Shingala Vaidik

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EDUCATION

- **Indian Institute of Space Science and Technology (IIST), Trivandrum, India** **Dec'21 - May'25 (Expected)**
  - Bachelor of Technology - Aerospace Engineering (CGPA - 8.15/10)
    Relevant coursework: Strangth of Material, Theory of elsticity, Aerospace Structure, Finite elemnt method, Material Processing, Machining Science and technology, Metrology lab, Manufacturing Processes Lab
- **Krishna School, Rajkot, Gujarat** **Jun'18 - May'21**
  - Gujarat Secondary and Higher Secondary Education Board (GSEB)
    Higher School Certificate (SSC) – 90.15 %, Secondary School Certificate (SSC) – 87.33% (Rank 1 in School)
  - Joint Entrance Examination (Jee), Advance - 17157 rank (Only student to qualify in School), Main - 95.92 PR

SKILLS

- Expertise in composite analysis using Nastran/Patran and ANSYS, with experience in additive manufacturing.
- **Programming Languages:** Matlab, Python, C/C++, CNC, Machine learning (ML)
- **Tools:** Microsoft Office, LaTeX, AutoCAD, Solidworks, Mastercam, Abaqus, ANSYS APDL, Nastran/Patran
- **Management** organized two events in the college annual festival Conscientia.

PROFESSIONAL EXPERIENCE

Indian Space Research Organization (ISRO), Bangalore, India

- **Research Intern** **Jun'24 - July'24**
  - **Structural Design & Analysis**
    - Modeled and analyzed a sandwich deck and hexagonal interstage under the **Structural Design Division**.
    - Modeled and analyzed using **MSC Patran/Nastran**, with a focus on frequency and buckling analysis. Developed and parameterized **PCL** scripts for analysis. Automated processes using **CMD** to read input.dat file, update PCL scripts, and extract frequency results in output.dat file, ensuring **user-friendly** execution.
    - **Validated** models, based on comparisons with published research, achieve **12%** and **10%** accuracy with experimental and theoretical results, respectively.
    - Visited a composite manufacturing lab to gain insights into advanced fabrication techniques.

Space Technology and Aeronautical Rocketry, Surat, India

- **Research Intern** **Jun'23 - July'23**
  - Designed and analyzed a cost-effective Rocket Motor Static Test Pad, focusing on portability and structural integrity. Gained practical experience in industry-standard design processes and **project management**.
  - Utilized **SolidWorks** for 2D geometry with geometric dimensioning and toleranc (**GD&T**) and 3D modeling, performed structural analysis, and gained experience in avionics, **system engineering**.
  - Completed weight and pricing calculations and developed a detailed **assembly procedure** for user implementation.

PROJECT EXPERIENCE

Indian Institute of Space Science & Technology, Trivandrum, India

- **Bending and buckling analysis of Composite** **Feb'24 - Apr'24**
  - Performed composite plate analysis using **ANSYS** and **MATLAB**, including natural frequency, buckling, and bending simulations, along with the calculation of the D-value and stiffness matrix formulation.
  - Developed MATLAB scripts to automate the calculation of Q and D values, as well as determining critical buckling load and natural frequency for laminated composite plates.
  - Conducted **finite element analysis** in ANSYS to assess the bending and buckling behavior of composite plates under various loading conditions.
  - Collaborated with the team to **validate** the ANSYS model against theoretical values in MATLAB, achieving a high accuracy of 2%.
- **V-Bending Sheet Metal Forming Simulation and Optimization** **Feb'24 - Apr'24**
  - Modeled and analyzed using **ABAQUS**, focusing on the effects of punch radius, sheet thickness, and friction, with key findings on the significant impact of plate thickness on stress distribution.
  - Conducted **Finite Element Analysis** of copper, AA6061 T6, and Steel 360X alloys using 3D simulations, achieving precise stress predictions validated against experimental data.
  - **Optimized** the V-Bending Simulation by evaluating punch radius, plate thickness, and friction, discovering the dominant influence of plate thickness and punch radius on tension stresses.
  - Predicted **internal stresses accurately** in the V-Bending Simulation, demonstrating that increasing plate thickness directly correlates with rising bending force, optimizing the bending process.

