Sidharth Enagala

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Research Interests

Computational Fluid Dynamics, Turbulence Modelling, Fluid Structure Interactions, Aerodynamics

Education

Birla Institute of Technology & Science (BITS) Pilani University **August 2019 – June 2023**
BE in Mechanical Engineering, GPA - 7.17/10 *Hyderabad, Telangana*

Experience

Politecnico Di Milano - *Prof. Riccardo mereu* **June 2022 – December 2022**
Undergraduate Research Assistant, CFD Lab *Milan, Italy*

- Performed CFD simulations of refrigeration systems in containers to improve the understanding of how they work
- CFD analysis of High Pressure Gas Releases from nozzles : studied and worked on highly underexpanded supersonic jets
- Generated a perfectly structured mesh for different geometries containing millions of cells through out the domain
- Studied the impact of nozzle shape on jet structure and dispersion characteristics of the jet release using various gases
- A sensitivity analysis based on pressure at inlet has been carried out depending upon the shape of the nozzle
- A modelling strategy is used for the rectangular nozzles with different aspect ratios is validated from experimental results

Indian Institute of Technology, Bombay - *Dr. Dhwanil Shukla* **June 2022 – September 2022**
Summer Research Intern, Low Speed Experimental Aerodynamics Lab *Mumbai, India*

- Multirotor Aerodyanmic Interactions Study through CFD Simulations : Fluid structure interactions of tandem rotors
- Performed simulations when the rototrs are rotating in opposite directions using MRF models rotating at high speeds
- Analysing the lift and drag parameters and also performing post processing to visualize the airflow and around the rotor
- Captured the wake region between the two rotors and validate the post processed results with experimental visual results

National Council of Cement & Building Materials **May 2021 – July 2021**
Summer Intern *Ballabgarh, India*

- Introduced to Computational Fluid Dynamics (CFD) and learned how to mesh and setup in ANSYS fluent software
- Conducted research on multi-phase flow inside calciner and performed simulation based on the Euler multi-phase model
- Studied combustion process and the calcination reaction to improve numerical modeling of the process in the calciner

Projects

Analysis of shock-wave interactions on sharp wedges | *Dr. Supradeepan, Dr. K.R.C. Murthy* **April 2022 – Present**

- Conducted extensive research on supersonic flow over wedges arrangements to improve understanding of fluid dynamics
- Performed steady simulations of single wedge in ANSYS Fluent and validated the results with the analytical results
- Conducted simulations for supersonic flow over double and triple wedge arrangements at Mach numbers 2,3 and 4
- Exported the results to Tecplot which is used as post-processing software to represent the contours and graphs visually

Analysis Of Air Flow Over Formula 1 Cars | *Dr. Pardha Saradhi* **March 2022 – August 2022**

- Extensive research on the effects of wake region created by F1 racing cars, specifically analysing lift and drag coefficients
- Validated the results of flow over single F1 car with flow over Ahmed body and with lift-to-drag ratio of the car
- analysed lift and drag of the car with parametric analysis using ANSYS Fluent by changing distance between the cars
- Documented a manuscript using LaTeXand explained the results by contours and graphs using Tecplot and MATLAB

Aerodynamics of Quad-copter (UAVs) | *Dr. Supradeepan K* **January 2022 – May 2022**

- Modified the given geometry to a suitable for simulating in ANSYS Fluent usinf Fusion 360
- Simulated steady and compressible flow over a simple rotor and understood the effects of airflow around the rotor
- Implemented multi-zone unstructured meshing around rotors of the quad-copter keeping the Y^+ value close to 1
- Extensive research on how MRF models work and how text user interface (TUI) commands are used in ANSYS fluent

Implementation of BMS in Electric Vehicles | *Dr. Madhuri Bayya* **September 2021 – March 2022**

- Developed an understanding of Battery Management Systems (BMS) and their importance in the automotive industry
- Became familiar with calculating output parameters like voltage, temperature and SOC, SOH estimation using Simulink
- Created a BMS as a team to produce different output parameters by giving different values of current at the input

IBPM for flow over airfoils | *Dr. Supradeepan K* **August 2021 – January 2022**

- Studied how Immerse Boundary Projection Method (IBPM) differs from methods used previously for similar problems
- Evolved the open source C++ code favoured to the problem simulating which is used in PetIBM and PetSc solvers
- Simulated flow over a 2D stationary circular cylinder also conducted a grid independence study and validated the results
- Meshing was done using Gambit & simulations were run on flapping Eppler E61 2D airfoil at different reynolds number

Latest Developments of Micro and Nano Machining processes | *Prof. N.S.K Reddy* **August 2021 – February 2022**

- Extensive research on Micro and Nano Machining processes in order to contribute to the advancement of the field
- Wrote a review report by equipment specifications and understanding related research papers in order to help guide future research

Technical Skills

Languages: Python, C/C++, MATLAB, LaTeX

Tools: ANSYS Fluent, OpenFOAM, Gambit, PetIBM, Tecplot, Fusion 360, Solidworks, CATIA

Communication: English, Telugu, Hindi, Italian

Leadership / Extracurricular

Mechanical Engineering Association **August 2021 – May 2022**

Design Head *BITS Pilani*

- Worked as design head for the mechanical engineering department for two semesters and led a team of 5 designers
- Managed various competitions conducted by in the technical and cultural fests with participation in hundreds
- Designed the mechanical department brochure for the academic year which is uploaded on department's website

Esports Club **August 2021 – May 2022**

Joint Secretary *BITS Pilani*

- Maintained a club consisting of more than 25 members and managed different esports organizations in the university
- Organized various esports tournaments involving more than participants from universities through out the country
- Bought different sponsors for funding and PCs to conduct tournaments for one of the biggest fest in the academic year

Team Rahas **September 2021 – Present**

Aerodynamics & Design Engineer *BITS Pilani*

- Was responsible for designing the FSAE car which is used for participationg in Formula Bharat in the upcoming year
- Was also responsible for improving the aerodynamics of the car by gathering information from other subsystems

Nirmaan BPHC **October 2019 – May 2022**

Volunteer *BITS Pilani*

- Actively involved in nurturing social innovations as part of Udaan, Ignite and Project Parishkaar
- Promoted a sense of volunteerism on campus and instilled valuable qualities like social leadership among the youth

NSS Organisation **November 2019 – May 2022**

Volunteer & Graphic Designer *BITS Pilani*

- Helped organize to run events which included visiting orphans and old age homes also interacting with them
- Volunteered my time and Graphic Design skills to help with the publicity of the NGO and coordinated with other volunteers to ensure that all events ran smoothly and that everyone felt comfortable participating