



Shaurya Agarwal
Bachelor of Technology
Mechanical Engineering Department
Indian Institute of Technology, Delhi

+91-8800915770
agarwalshaurya7@gmail.com
me1231038@iitd.ac.in

EDUCATION

Examination	University	Institute	Year	CPI / %
Graduation	IIT Delhi	Indian Institute of Technology Delhi	2027	8.71
Intermediate	CBSE	Shiv Nadar School, Noida	2023	97.8%
Matriculation	CBSE	Shiv Nadar School, Noida	2021	97%

SCHOLASTIC ACHIEVEMENTS

- **Formula Bharat:** Ranked **5th** in the EV category, demonstrating strong technical performance among all participating Indian teams (2025)
- **1-2-3-4 Discover & Learn:** Awarded a grant of **Rs 2,00,000** by Industrial Research & Development for Research and Development (2025)
- **Teaching Assistant:** Assisted students with solving, question development, & instruction for the **Thermodynamics** course (2026)
- **Bajaj Torq Competition:** Secured **3rd position** for developing a novel brake pedal design amongst all campus participants (2026)
- **Academic Merit Award:** Conferred with a monetary award for ranking in the **Top 7%** across all department students, 6th Sem (2026)

INTERNSHIPS

Isler Infra India Pvt. Ltd.

(May'26-Jul'26)

New Product Development Intern – Silent Chimney & Hybrid Cooktop

- **Benchmarked** commercial silent chimney architectures using experiments to guide product-level **design improvements**
- **Validated** noise reduction concepts through **simulations & experiments**, delivering a portfolio of solutions reducing **5–9dB** noise
- **Characterized** various technologies through experiments on **materials & heat distribution** to develop a hybrid architecture
- **Designed and manufactured** an integrated hybrid cooktop, applying **DFMA**, PCB integration and assembly-line scalability

PROJECTS

Algorithm Design & Implementation for Autonomous Vehicles

(Apr'26–Ongoing)

- Developed **OpenCV & CNN** models for lane detection & sign recognition using algorithms like **Canny Edge, HSV Preprocessing** etc
- Evaluated **EKF** state estimation & **MPC** algorithms to optimize vehicle kinematics and trajectory tracking dynamics
- Autonomous Driving Models: Examined **Behavioral Cloning CNNs** on **10,000+** frames to simulate end-to-end driving responses
- Analyzed **Autoware navigation architecture**, how it stacks to design autonomous perception pipelines for **mobile rovers**

EV Battery Systems & Mechanical Design — Axlr8r Formula Racing

(Dec'24–Nov'25)

- Executed cell **characterization & cycling tests** using capacity and internal resistance data to evaluate cell degradation dynamics
- **Designed** the Battery Segment & enclosure of over **2150 parts** on **SolidWorks** using DFMA principles ensuring rule compliance
- Optimized wire bonding parameters on **composite busbars**, for robust, low-resistance electrical joints, used **BMS** on stacks
- Integrated custom **BMS**, master-slave topology with passive cell balancing; researching for **additive manufacturing** technologies
- Manufactured & integrated the **400VDC, 200A, 7.8kWh** pack, driving a **17%** weight reduction & FOS > 1.3 in accidental cases

Physics-Informed Digital Twin for Battery Pack State Estimation

(Dec'25–Aug'26)

- Engineered a **Python digital twin** simulating cell degradation, State-of-Charge (SoC), and thermal limits under dynamic loads
- Applied recursive **noise filtering** on high-frequency telemetry data to seamlessly align simulation models with trial results
- Optimized Thermal Management, simulated pack **CHT** in **ANSYS Fluent** using vehicle track data, cutting cooling power by **38%**

- Formulated Physics Based **SPM** (Single Particle Model) in **Python** using 1D spherical diffusion **PDEs & Butler-Volmer kinetics**, validated by **PyBaMM**

CO2 Refrigeration & Thermal Energy Storage — Carrier Sponsored

(Dec'25–Ongoing)

