

Harsh Meel

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EDUCATION

Graduation, B. Tech.: Civil Engineering with Minor in Mechanical Engineering	2023
Indian Institute of Technology Bombay	8.21/10
Intermediate, Board of Secondary Education Rajasthan	2019
Rajat Vidyapeeth Sr. Sec. School, Sikar	93.80%
Matriculation, Council for the Indian School Certificate Examinations	2017
St. Mary's Sr. Sec. School Sikar	96.80%

KEY PROJECTS

Algorithms and Software for Mixed-Integer Quadratically Constrained Optimization [Nov'23 – Present]

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

- Collaborating in implementation, testing, and debugging phases of the MIQCO solver within the Minotaur open-source software framework, ensuring robustness and speed to solve medium and large-scale problems
- Demonstrating the usage of the solver through problem statements like Vehicle Charging Infrastructure etc.
- Utilizing Python and Julia programming languages extensively to leverage optimization softwares like Pyomo

Optimization of Electric Vehicle Charging Infrastructure | BTech Technical Project [Jan'23 – April'23]

Guided by: Prof. Tom V. Mathew

- Conducted comprehensive analysis and optimization of EV charging infrastructure along a highway corridor to address EV adoption and inadequate charging infrastructure in India, receiving a full (AA) grade for the work
- Conducted literature review, collaborating with industry experts, identifying gaps and relevant methodologies
- Developed corridor model integrating EV battery capacity, charger power and delay due to charging (service)
- Employed optimization techniques to determine most cost-effective charger placement and charging power
- Demonstrated significance of Level 3 DC fast charging infrastructure for greater EV adoption and level of service
- Validated that current EV battery sizes are sufficient for medium-length highway transportation in India

Overtake Assist System | Institute Technical Summer Project [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 test viability of the system to optimize via Machine Learning

SCHOLASTIC ACHIEVEMENTS

- Achieved All India 99.74 percentile in IIT Joint Entrance Examination - Main 2019, 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

[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, decreasing energy capacity of car by ~33% , reducing weight and increasing performance
- Engineered new battery assembly with initiative of parallel configuration of cells, reducing battery pack heating
- Initiated technical alliance with Exigo Recycling, reducing 640 kg eq. of annual CO₂ emissions in fabrication
- Led Battery subsystem at Formula Bharat'22, premiere Indian FS event with 41 teams from across the country
- 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]

- Assembled Battery (over 1000 parts) working in High Voltage environment with professional standards
- 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
- Collaborated with electrical team on setting up and testing of Battery Management System and Electronics
- Led 4-member team to prepare and conduct recruitment tests for 140+ new aspirants for engineering team
- 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 Noida International Airport Project construction through project control and execution vertical
- Completed month-long cross-department induction, gaining insights into management and corporate practices

TECHNICAL/SOFTWARE SKILLS

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

ACADEMIC PROJECTS

Racing Driver Aggression Predictor | Course Project

[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
- Received perfect grade (AA) for the quality of work done and final results obtained in the course project

Residential Vehicle Charging Entrepreneurial Venture | Course Project

[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/m² 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	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 GC'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 worth INR 2M+ and an audience of 6K+	[Dec'19]
	o Presenter at Fresher's Technical Orientation'21 and conducted open house QnA session	[Nov'21]
Others	o Volunteered as assistant in School Science Exhibition by Dept. of Education, Govt. of Raj	[Feb'18]