Aaryan Shah

734-548-2184 — Ann Arbor, MI — aaryansh@umich.edu — linkedin.com/in/aaryanshah4261 — Publications

Education

University of Michigan, Ann Arbor — **Ann Arbor, USA**
Master of Science in Mechanical Engineering — *Aug 2024 - Dec 2025(Expected)*
Coursework: Vehicle Crashworthiness and Occupant Protection, Finite Element Method, Design Optimization, Machine Learning, Mech Vibrations,

Vishwakarma Government Engineering College, GTU — **Ahmedabad, India**
Bachelor of Engineering in Mechanical Engineering — *July 2019 - May 2023*
Coursework: Design of Machine Elements,Applied Thermodynamics, Rapid Prototyping, Dynamics of Machinery, Kinematics of Machines

IIT - Indian Institute of Technology, Gandhinagar — **Gandhinagar, India**
Exchange Student - 6th Sem (Junior year) — *Jan 2022 - May 2022*
Coursework: Synthesis and Analysis of Mechanisms, Integrated Design and Manufacturing, Industrial Engineering and Operations Research

Experience

Adani Green Energy Ltd. — **Ahmedabad, India**
Engineer, Logistics Optimization — *Jul 2023 – Jun 2024*
- Oversaw the development and implementation of a Logistics Management Solution, streamlining logistics and custom movements across 10+ functions dealing with an operational scale of $3bn/year.
- Developed a **route simulation and optimization model** using data analysis, enhancing business decision- making processes and reducing project costs by optimizing route selection and improving efficiency using open source **Sumo Simulation**.

ISRO - Indian Space Research Organisation — **Ahmedabad, India**
Intern, Structural / Thermal Designing — *Jan 2023 – May 2023*
- Designed three iterations of an Electronic Power Conditioner (EPC) unit for microwave space payloads using **Autodesk Inventor**
- Conducted comprehensive structural and thermal simulations, including **modal, quasi-static, random response, steady-state, and transient thermal analyse**s, using **Ansys Workbench** to evaluate design performance under space conditions.
- Performed **DFMEA** to identify potential failure modes in the EPC design, enabling proactive mitigation of structural and thermal risks.
- Performed **topology optimization** to minimize material usage while maintaining structural integrity, resulting in reduction of weight by **47%**.
- Suggested and presented final design recommendations based on FEA results, improving **thermal management** and **structural reliability**.

IITGN Robotics Lab, IIT Gandhinagar — **Gandhinagar, India**
Intern, Mechanical Designing — *May 2022 – Aug 2022*
- Designed a **cycloidal drive** with an 11:1 gear ratio using SolidWorks and manufactured it with 3D printing, optimizing mechanical performance with using **GD&T**. Operated the motors of drive using **Arduino IDE**
- Developed a **robotic gripper** using SolidWorks, 3D printing technology and arduino IDE, enhancing robotic manipulation capabilities.
- Designed and developed a **Series Elastic Actuator** for Humanoid Robot for space application with backdrivable torque of less than 2 nm.

Skills

FEA Softwares Hyperworks, LS-Dyna, LS-Prepost, Ansys Workbench, SolidWorks Simulation
CAD Softwares SolidWorks (**Certified SolidWorks Professional** - (C-JVWTZ4D9NG)), Autodesk Inventor, Fusion 360, AutoCAD
Languages/Tools Python, C, Arduino IDE, MATLAB, Sumo Simulation, Ultimaker Cura

Projects

Parametric Finite Element Wheelchair Model for Crash Simulations — **Aug 2024 – Present**
- At UMich Transportation Research Institute, under guidance of Prof. Jingwen Hu.
- Developing a Parametric finite model for manual wheelchair, to allow the adjustment of critical design parameters to account for the size and shape variations among the wheelchair designs using **Hypermesh**.
- Currently working to automate the entire process of **mesh morphing and scaling** using **MATLAB** to streamline the workflow.

Design Optimization of Driver Safety Parameters for an Obese Female Occupant in Toyota RAV4 — **Oct 2024 – Dec 2024**
- This project aimed to reduce injury risks for a short, obese female occupant in vehicular impacts by **optimizing safety equipment parameters**.
- A baseline frontal crash simulation was conducted in LS-Dyna and LS-Prepost using a Taguchi matrix to analyze injury metrics, with subsequent refinement of parameters based on initial iteration outcomes and engineering intuition.
- After 50 simulation iterations, a final optimized design was selected, reducing the P-Joint value by **45.85%**.

Stress Analysis of Carbon Composite Material for Space-Based RF Components — **June 2021 – Sept 2021**
- Designed a carrier plate for microwave integrated circuits, incorporating Kover material using **SolidWorks**.
- Conducted detailed modal, stress, and displacement analyses via Finite Element Method (FEM), assessing various lug constraints and including **Carbon Fibre Reinforced Plastic** (CFRP) materials in Solidworks Simulations.
- Observed a reduction in **stress by 85%** and **weight by 78%** when using CFRP material, demonstrating its superior structural performance.

Publications

- **Aaryan Shah**, Ashish Soni, Dhaval Vartak, Pina Bhatt. *"Stress Analysis of Carbon Composite Material for Space-Based RF Components Using CAE Simulation"*. LNME series, Springer-Nature, 2023. URL
- **Aaryan Shah**, Piyush Shukla, Ulkesh Desai. *"Structural and Thermal Evaluation of Electronic Power Conditioner Unit for Space Payload"*. Advances in Thermal Engineering series, Springer, 2024. URL

Accomplishments

- Received Spot Recognition Award for exemplary contributions to implementing the Logistics Management Solution at Adani Green Energy Ltd., June 2024.
- Presented 2 research publications in the International Conference during my undergrad and published them in Springer journal.
- Certified SolidWorks Professional (CSWP)
- Holding Lean Six Sigma Yellow Belt