Rukhsar

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Education

- **Indian Institute of Technology(ISM)** Dhanbad,India
  Bachelor of Technology - Mechanical Engineering; GPA:8.33 *2021 - 2025*

Experience

- **A Squirmer Across Reynolds Numbers** IIT ISM Dhanbad
  Ongoing Research under Prof. Antarip Poddar *March 2024 - Present*
  - Investigating the locomotion of a spherical squirmer across Reynolds numbers, focusing on the transition from viscously to inertially dominated flow.
  - Objectives includes determining the stability of steady axisymmetric flow and computing critical Reynolds numbers for transitions to three-dimensional and transient flow.
  - Currently utilizing the Gmsh software for geometry creation and meshing, and OpenFOAM for simulating for quantifying self-propulsion dynamics

- **Jindal Steel and Power** Angul, Orissa
  Mechanical Internship *May 2024 - July 2024*
  - Led a project in the CRM Complex on the Pickling line, *Developing a solution to prevent concentrated HCL fumes leakage from acid tanks, ensuring the safety of components and personnel.*
  - Applied technical knowledge in real-world scenarios, focusing on industrial safety and process optimization within the steel manufacturing environment.
  - Gained hands-on experience with steelmaking processes and SAP technology, while enhancing understanding of large-scale industrial operations and safety protocols.

- **LRDE DRDO - Ministry of Defence, Government of India** Bengaluru
  Research and Development Internship *June 2023 - Aug 2023*
  - Led the *Thermal Management of Electronic Enclosure for Underwater Radar* project, focusing on crucial heat dissipation issues.
  - Conducted an extensive literature review and further designed a compact cylindrical enclosure to house heat-generating electronic components and simultaneously utilized computational fluid dynamics (CFD) techniques to formulate an optimized fin configuration through the analysis performed on Ansys and validated the result through analytical calculations.
  - This design approach resulted in an impressive 63.6% reduction in chip temperature. It enabled safe and efficient operation while adhering to size and weight constraints. Further explored Phase Change Material (PCM) for potential extended operations.

Workshop

- **Bootcamp on Unmanned Aerial Systems, Sensors, and Communications** IIT (ISM) Dhanbad
  Training *May 2023*
  - Acquired knowledge in drone Electronics, gaining hands-on experience with Arduino, Simulink and RoboAnalyzer.
  - Led the successful assembly of a hexacopter from scratch and proactively explored diverse applications of drone systems.

- **Adsorption for CO2 Capture, Green Refrigeration, and Energy Storage** IIT (ISM) Dhanbad
  Workshop *April 2024*
  - Participated in a comprehensive workshop focused on the applications of adsorption technology in addressing environmental and energy challenges. Explored topics including the basics of adsorption, CO2 capture, green refrigeration, and energy storage through insightful sessions led by leading experts in the field.
  - Gained practical insights into mathematical modeling of adsorption systems and simulation techniques using COMSOL Multiphysics.

Projects

- **Product Design Challenge - Solinas, InterIIT Techmeet**: Led team in designing a retractable shaft using a lead screw for efficient homogenization in 5m deep tanks. Achieved 1m to 5m extension in 50 seconds at 120 RPM. Validated centrifugal retractable blade through Ansys CFD simulations for sewage tank mixing. Implemented self-engaging mechanism for safety, preventing damage to tank walls. Conducted structural analyses on Ansys for failure simulations. Ensured user-friendly controls with an actuator for engaging blades effortlessly. Balanced innovation, portability, waterproofing, and spark-proofing for underwater or sludge storage tank operations.

- **Flow over an equilateral triangular Prism using OpenFoam**: Studied the flow past a bluff triangular prism of base length of 1m using an incompressible, laminar and transient solver, icoFoam, prior validation of which is done using a case of 2-D cylinder. Analysed the flow parameters are at 3 different values of Reynolds Number - 20,40 and 60 for two values of angle of attack - 0 degrees and 10 degrees. Examined force Coefficients, namely Drag coefficient and lift coefficient.

- **Formula Student Chassis Development** : Played a pivotal role in designing and fabricating the chassis model, conducting rigorous structural analyses utilizing SOLIDWORKS and Ansys Software to ensure both optimal performance and safety. Collaborated with the team to execute the fabrication of the chassis from scratch.

- **The Big Muskie Bucket**: Designed a 3D CAD model of The Big Muskie Bucket, a Component of a mining machine used for excavation in Mining. *Drive link for Projects*

Skills Summary

- **Softwares** : ANSYS, SOLIDWORKS, OpenFoam, AutoCAD, MasterCam, Gmsh, Excel
- **Languages** : Python, C/C++, MATLAB
- **Platforms** : Windows, Linux
- **Soft Skills** : Leadership, Problem-solving, Project management, Team Work, Time Management

Relevant Coursework and Certifications

Fluid Mechanics	Fundamentals of Aerodynamics	Scientific Computing
Heat Transfer	Numerical Methods	CFD Foundation
Applied Thermodynamics	MATLAB Fundamentals	CFD Coding

Social Engagemennts

- **Mechismu Racing Electric, Official FSAE Team of IIT (ISM) Dhanbad**: Vice-Captain, Mechanical Division Head
  - Leading the MREX02 project for Formula Bharat 2025, overseeing the design and manufacturing phases for chassis, aerodynamics, steering and suspension, and brakes.
  - Managing the external affairs, including industry partnerships and sponsorships, while coordinating the mechanical division's efforts to meet project timelines and quality standards.
  - Pi-EV Formula Bharat 2023: Worked on the Team Management report, Procurement strategies, and Timelines for the club activities, including procurement.

- **MoE's Innovation Cell Coordinator, IIT ISM Dhanbad** : Responsible for planning and executing innovation challenges, workshops, seminars, and Hackathons, along with maintaining thorough reporting to the Ministry of Education.

- **Organizer :**: Parakram'23: Sports Fest, Hackfest'24: Operations Head

- **Sports Engagements:** : Badminton, Shotput

Achievements

- Second Runner-up at Product Design Challenge "Solinas" at Inter IIT Techmeet'23.

- Second Runner-up Overall at the Pi-EV'23 Formula Bharat Event on an international level.

- Achieved First position in Dezyn-O-Mania: Mining Machine 3D Design Event at Geo-Mining Fest of IIT Dhanabad.

- Conducted workshops on "Automobile Aerodynamics", "Fundamentals of SOLIDWORKS" and "Content Writing" for first-year B-Tech Students.

- Represented Agra Region in the Nationals of National Children Science Congress Program 2018 held in Kanpur.