- Developed an **EES** simulation of a transcritical **CO2** supermarket system integrated with ice-water Thermal Energy Storage (**TES**)
- Executing detailed thermal simulations for pillow-plate **HEX** sizing, design, and direct **PCM**-to-evaporator heat transfer dynamics
- Simulated dynamic TES behavior using real supermarket **load profiles** to achieve **peak-load shaving** & grid resiliency

Autonomous UAV Precision Landing Engine

(May'25–Jul'25)

- Engineered an **RL**-based landing engine using **PyTorch/Gymnasium** to simulate autonomous touchdowns under gravity constraints
- Trained **DQN** and **PPO** RL agents with dynamic reward functions, balancing landing accuracy against thruster fuel efficiency
- Benchmarked **RL policies** against baseline controllers across **20** seeded test environments, logging drift and fuel metrics

RAG Engine for Automatic Technical Specifications — Hackathon

(May'25–Jul'25)

- Built a local hybrid **RAG** pipeline using **LangChain, FAISS, & HuggingFace** across **500+** pages of dense engineering manuals
- Integrated **BM25 lexical search** with vector similarity to retrieve alphanumeric standard IDs, math formulas, & code blocks
- Optimized chunking (**500 tokens, 10% overlap**) and metadata filtering, driving retrieval latency under **200ms** with zero hallucination

ML-Driven Prediction of Transmission Loss by Acoustic Metamaterials

(Mar'26–Apr'26)

- Extracted **10,000+** simulation data points from **COMSOL** across 3 input features to model non-linear transmission loss
- Built **XGBoost** & Random Forest models with **10+** physics-informed features, achieving **R² score of 0.9993** & RMSE = 0.33dB
- Designed an inverse prediction pipeline mapping target attenuation to unit-cell geometries and frequency within **0.02dB** error

TECHNICAL SKILLS

Languages/Libraries: Python (NumPy, Pandas, Scikit-learn, PyTorch, OpenCV), C++, MATLAB, Matplotlib, Simulink

Softwares: Ansys, SolidWorks, COMSOL, SimScale, FluidSim, Excel

Quantitative Analytics: Machine Learning, Econometric Analysis, Time Series Forecasting

POSITIONS OF RESPONSIBILITY

Executive — Axlr8r Formula Racing

(Jan'24–Jan'25)

Spearheaded a 3-tier team of 4 coordinators, 10 executives & 50+ trainees

- **Senior Engineer** – Led designing, manufacturing and testing phase of the pack, along with HVDL, LV Battery, Charging Cart
- Drafted **SOPs, BOMs, EDR, CSMF, DFMEA** reports for clearing scrutiny, and took system level integration decisions
- Coordinated strategic **sponsorships** like Phrozen 3D, Formlabs, Accu getting support of SLA, FDM 3D printers, along with resins
- **Junior Engineer** – Guided **150+** freshers by conducting regular training workshops, recruitment quizzes & doubt-clearing sessions

Representative, Photography & Films Club

(Apr'24–Apr'25)

- Trained over **20** freshers in the club, taking workshops; organized competitions throughout the year with **70+** participants

EXTRA CURRICULAR ACTIVITIES

- **Top 10:** Formula Student East, Hungary (300+ global teams)
- **Represented** IITD at Formula Student, Coimbatore – Technical Inspections & Static Events, Formula Bharat 2025
- **2nd Runner-Up:** Inter Hostel Portfolio Making
- **2nd Runners-Up:** PFC Club Trophy
- **Media:** House Day (2022–2023)
- **CAIC Tech GC Participant:** Inter Hostel TechGC (2024–25)
- **Qualified:** Formula Student Germany & Czech
- **Showcased** racecar XLR25 to industry leaders, faculty, visitors & students at Tryst 2025, Industry Day & Open House
- **Runners-Up:** BRCA General Championship
- **Organising Committee:** IITD MUN – RendezvousX
- **Photography:** Department Farewell'24
- **International Quiz** Participant