- **Mechanical Housing Design of an avionics payload** 🔗 **Feb'23 - Apr'23**
  - Designed and modeled a 2-part housing assembly in SolidWorks for 4 sensors and 1 electronic board, fitting within a 300x300x150 mm constraint.
  - Modeled all sensors in SolidWorks and a 2-part housing assembly and utilized **SolidWorks** for 2D geometry with geometric dimensioning and toleranc (**GD&T**) and 3D modeling, adhering to all design constraints.
  - Achieved a total weight of 2.5 kg, **satisfying** the design constraint of under 3 kg.
  - Developed a **sequence of machining operations**, selected materials and tools, and outlined **metrology requirements** for quality assurance, along with an **assembly video**.
- **Space Flight Mechanics** 🔗 **Sep'23 - Nov'23**
  - Used **MATLAB** to calculate the position and velocity vectors of a space object after 2 hours, achieving accurate results by confirming angular momentum conservation, indicating a consistent orbit.
  - Used **Lambert's Problem** in MATLAB to calculate orbital elements for an Earth satellite, confirming consistent results with identical orbital parameters for both r1 and r2, indicating high solution accuracy.
  - Designed a **lunar transfer trajectory** using Lambert's Problem and MATLAB, optimizing energy boosts and maneuvers for efficient transit from Earth Parking Orbit to Lunar Parking Orbit, while minimizing delta-v and validating the trajectory through simulations.
- **Modeling and Analysis of Physical Systems** 🔗 **Sep'23 - Nov'23**
  - Independently modeled and simulated the motion of a cannonball, artillery shell, rocket, and offset slider crank mechanism, focusing on projectile trajectories and dynamics.
  - Analyzed the impact behavior of spherical objects subjected to rotation and slipping along contact surfaces, simulating real-world physical interactions using **MATLAB**.
  - Used **FreeFEM++** to solve fluid flow and diffusion problems, applying numerical methods like CSFT and CSCT within the **finite difference method** to analyze complex systems.
- **Performance Analysis of Jet and Propeller driven Aircraft** 🔗 **Sep'23 - Nov'23**
  - Generated V-n diagrams, gust analysis, and VTAS-n diagrams for altitudes up to 5000 meters using MATLAB.
  - Analyzed turning performance including the tightest and fastest turns, showcasing proficiency in aerodynamics and **MATLAB data visualization**.

LEADERSHIP EXPERIENCE

Indian Institute of Space Science & Technology, Trivandrum, India

- **Conscientia 2k23 - Event Organizer** **Sep'23**
  - **Machinist Event** 🔗
    - Organized and managed a two-round precision machining competition, where participants crafted components using **lathe machines**, with a focus on guiding teams through both theoretical and practical stages.
    - Designed the event's layout, including the use of **SolidWorks** for 2D drawing and 3D modeling, and created event **brochures** using **Canva**, overseeing 10 teams and ensuring smooth execution.
  - **Hangover Bridge Building** 🔗
    - Coordinated the **ice cream stick** bridge-building competition, ensuring adherence to dimensional constraints, and provided guidance to participants in both theoretical and practical aspects of bridge design.
    - Managed the participation of 20 teams, monitored the construction phase, and helped with the judging criteria, ensuring **fair evaluation** based on creativity, aesthetics, and load-bearing capacity.

ACHIEVEMENTS

- Awarded the **Foundation for Excellence** Scholarship in 2022, selected based on performance in the **JEE Exam**
- Secured **runner up** place in event panchmatra Conscientia 2k22 and 2k23, competing in challenging aptitude, mathematical, and mind-bending problem-solving events. 🔗

INTEREST

Cricket • Fitness • Food • Watching movies • Gaming