Harsh Meel

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EDUCATION

Post-Graduation, M. S.: Mechanical Engineering	**2026**
Cornell University, Ithaca	
Graduation, B. Tech.: Civil Engineering with Minor in Mechanical Engineering	**2023**
Indian Institute of Technology Bombay	
Intermediate, Board of Secondary Education Rajasthan	**2019**
Rajat Vidyapeeth Sr. Sec. School, Sikar	

KEY PROJECTS

Algorithms and Implementation of Mixed-Integer Optimization | Research Assistant   **[Nov'23 –June'23]**

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

- Collaborating in implementation, testing and debugging of MIQCO (Mixed-Integer Quadratically Constrained Optimization) solver within the Minotaur software, ensuring robustness and solver speed on various problems
- Utilizing mathematical models in problems as EV Charger Usage Optimization & Investment Portfolio Selection
- Employing Minotaur Solver with our team to provide optimized solutions for industry partners and agencies

Optimizing Electric Vehicle (EV) Charging Infrastructure | BTech Technical Project [Repo]**[Jan'23 – April'23]**

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

- Conducted comprehensive analysis and optimization of EV charging infrastructure along a highway corridor to address EV adoption and inadequate charging infrastructure in India, receiving perfect (AA) grade for the work
- Conducted literature review, collaborating with industry experts like Tata Motors, identifying gaps and solutions
- Developed corridor travel model, optimizing EV battery capacity, charger power and time lost in queues (delay)
- Confirmed Level 3 DC fast chargers as pivotal for improved service, with increased EV adoption in Indian market
- Identified original EV battery model's drawbacks and suggested improvements for enhanced future accuracy

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

Tinkerers' Lab IIT Bombay

- Project awarded Special Mention (top 7) out of 64 projects with over 200+ participants from the institute
- Built a vehicle-mountable driver assistance system which scrutinizes three-car overtake maneuver on two-laned roads, assisting the driver to avoid head-on collision in difficult weather and poor lightning conditions
- Formulated the final algorithm to be developed into a demonstrative two-dimensional simulation web-app
- Conducted primary on-road experiment to collect data and test for further refining via Machine Learning

SCHOLASTIC ACHIEVEMENTS

- Achieved All India 99.74 percentile in IIT JEE - Main, national college entrance exam, out of 1.2M aspirants   ['19]
- Awarded INSPIRE scholarship for performing among top 1% of 0.2M aspirants of Senior Board examination   ['19]
- Secured Distinction Certificate in State Talent Search Examination, conducted by Government of Rajasthan   ['16]

PRODUCT DEVELOPMENT EXPERIENCE - IIT BOMBAY RACING

A 3-tier cross functional team of 70+ IITB students to build an electric race car for Formula Student. Car E12 won Design Event'21 and Overall Championship'21 Concept Class, only Indian car ever to achieve this feat in Formula Student UK

Design Engineer | Battery Subsystem [Repository]   [May'21 – June'22]

- Responsible for design, analysis, manufacturing and testing of 400V battery made of composite material and encompassing lithium-polymer cell modules having capacity of 7.8 kWh and worth INR 1Million+
- Developed a new method to calculate energy required by vehicle using driver performance data and transient simulation of race car, cutting battery size of car by ~33% , reducing weight and increasing performance
- Engineered new battery assembly with initiative of parallel configuration of cells, reducing battery pack heating
- Earned the Tesla FS Battery Sponsorship for newer cells, based on exceptional design and technical expertise
- Initiated technical alliance with Exigo Recycling, reducing 640 kg eq. of annual CO_2 emissions in fabrication
- Trained and managed 3 junior design engineers, acquainting them with design and subsystem management

Junior Design Engineer and Trainee | Battery Subsystem   [Nov'19 – April'21]

- Utilized hands-on experience on several manufacturing machines and processes like Hydraulic Press, Laser Cutting, Additive Manufacturing, Carbon Fiber Composite casting, High Voltage wire routing, workshop tools
- Assembled Battery (over 1000 parts) working in High Voltage environment with professional standards
- Led 4-member team to prepare and conduct recruitment tests for 140+ new aspirants for engineering team
- Collaborated with electrical team on setting up and testing of Battery Management System and Electronics
- Designed Universal Joint for vehicle's steering and conducted structural finite element analysis of car's Chassis

PROFESSIONAL EXPERIENCE

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

Global leader in UAV technology | Developing drone solutions for Defence & Homeland Security, Surveying and Enterprises

