Eswar Sai Viswajit Manchalla

2nd Year Postgraduate
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Academic Qualifications

Year	Degree/Certificate	Institute	CPI/%
2023 - Present	M.Tech	Indian Institute of Technology, Kanpur	8.11/10.0
2016 - 2020	B.Tech	Hindustan Institute of Technology and Science, Chennai	8.23/10.0
2016	Andhra Pradesh Board(XII)	Narayana Junior College, Guntur	92.7%
2014	CBSE(X)	Sri Venkateswara Bala Kuteer, Guntur	8.0/10.0

Professional Experience

National Wind Tunnel Facility (Project Associate)
IIT KANPUR | *May'22 - May'23*

- Designed and Conducted wind tunnel testing for various UAVs and vessels, including structural & modal analysis using Ansys static structural.
- Participated in multiple Particle Image Velocimetry (PIV) tests.
- **</>Tools used: Solidworks, Ansys, Catia, OpenFOAM, AutoCAD.**

StarWatch Technologies (Data Analyst Intern)
Coimbatore | *Aug'24 - Ongoing*

- Developed a product recommendation system for e-commerce by employing collaborative filtering and Pearson correlation.
- Performed data preprocessing, EDA, model training, & hyperparameter tuning to optimize recommendations.
- **</>Tools used: Python, NumPy, pandas, matplotlib, Seaborn, Scikit-Learn.**

Star Labs (Design Intern) SURAT | *April'21 - May'21*

- Designed test pads and simulated rocket test runs.
- Programmed and tested onboard gadgets using Arduino.
- **</>Tools used: Open Rocket, Fusion 360, Arduino, Proteus.**

Mtech Thesis

Atomization Analysis of Burning Nanoemulsion & Microemulsion Droplets IIT KANPUR | *May'22 - May'23*
Supervisor: Dr. D Chaitanya Kumar Rao

- Wavelet and Proper Orthogonal Decomposition (POD) analysis of droplet shape oscillations.
- Capturing onset of Nucleation and categorization of Bubble growth regimes.

Key Projects

Estimation of Droplet Growth Trend
IIT KANPUR | *May'24 - Ongoing*

- Currently estimating droplet size growth trends by solving the Rayleigh-Plesset Equation.
- Utilizing Matlab to solve the second-order nonlinear ODE and visualize the growth trend.
- **</>Tools used: Matlab.**

Analysis of Turbulent Mixing of Hot Exhaust Gas and Its Impact on Deck Structures IIT KANPUR | *May '22 - July '22*

- Wind Tunnel testing of Vessel releasing Hot gases from it's exhaust and the effects of it on the deck structures.
- Involved in performing the PIV testing of flow around the vessel and visualizing flow interaction with structures on the deck.
- **</>Tools used: Catia V5, AutoCAD.**

Wind Tunnel Testing of Twin Boom UAV
IIT KANPUR | *July '22 - Nov '22*

- **Wind Tunnel Testing and Optimization:** Conducted wind tunnel tests on the UAV with different configurations and Angle of Attacks. Optimized the internal structure to accommodate components and minimize the weight.
- **Structural Analysis and Performance Estimation:** Performed static structural & modal analysis in Ansys to validate load-bearing capacity. Estimated Lift, Load, Drag, and Deflection during testing within 5% error margin.
- **</>Tools used: Ansys, Solidworks.**

Wind Tunnel Testing of Flying Wing UAV
IIT KANPUR | *Nov '22 - Feb '23*

- **UAV Wind Tunnel Testing:** Carried out wind tunnel tests for Flying wing UAV with different payload configurations, at various control surface deflections, & at various ground run conditions.
- **Structural Analysis and Performance Estimation:** Performed static structural & modal analysis in Ansys to validate load-bearing capacity. Estimated Lift, Load, Drag, and Deflection during testing within 5% error margin.
- **</>Tools used: Ansys, Solidworks.**

Aerodynamic Effects of Wing Serrations
Bachelor's Final Year Project
Hindustan Univ | *Nov '19 - April '20*

- Conducted CFD simulations on various serrated wings.
- **Aerodynamic Impact:** Explored different serration types and their frequency-related effects, observing a 14% lift increase and 3% drag reduction for specific wing serrations at a given angle of attack.
- **</>Tools used: Catia V5, Ansys, Matlab.**

Design of Airfoils IIT KANPUR | *Feb '23 - May' 23*

- **Industry Airfoil Design:** Developed airfoil designs provided by an industry partner for wind tunnel testing and manufacturing.
- **Adaptive Flap Mechanism:** Designed a mechanism to use a single set of flaps across different angles of attack.
- **</>Tools used: Solidworks, Catia V5, Ansys.**

Flow Analysis of High Speed Railway Pantograph
IIT KANPUR | *May '24-June '24*

- Designed Pantograph as per client requirements.
- Performed CFD Analysis on Railway Pantograph using Ansys Fluent and extracted the Lift & Drag forces, performed grid independence to check consistency of the results.
- Validated results with available literature.
- **</>Tools used: Solidworks, Catia V5, Ansys.**

Course Projects

CFD Simulations of Lid Driven Cavity
IIT KANPUR | *Jan '24- April '24*

- Performed CFD Simulations on Lid Driven Cavity for a variety of Aspect Ratios (0.5, 1, 1.5) and Reynolds Numbers(500, 1000, 2000).
- Used PRAVAAH In-house code to run the simulations.
- Adjusted the time step size and iterations required to achieve optimal results and computational costs.
- </>**Tools used: Techplot, Matlab.**

