# Mude Prem Kumar Naik

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## Education

**Indian Institute of Technology Kharagpur** **2019-Present**
*M.TECH Dual Degree 5Y in Aerospace Engineering* *Overall GPA: 7.65/10*

**Sri Chaitanya Junior College** **2016-2018**
*Board of Intermediate Education* *Marks: 87%*

**Bhashyam Public School** **2015-2016**
*Board of Secondary Education* *Overall GPA: 8.3/10*

## Technical Skills

**Softwares:** Ansys fluent, SOLIDWORKS, flow 5, XFLR 5, AutoCAD, OpenFOAM, LT spice, MATLAB, XFOIL, SU2
**Experiments:** Wind Tunnel Operation, Pressure Measurements, Smoke Flow Visualization, PIV
**Programming skills:** C, C++, Python
**MS Office:** Excel, Powerpoint, Word, LaTeX

## Experience

**Fuselage design for VTOL Electric Plane [Work]** **[May 2023 - July 2023]**
*Tekkr Innovations- Startup, Hyderabad* *Summer Intern*

- The project aim is to design a VTOL Electric Plane for a pilot and two Passengers weighing **1000kg** for urban air travel
- Designed various types of existing **VTOL Electric plane fuselages** in SOLIDWORKS, assessed via Ansys Fluent
- Developed over **300** fuselages with varied airfoils in SOLIDWORKS, assessed improvements through **FLOW-5**
- Enhanced L/D by optimizing diverse designs, assessed forces with Flow5, selected top **5** models for structural analysis
- Involved in **flight testing** of a single-seater VTOL Electric plane prototype weighing **250kg**, designed for transportation

**UAV Design for Pulse Engine, National Aerospace Laboratories(NAL) [Certificate] [June 2023 - July 2023]**
***Guide:*** *Cheif Scientist, Joint Head of Propulsion division - C Rajashekar, Bangalore* *Summer Intern*

- The project aims to design an Unmanned Aerial Vehicle (**UAV**) for a Pulse engine for Surveillance and Monitoring
- Involved in **pulse engine** testing to achieve targeted **Thrust** with the combinations of various fuels and pulse engines
- Designed various types of UAVs for a pulse engine, incorporating various fuel systems for **15-20min** flight time

**AWaDH Internship Carnival - 2022, IIT Ropar** **[Jun 2022 - Aug 2022]**

- The project aims to design a Smart Crop Sensor System(**SCSS**) for fertilizers and Automatic Weather Station(**AWS**)
- Explored the conceptual design and performed the literature review to know the future and advantages of the SCSS
- Designed the **3D CAD** model for an Automatic Weather Station(AWS), which is flexible to use in a remote area

## Projects

**Long Endurance Mars Flying Exploration Vehicle (LEMFEV) [Work]** **[ Jun 2022 - Present]**
*Supervisor: Prof. S Saha and Prof. Aditya Bandopadhyay, IIT Kharagpur* *Bacher & Masters Thesis*

- Long Endurance Mars Flying Exploration Vehicle (**LEMFEV**) is a collaboration with **IIT Kanpur**
- Analyzed electric (VTOL, STOL, Hybrid UAV, Tiltrotor, and Fixed Wing) concepts diving into literature
- Built a **300mm** wingspan acrylic glass wing model with **5mm** thickness and integrated **30** pressure ports for experiment
- Conducted wind tunnel experiments at Reynolds **10K-30K** and observed smoke flow under varying angles of attack
- Compared Direct Numerical Simulations(**DNS**) with **experimental** results and visualized flow through **Smoke flow**
- Researched the impact of Sweep angles, Stagger, Winglet radius, and Gap on the performance of the box wing model

**Study of aerodynamic forces acting on the sailboat, IIT Kharagpur [Work]** **[July 2021 - Dec 2021]**
*Supervisor: Prof. S Saha , IIT Kharagpur*

- Designed a **sailboat** with keel and a sailboat without keel in SOLIDWORKS to observe various forces using Ansys Fluent
- Examined the forces acting on the sailboat by varying the **wind direction and magnitude** and calculated drag
- Observed the calculus behind the mechanism of the sailboat and **concluded** that a sailboat with a keel performed better

