Diwanji Srinivas Prakash

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A research minded person with a proactive personality | In search of challenging opportunities to get the best out of myself in Technical as well as in Research and Development field

Examination	Field	Institute	Year	CPI/%
Post-Graduation	Aerospace Engineering (Propulsion)	Indian Institute of Technology (IIT) Bombay	2021	9.14
Graduation	Mechanical Engineering	IIT (BHU) Varanasi	2019	9.37
Intermediate	Maharashtra State Board	M.H. High School and Jr. College	2015	88.92
Matriculation	Maharashtra State Board	Abhinav Vidyalay	2013	96.18

SCHOLASTIC ACHIEVEMENTS

- All India Rank **2906** among **1.5+ Lakh students** in **JEE(Adv)** | **3746 in JEE(Mains) 2015** among **10+ Lakh students**
- **Current Department rank 10** among **60 students** and **specialisation rank 4** among **17 students**

ACADEMIC PROJECTS

Unsteady Flow Interactions in a Contra-Rotating Axial Compressor (CRAC) with Inflow Non-Uniformities

M.Tech Project| *Guide: Prof. A.M. Pradeep, Dept. of Aerospace Engineering, IIT Bombay* **Jul'20-Ongoing**

- **Validated** the CFD solver by comparing the **steady state simulations** in **Numeca** with the existing experimental results and carried out the **performance study** of CRAC at various operating points
- Performed **NLH** and **URANS simulations** to study **unsteady flow interactions** between various flow features at various operating points and sections of the blade passage and their effect on performance and stability of **CRAC**
- Further extended the unsteady simulations for **distorted inlet flows** to understand the **detrimental** as well as the **beneficial aspects** of the **unsteadiness** in the flow.

Understanding Unsteady flow-physics in Axial-Flow Compressors | (M.Tech Seminar) **Jan'20-Jun'20**

Guide: Prof. A.M. Pradeep, Dept. of Aerospace Engineering, IIT Bombay

- Did **rigorous literature review** of the topic by reading **14 research papers** and presented the study
- Studied the **unsteadiness** in the flow occurring at **design and near-stall condition** due to various **flow interactions**, their effects on unsteady forces, and **flow control techniques** for improvements over the performance

Integrated 1-D Meanline Solver for Axial-flow Turbines | (Summer Internship IIT Kanpur) **May'18-Jul'18**

Guide: Prof. Santanu De, Dept. of Mechanical Engineering, IIT Kanpur |Co-Guide – Mr. Ankit Surti, Sr. Project Engineer

- **Flow-physics** dependent **loss models** were developed on **MATLAB** | Modelled from **entropy generation**
- Developed an **indigenous 1-Dimensional Meanline Solver** and **integrated** it with the **Loss Models** code to develop a **complete tool** for **1-D analysis** for not only axial-flow turbines but also for other types of turbomachines
- **Optimization** of **1-D design done** from integrated code would **significantly reduce the time** taken in design optimization from 3D CFD analyses and it offers a **better design strategy** to adopt for modern blade designs

Liquid Cooling of Battery Pack Using Nanofluids |(B.Tech Project) **Jan'18-Nov'18**

Guide: Prof. Pradyumna Ghosh, Dept. of Mechanical Engineering, IIT (BHU) Varanasi

- **Designed and fabricated** a **serpentine arrangement** of a battery module and performed **theoretical, experimental** and **CFD analyses** to study the cooling effect with varying Reynolds number, different coolants and concentration
- **Optimised** for the number of channels required and CFD, theoretical results were validated from experiments

TEAM PROJECTS

Hyperloop IIT Bombay Team **Sept'19-Ongoing**

Guide: Prof. Rajneesh Bhardwaj, Dept. of Mechanical Engineering, IIT Bombay

- Involved in a **team of 50** as **Senior Engineer** in designing a the pod for the **SpaceX Hyperloop Competition**
- Developed a code and obtained the **2D profile** in **MATLAB**, designed it in **CATIA V5** and analysed in **ANSYS Fluent**
- Shortlisted as **one of the 6 finalists** in Arizona State University Hyperloop symposium for the pod design

Arsenic water Filter using Iron-Oxide Nanoparticles loaded PU foam **May'17-Jul'17**

Guide: Prof. Pradyumna Ghosh, Dept. of Mechanical Engineering, IIT (BHU) Varanasi

- **Designed and fabricated the filtration system** and performed experiments with varying flowrates and different **Iron-oxide Nanoparticle (IONP)** concentrations loaded in a **Polyurethane (PU) foam**
- Achieved more than **90 % arsenic removal** from the filtration system and well within the **recommended limit**