Data Analysis of PIV Flow IIT KANPUR | *Jan '24- April '24*

- Extracted Grey scale frames from PIV Flow video.
- Plotted the Intensity values at specified pixel locations over the entire time duration.
- Carried out the autocorrelation and obtained the corelation coeffecients.
- </>**Tools used: Matlab.**

Analysis of Pure and Blended Fuels
IIT KANPUR | *July '23- Nov '23*

- Fuel Burning Characteristics: Investigated the combustion behavior of various fuels, including Pure Jet A, Pure Ethanol, and Pure Methanol, as well as different blends (e.g., Jet A with Methanol or Ethanol).
- Equivalence Ratios and Pressure Levels: Conducted the study at multiple Equivalence Ratios (0.5, 0.75, 1.0, 1.25, 1.5) and two pressure levels (1 ATM and 10 ATM).
- Emission Estimations: Estimated emissions of Carbon Monoxide, Carbon Dioxide, and Nitrous Oxide for all tested fuels.

Design of 300 seater Commercial Aircraft
Hindustan Univ | *Nov '18- April '19*

- Aircraft Design Fundamentals: Explored the foundational principles of aircraft design. Investigated multiple wing profiles.
- **Aerodynamic Analysis and Performance Estimation:** Estimated aerodynamic forces, and performed Lift, weight, fuel, and drag calculations. Additionally, estimated take-off and landing distances.
- </>**Tools used: Catia V5.**

Self Projects

Analysis of the Android App Market Github | *Jan '24 - Feb'24*

- Analyzed over 10,000 Google Play apps to derive growth and retention strategies, examining app categories, ratings, and pricing.
- Performed data cleaning, sentiment analysis, and filtered out "junk" apps to compare the popularity of paid versus free apps.
- </>**Tools: Python, Pandas, NumPy, Matplotlib, Sentiment Analysis Engine.**

Predicting Credit Card Approvals Github | *April '24 - Jun'24*

- Developed a classification model to predict credit card approvals, addressing data imbalance and applying algos like Logistic Regression, Random Forest, and SVC.
- Cleaned and preprocessed data, handled missing values, and used Grid Search for model optimization.
- </>**Tools used: Pandas, NumPy, Scikit-Learn.**

Predictive Maintenance for Industrial Equipment
Github | *Oct'23 - Dec'23*

- Developed a predictive maintenance model using machine learning algorithms to predict equipment failures and optimize maintenance schedules.
- </>**Tools used: Python, Scikit-Learn, TensorFlow, Pandas.**

Technical Skills

- **Core Softwares:** Ansys, Catia, Solidworks, Fusion 360, Techplot 360, Openfoam, Paraview, Autocad, Siemens NX CAD and CAM.
- **Programming Languages:** Python, C, C++, SQL.
- **Software and Libraries:** Power BI, Microsoft, Pandas, Matplotlib, Seaborn, NumPy, Scikit-Learn, TensorFlow, Keras.
- **Machine Learning & Data Science:** Regression & classification analysis, clustering, supervised & unsupervised learning, CNNs, GANs, LLMs, NLP.

Positions of Responsibility

Department Placement Coordinator (DPC) Aerospace Engineering Department IIT KANPUR | Jun '23 - Ongoing

- Involved in inviting the companies to take part in placement drive.
- Coordinated placement drive activities, acted as a liaison between the placement office, companies, and students.

Student Guide ICS IIT KANPUR | May'2023 - Ongoing

- Mentored **8 freshers** students in acclimatizing to the Environment of the institute.
- Assisted in the **registration & ID card generation** of more than **800 students**, aided by other student guides.

Publications

AERODYNAMIC INVESTIGATION OF SERRATED WING IN UAV APPLICATION

- International Journal of Mechanical and Production Engineering, ISSN(p): 2320-2092, ISSN(e): 2321-2071 Volume- 8, Issue-9, Sep.-2020, http://iraj.in

Certifications

- IBM Data Analyst.
- IBM Machine Learning
- SOLIDWORKS CAD Design Associate (CSWA)

Conferences

INTERNATIONAL CONFERENCE ON Recent Advances in Engineering, Technology and Science by ARSSS

Workshop

Ansys Multi physics Hands-on Workshop (Structural)

Relevant Coursework

- Fundamentals of Combustion
- Design Practices
- Mathematics for Aerospace Engineers
- Applied Computational Fluid Dynamics
- Measurement and Data Analysis
- Applied Compressible Flows
- Strength of Materials
- Aerospace Structures - 1
- Aerospace Structures - 2
- Advanced Materials and their Performance
- Composite Materials and Structures
- Non Destructive Testing Methods
- High Temperature Materials
- Introduction to Data Analysis
- Excel Basics for Data Analysis
- Data Visualization and Dashboards with Excel and Cognos
- Python for Data Science and AI Development
- Python Project for Data Science
- Data Bases and SQL for Data Science with Python
- Data Analysis with Python

- Data Analysis with Python
- Data Visualisation with Python
- Exploratory Data Analysis for Machine Learning
- Supervised Machine Learning: Regression
- Supervised Machine Learning: Classification
- Unsupervised Machine Learning
- Deep Learning and Reinforcement Learning

SCHOLASTIC ACHIEVEMENTS

- Secured **All India Rank 132** in **Gate 2023**.