, stiffness, and damage tolerance in composite structures.

6. **Design and Development of Radar and Radome Systems**
   - Studied and analysed various radar frequency bands (L, S, C, X, Ku, Ka) and their interaction with composite materials for structural and electromagnetic compatibility.
   - Designed and developed composite radomes of different shapes and thicknesses, optimized for low dielectric loss, high transmission efficiency, and mechanical strength under aerodynamic loads.
   - Developed and tested a lightweight X-band composite reflector and radome achieving high stiffness-to-weight ratio, excellent electromagnetic transparency, and suitability for aerospace radar applications.

ACADEMIC PROJECTS

M. Tech Project: Design and Motion Analysis of a Humanoid Robot. **(1.5 Years)**

Objective: To design and analyse a humanoid robot capable of stable, efficient, and human-like locomotion using lightweight and sustainable materials.

Conducted a comprehensive literature review on humanoid dynamics, gait stability, and actuation mechanisms before initiating the design phase. Designed a humanoid robot using lightweight materials such as ABS and recycled composite waste to achieve improved strength-to-weight efficiency and cost-effectiveness. Performed structural analysis using ANSYS to evaluate joint loads and stress distribution, and carried out motion analysis using V-REP Simulation and MSC Adams to study balance, trajectory tracking, and actuator performance. Optimized joint geometry and control parameters for smooth, stable, and energy-efficient movement.

PUBLICATION & TECHNICAL PRESENTATION

Marthala Narayana Reddy and Team (2023). *"Design for Manufacturing of Hydraulic Cylinders Using Composite Materials."* Presented at the **Fluid Power Society of India (FPSI) Conference**, Bengaluru, 2021.

Technical Talk: *"Indigenisation of Carbon Fibre Materials for Aerospace Applications."* Delivered a **conference speech at ISRO – Trivandrum Chapter (2024)**, focusing on indigenous development and application of carbon fibre composites for lightweight aerospace structures.

ACHIEVEMENTS & EXTRACURRICULAR ACTIVITIES

- GATE Rank: 248 (2020) — Top 1% Mechanical Engineering
- JEE Qualified — Completed education at a premier national institute (IIITDM)
- Industry-level Badminton Champion — Multiple-time winner
- State-level Cricket (U-15 Andhra Pradesh Trials)
- Lead organizer for technical & cultural events in college and industry.

TECHNICAL SKILLS

- **Design & CAD:** SolidWorks, CATIA, Siemens NX
- **Simulation & Analysis:** ANSYS Mechanical, ANSYS Fluent, Hyper Works, MSC Adams
- **Computational Methods:** FEA, CFD, FSI, multi-body dynamics, Design Optimization
- **Programming & Modelling:** MATLAB, Python, C, Artificial Intelligence & Machine Learning
- **Robotics & Control:** KUKA industrial robots, Simulink-based control modelling, sensor fusion
- **Advanced Manufacturing:** RTM, filament winding, composite layup, NDT (UT, Acoustic Emission, X-ray)

OBJECTIVE

I am eager to pursue a Doctorate in Aerospace Engineering, building upon my strong foundation in dynamics, vibrations, and structural analysis developed during my master's research. My professional experience in aerospace design, UAV development, and composite structures has further deepened my interest in understanding and improving the performance of advanced aerospace systems. Through doctoral research, I aim to contribute to the development of lightweight, intelligent, and vibration-optimized structures, combining computational modelling, experimental validation, and material innovation at your prestigious university.