Design and fabrication of an All-Terrain Vehicle **Apr'16-Jan'18**

Guide: Associate. Prof. Rashmi Sahoo, Dept. of Mechanical Engineering, IIT (BHU) Varanasi

- Part of a **25 member team** for **2 years** and served as the **Vice-Captain and Head of the Roll-Cage (Design) Department** for one year
- **Formulated** a **design methodology** for roll cage taking into account the structural aspect and design constraints
- Designed the **roll-cage** in **CATIA V5** and performed **static** and **dynamic analyses** on it on the ANSYS platform
- Achieved **50 % weight reduction** in the roll-cage structure and an overall **7.2 % vehicle weight reduction**

SOFTWARE AND TECHNICAL SKILLS

- **Analysis and Design Software** : ANSYS FLUENT and CFX, Numeca, CATIA V5, Solidworks, AutoCAD, Multall
- **Programming Languages and other tools**: C, Python 3.0, MATLAB, Advance Excel

COURSE PROJECTS

Design of Two-Stage Low Pressure Turbine |*(Aerodynamics of Compressors and Turbines)* **Aug'19-Nov'19**

- **1-D meanline calculations** were done with an optimization loop to **converge upon mass flow rate** at the 1-D design stage| Performed 1-D, 2-D design tools in the **MULTALL software** with in built free-vortex assumption
- Performed **3-D CFD** analysis in **MULTALL** which converged on mass flow rate| Modeled the **3D design** in **CATIA** V5| Optimum performance was achieved with Pr. Ratio 3.09| Practical values were obtained for all parameters

Python Code for Airfoil Performance | *(Aerodynamics of Aerospace Vehicles)* **Aug'19-Nov'19**

- Developed and validated a python code to predict lift curves, camber for NACA airfoils using **Thin airfoil theory**.
- Modified and compared a given python code to predict **airfoil performance** using **two vortex panel methods**

Python Code for Engine Performance | *(Aircraft Propulsion)* **Aug'19-Nov'19**

- Developed a python code to study **engine performance** of **turbofan, turbojet with afterburner and mixed exhaust turbofan with an afterburner**

Computational Fluid Dynamics (CFD) **Jan'20-Jun'20**

- Developed a **C code** to compare various **finite difference schemes**, their behaviour over various **CFL** numbers.
- Wrote a C code to solve **shock-tube problem** based on **1D Euler equation** using **flux vector splitting** methods

CONFERENCES AND PUBLICATIONS

- Presented the **IIT Kanpur internship** work at the **7th International and 45th National Fluid Mechanics and Fluid Power Conference (FMFP) 2018, IIT Bombay**
- Got the internship work **published** in the **'Journal of Energy and Environmental Sustainability (JEES)'** in **2019**

POSITIONS OF RESPONSIBILTY

Team Leader and Subsystem Head **Apr'17-Jan'18**

- Managed a **25 member team** as the **Vice-Captain** and also served as the **Head** of the **Roll-Cage subsystem**

Teaching Assistant (TA)

Aerodynamics of Compressors and Turbines, Prof. A.M Pradeep

- **Explained** working of **Turbomachinery-based MULTALL** design software to a batch of 60 students

KEY COURSES

- Post-Graduate - **Aerodynamics of Compressors and Turbines, CFD, Essentials of Turbulence, Introduction to Machine Learning**, Aerodynamics of Aerospace Vehicles, **Numerical Methods for Conservation Laws**
- Undergraduate - **FEM,** Optimisation for Engineering Design, **Turbomachines,** Composite Materials, **Robotics**

TRAININGS & WORKSHOPS

- **AutoCAD** and **Advance Excel** training certification by Internshala VTC
- **GIAN** course on '**Fractional Derivatives and its Applications**'.

ACHIEVEMENTS AND EXTRA-CURRICULAR ACTIVITIES

- Secured **First** position in Mechanical Engineering Department for presenting a poster on '**Arsenic Water Filter Using IONP Loaded PU Foam**' in the **Institute Day 2018**.
- Received **Most Popular Poster award** for presenting a poster on '**Design and Fabrication of an All-Terrain Vehicle**' in the **Institute Day 2018**.
- Participated in **ZS Case Challenge 2018** and made it to the **top ten** teams from engineering colleges in **India**.
- Participated in **National Level Workshop** on **Internet of Things (IOT)** by TechTrunk Ventures Pvt Ltd.