- Designed plan of modular, disassemblable wind tunnel capable of variable controllable flow in a confined space
- Developed testing setup to collect data and analyze flow of tube axial fans and relation of fan-flow parameters
- Proposed further solutions to cut costs of system by over 30% and power consumption by over 50% of initial
- Conducted hardware procurement study, vendor shortlisting and prepared detailed Cost estimation of project
- Worked across multiple teams in different departments to finalize the technical and functional requirements
- Awarded Letter of Recommendation by Co-Founder and VP Engineering for work and performance delivered

Tata Projects | Executive Trainee   [Aug'23 – Oct'23]

Leading technology-led engineering, procurement, and construction (EPC) company in India under the Tata Group

- Contributed to build Noida International Airport, India's largest greenfield project, in control & execution verticals
- Completed month-long cross-department induction, gaining insights into management and corporate practices

TECHNICAL/SOFTWARE SKILLS

- Programming Languages   Python, C++
- Engineering Software   SolidWorks, Ansys, AutoCAD, MATLAB, Pyomo

ACADEMIC PROJECTS

Racing Driver Aggression Predictor | Course Project [Repository]   [Aug'22 – Dec'22]

Guided by : Prof. Gopal R. Patil, Dept. of Civil Engineering IIT Bombay

- Analyzed driving behavior of Go Kart drivers based on 82 unique data points generating probability distribution
- Defined and calculated driver aggression using statistical analysis, yielding model to predict driver performance
- Applied findings to Formula Student car energy usage calculation and received AA grade for results achieved

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

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

- Formulated an innovative home charging solution for electric vehicles, post comprehensive market research
- Conducted survey among diverse vehicle owners, revealing prevalent charger usage and installation challenges
- Developed strategic business model and outlined a retail strategy based on Mobility as a Service (MaaS)

Steel Pedestrian Bridge | Course Project   [Jan'22 – April'22]

Guided by : Prof. Siddhartha Ghosh, Dept. of Civil Engineering IIT Bombay

- Designed pedestrian bridge of span 28m, width 3.2m, height 14m with load 500kg/m^2 and wind speed 33m/s
- Modeled bridge structure in STAAD Pro, conducted load & stability analysis yielding a max 0.42 utilization ratio
- Documented results using detailed Structural Drawings on bridge geometry and connections in AutoCAD

VISSIM Traffic Junction Design | Course Project   [Jan'22 – April'22]

Guided by: Prof. Narendra R Velaga, Dept. of Civil Engineering IIT Bombay

- Developed a traffic volume model on PTV VISSIM software and identified congestion causes on Jogeshwari Vikhroli Link Road (JVLR), 6-laned road in Mumbai connecting Western Expressway to Eastern Expressway
- Designed an improved traffic signal cycle at IITB-JVLR 5-way junction increasing Level of Service
- Proposed flyover design at junction, improving Level of Service from E (Constraint Flow) to B (Smooth Flow)

RELEVANT COURSES UNDERTAKEN

- **Civil Eng. and Others:** Probability and Statistical Methods, Introduction to Renewable Energy Technologies, Transport Engineering I & II, Fundamentals of Urban Science, Fluid Mechanics
- **Mechanical Eng.:** Kinematics and Dynamics of Machines, Manufacturing Processes I & II, Thermodynamics, Solid Mechanics, Engineering Graphics and Drawing

EXTRA-CURRICULAR ACTIVITIES

Film Making [link]	o Winner Film Cup, Inter IIT Cultural Meet'22 at IIT Madras, leading cinematography of 2 films	[Jan'23]
	o Winner Best Editing as Director of Photography in IIT Bombay Music Video General Cup'22	[Feb'22]
	o Collaborated with Student Alumni Cell in ideation and production of IIT B Class Song 2023	
Sports	o 2 times Table Tennis U-14 Champion, District Level School Championship	['13, '14]
	o Gold Medalist in Table Tennis in Freshiesta, IIT Bombay Sports Freshmen Competition	['19]
	o 2 Gold, 2 Silver and 1 Bronze in Badminton, Table Tennis at different School Sport Meets	['11 - '16]
Communication Skills	o Anchor and Stage Manager at an annual event with audience of 6K+ and worth INR 2M+	[Dec'19]
	o Presenter at Fresher's Technical Orientation'21 and conducted open house QnA session	[Nov'21]
Others	o Volunteered as lab assistant in a rural school science fair by state education dept, Rajasthan	[Feb'18]