**Wind Turbine on MARS, IIT Kharagpur [Work]** **[Aug 2021 - Apr 2022]**

*Supervisor: Prof. S Saha , IIT Kharagpur*

- The project aims to design and set up an efficient **wind turbine** and use wind energy on **Mars** for electricity
- Explored weather conditions of Mars to find a suitable place for setting up the wind turbine on Mars
- Designed and simulated various types of wind turbines and concluded that the **Savious** model gives maximum efficiency
- Compared and prioritized different places on Mars and found the more **suitable place** for setting up wind turbine farm

**Project AIRAVAT** **[Mar 2021 - Aug2021]**

*Supervisor: Prof. C.S Mistry, IIT Kharagpur* *Research Group*

- The project aims to build a fully working model of an Electric aerial vehicle of VerticalTake-off and Landing (VTOL)
- Selected as a member of an Aerodynamics team to design a wing and fuselage for a 6kg prototype VTOL model
- Designed & simulated various fixed-wing models using ANSYS Fluent, calculated lift & drag at various angles of attack

## Position Of Responsibility

**Head of Long Endurance Mars Flying Exploration Vehicle (LEMFEV) [Website]** **[Aug 2022 - Present]**

*Supervisor Prof. S Saha , IIT Kharagpur* *Research Group*

- Teamed up with **IIT Kanpur** and **IIT Kharagpur** to design a Mars-suited UAV to explore the Martian atmosphere
- Formed and guided a **15-member** team, dividing them into four domains through rigorous **tests** and **interviews**
- Instituted **weekly progress** reports to foster transparency, informed choices, and a culture of open communication
- Adeptly managed project resources, optimizing **time and budget**, ensuring efficient progress and project completion

**Guide: Extra Terrestrial Flight, IIT Kharagpur[Certificate]** **[Aug 2022 - Present]**

*Supervisor Prof. S Saha , IIT Kharagpur* *Research Group*

- Established and expertly guided a **16-member** team, segmenting into domains through meticulous tests and interviews
- Strategically guided research group on UAV design for Interuniversal planets, offering insights that shaped the study
- Fostered knowledge exchange, thus inspiring dynamic **idea sharing** to innovate solutions for complex space exploration

**Teaching Assistant, Aerodynamics Lab, IIT Kharagpur [Certificate]** **[ Aug 2023 - Present ]**

- Selected as **Teaching Assistant** for Aerodynamics Lab under the professor, contributing to student's lab activities
- Conduct presentations on experiments and practical applications, also evaluated the lab reports for over **77** students
- Exhibited strong communication skills in conveying technical information to the students in an engaging manner

**Students Mentor, IIT Kharagpur [Certificate]** **[ Aug 2022 - May 2023 ]**

- Selected as a mentor to guide four first-year Aerospace students under Technology students' gymkhana, IIT Kharagpur
- Boosted academic excellence and study skills in diverse student groups by effectively shaping their education
- Catalyzed remarkable success through personalized guidance while meticulously aligning goals with actionable strategies

## Relevant Coursework

- Aerodynamics (Low-Speed and High-Speed)
- Propulsion
- Industrial Aerodynamics
- Physics of fluid flow experiments
- Engineering design process
- Special Topics in Entrepreneurship
- Innovation Management
- International Business

## HONOURS & AWARDS

**National Scholarship Portal [Website]** **[2019 - 2023]**

- Selected for NSP Scholarship under the Ministry of Electronics & Information Technology, Government of India for 4Y

**Boeing India Mentorship Programme [Certificate]** **[Aug 2021 - Apr 2022]**

- Selected for the IIT Kharagpur-Boeing Mentorship Programme, 2022, to collaborate with Boeing industry experts and open new pathways into the Aerospace field and future scope

## Extra Academic & Activities

- Engaged in 2-year National Cadet Cop (NCC) training, a Govt. of India program, obtaining a B Certificate
- Represented Lal Bahadur Shastri Hall of Residence in the Inter-Hall Hockey Tournament General Championship for two consecutive years and won a silver medal
- Actively joined Interhall Illumination (2019-2020), representing IIT Kharagpur's Lal Bahadur Shastri Hall of Residence