Harsh Meel
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EDUCATION

Cornell University, Sibley School of Mechanical and Aerospace Engineering Aug 2024 – May 2026

Master of Science (Research) in Mechanical Eng. | Conc.: Dynamics and Control, Atmospheric Science

Indian Institute of Technology Bombay (IIT Bombay), Mumbai, India 2019 - 2023

Bachelor of Technology in Civil Engineering with Minor in Mechanical Engineering

KEY EXPERIENCE

Regional Climate-Based Use of Geoengineering, Climate Engineering Lab | MS Thesis [Oct'24- Current]

Principal Advisor: Prof. Douglas MacMartin, MAE, Cornell University; Minor Advisor: Prof. Daniele Visioni, CALS,

- Researching Stratospheric Aerosol Injection (SAI) as a potential climate change control strategy
- Using climate metrics at regional scale (South Asia) to analyze impacts of SAI and climate change
- Addressing uncertainty in effects of SAI deployment using decision trees & multi-scenario analysis
- Using rate of learning methods to detect and control strategies to respond to multiple scenarios
- Mapping control methods and strategies to physical dynamics for validation with climate science
- Aiming to publish in peer-reviewed journal to inform policy and research on SAI use and risks

Reliability Analysis of Renewable Grid Transition Using Data-Driven Models [Report] [Nov'24 – Dec'24]

Guided by: Prof. Scott Steinschneider, Biological and Environmental Engineering, Cornell University

- Analyzed drivers of electricity price spikes in NY State electricity grid using load and fuel mix data
- Used regression, decision trees, and ensemble methods to find fit between spike events and the renewable grid; identified issues using correlation analysis, VIF values, and data imbalance check
- Derived insights on results using performance metrics, multicollinearity, and unaddressed factors

Operations Research for Electric Vehicle (EV) Charging in India | Research Assistant [Nov'23 –June'24]

Guided By: Prof. Ashutosh Mahajan, Industrial Engineering and Operations Research, IIT Bombay, India

- Pointed out opportunities and limitations of operations research tools in aiding the EV charging penetration in India, based on optimization of cost of infrastructure spread and customer usage
- Surveyed state of EV charging in India by interacting with businesses to identify key obstructions
- Created test cases for use of lab's Mixed-integer nonlinear optimization solver (Minotaur toolkit)

Student Electric Race Car Team, Formula Student | Battery Engineer [Reports] [Nov'19-Jun'22]

IIT Bombay Racing - 3-tier cross-functional team of 70+ undergrad students building an electric race car for Formula Student. The team won Overall Championship'21 Concept Class at FSUK, pioneer among Asian teams

- Responsible for design, analysis, manufacturing and testing of 400V battery made of composite material and lithium-polymer cell modules having capacity of 7.8 kWh and worth INR 1Million+
- Developed a novel method to estimate vehicle energy budget using driver performance data and transient simulation of car, theoretically cutting battery weight by ~33%, increasing performance
- Designed new parallel configuration of cells, theor. cutting battery heat by 50% and size by 33%

- Initiated technical alliance with cell recyclers to handle degraded and discarded cell modules
- Trained and managed 3 junior design engineers, acquainting them with design and subsystem
- Led a 4-member group to prepare and conduct recruitment tests for 140+ aspirants to the team

RELEVANT COURSES UNDERTAKEN

**Ongoing*

Graduate Level (Cornell)	Feedback Control Systems (MAE 5780) *, Environmental Statistics and Learning (BEE 6310) Climate Dynamics (EAS 5051), Aerosol and Climate Physics (EAS 6920), Energy Seminar
Undergraduate Level (IIT Bombay)	Intro.to Renewable Energy Technologies, Environmental Studies: Science and Engineering, Fundamentals of Urban Science, Manufacturing Processes, Kinematics and Dynamics of Machines, Transportation Engineering

TECHNICAL/SOFTWARE SKILLS

Software	Python, MATLAB, Optimization (Pyomo, AMPL), SolidWorks, Ansys
Prototyping	3D Printing, Electro-Mechanical Assembly, Metal and Composite Fabrication

RELEVANT PROJECTS

Optimizing Electric Vehicle (EV) Charging along highway| BTech Project [Report] [Jan'23 – April'23]

Guided by: Prof. Tom V. Mathew, Department of Civil Engineering, IIT Bombay

- Applied optimization theory on a highway corridor model, with variable EV battery capacity, charger power, and waiting time lost; identified drawbacks of the basic model and their solutions

Residential Vehicle Charging Entrepreneurial Venture | Course Project [Report] [Aug'22 – Dec'22]

Guided by: Prof. Anuradha Narasimhan, Desai Sethi School of Entrepreneurship, IIT Bombay

- Formulated a home charging solution for electric vehicles, as case study of lab-to-market rollout
- Surveyed customers for user behavior and issues; prepared a business model and market plan

Overtake Assist System | Institute Technical Summer Project [Report] [May'20 – Aug'20]

Tinkerers' Lab, IIT Bombay; Awarded Special Mention (top 7) out of 64 projects with over 200+ participants

- Designed a vehicle-mountable driver assistance system, assisting the driver in overtake maneuvers on undivided two-laned roads, to avoid head-on collisions in poor sight conditions

PROFESSIONAL EXPERIENCE

ideaForge Technology | R&D Intern [May'22 – June'22]

Industry leader in UAV technology in India | Developing drone solutions for Defense, Surveying, and Enterprises

- Designed plan of a modular wind tunnel capable of variable controllable flow in a confined space
- Tested flow data of tube-axial fans and validated correlation in fan parameters and tunnel flow

AWARDS

- Awarded Swami Vivekanand Scholarship by Govt. of Rajasthan to pursue graduate studies [2025]
- Secured rank 6722 among 160k aspirants in JEE Advanced, national college entrance exam [2019]