



TUSHAR VERMA

Final Year Undergraduate
Department of Chemical Engineering
Indian Institute of Technology Kanpur

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EDUCATION

Year	Qualification	School/Institution	CPI/%
2022-Present	B.Tech	Indian Institute of Technology Kanpur	7.5/10
2022	CBSE XII	Satluj Public School, Sirsa, Haryana	93%
2020	CBSE X	Satluj Public School, Sirsa, Haryana	94%

SCHOLASTIC ACHIEVEMENTS

- Awarded the **Merit-cum-Means Scholarship** by IIT Kanpur annually since **2023**, given to the **top 1%** meritorious students.
- Secured **All India Rank 3985** in **JEE Main 2022** conducted by National Testing Agency, amongst **1.5M** appeared participants.
- Secured **All India Rank 7673** in **JEE Advanced 2022** conducted by IIT Bombay, amongst **0.5M** shortlisted candidates.
- Received **Silver Honor (Top 7%)** in the **International Youth Math Challenge 2020** among **6,500+** global participants.

RESEARCH EXPERIENCE

Undergraduate Researcher Dec'24 - Jun'25

Mentor: Prof. K.P. Rajeev | NETP Lab, IIT Kanpur

- Conducted **numerous** electrolysis experiments using **D₂O** and **PdCl₂** electrolyte to investigate **nuclear reaction** possibilities.
- Enhanced detection with **three innovative methods** (boron-coated CR-39, triple tracks, Gd- γ ray spectroscopy) to validate **neutron emissions** from the electrolytic cell.
- Recorded **neutron activity** exceeding **0.107 mCi**, with **neutron yield** amplified by **4x** using **0.25 T** magnetic fields.
- Engineered a **reliable and consistent nuclear track detector** using boron-coated CR-39, achieving a **115% efficiency gain**.

WORK EXPERIENCE

Product and Strategy Intern Aug'24 - May'25

HealthQuant Pvt. Ltd. | Startup, IIT Kanpur

- Contributed to **successful fundraising** exceeding **INR 20L** by preparing **investor pitch decks** and **market-facing materials** for stakeholder engagement.
- Collaborated with **co-founders** to refine **business strategy**, driving **investor outreach** for sustainable growth.
- Designed **UI prototypes** and **digital assets** that increased pre-launch **client engagement** by over **30%**, supporting strategy for upcoming **product launches**.
- Supported establishing **key strategic connections** with the **Ex-Head of Abbott India**, now serving as an **advisor** and on the **Cap Table**.

PUBLICATION

Neutron Emission During D₂O Electrolysis May'25

Ankit Kumar, **Tushar Verma**, Pankaj Jain, et al. | NETP Lab

DOI: [10.13140/RG.2.2.32604.50565](https://doi.org/10.13140/RG.2.2.32604.50565)  | Preprint

- Engineered and calibrated a custom **neutron detection system**, enhancing detection **efficiency** by **115%** and minimizing errors.
- Designed and executed **25+ experimental protocols** to investigate neutron emission under varied **electrolysis conditions**.
- Conducted **statistical analysis** on neutron data using **Origin** and **ImageJ**, correlating with microscopy to validate emissions.

KEY SKILLS

- Programming:** Python, R, SQL, Js, Dart, MATLAB, Git
- Libraries:** TensorFlow, Scikit-learn, Panda, NumPy, Matplotlib
- Technical:** Jupyter, Origin, MS Excel, Google Cloud Platform
- Detectors:** XPS, HPGe, CR-39, NaI detector, BF₃ detector

RELEVANT COURSES

- Nuclear Chemical Engineering
- Neutron Activation Analysis*
- Intro. to Radioactive Sources*
- Nuclear Reactor Physics*
- Manufacturing Energy Systems**
- Transport Phenomenon
- Thermodynamics
- Heat & Mass Transfer

KEY PROJECTS

Neutron Transport Modeling May'25 - Jun'25

Self Project | NETP Lab, IIT Kanpur

- Developed a **Monte Carlo simulation** from scratch in **MATLAB**, implementing **stochastic model** to simulate **neutron transport** and particle interactions within a moderating medium.
- Built a **data pipeline** to process and integrate **large-scale ENDF & JANIS** cross-section data, enabling a **quantitative comparison** of H₂O and D₂O moderator effectiveness.
- Calculated and visualized **spatial neutron flux** distributions for **4 source geometries**, graphically validating **statistically significant** differences in moderation properties of heavy water.
- Performed **rigorous statistical analysis** on simulated particle tracks to derive key reactor physics parameters, achieving **>98% model validation accuracy** against MCNP benchmark.

Visual Data Forecaster Aug'25 - ongoing

Self Project | Dashboard 

- Developed a dynamic and **interactive web application** using **vanilla JavaScript**, HTML5, and CSS3 to perform **time-series analysis** and **visualize predictive trends** for users.
- Implemented multiple **statistical forecasting models**, including **Linear Regression**, **Polynomial Regression**, and **Double Exponential Smoothing**, to ensure analytical versatility.
- Engineered an intuitive and **fully responsive user interface** with **Tailwind CSS**, featuring an interactive **data exploration dashboard** and charts rendered by **Chart.js**.
- Integrated advanced features for **automated model insights** and **statistical confidence interval** calculation.

Lexora: Legal Advice Platform Jun'25 - ongoing

Self Project | IIT Kanpur

- Developed **Lexora**, a **Flutter cross-platform** mobile platform for legal advice, featuring a **real-time community** feed and **E2E encrypted** chats to drive user interaction.
- Engineered the **Firestore** backend, integrating **Firestore** for the database, **Authentication** for security, and **Firestore Analytics** to capture and model user engagement metrics.
- Built the core community feed with an **upvote/downvote system** and **threaded replies**, enabling the **in-depth analysis of user behavior** and emerging content performance trends.

Machine Learning with Python Dec'23 - Jan'24

Chemineers Society | IIT Kanpur

- Built a **logistic regression model** from scratch, boosting **prediction accuracy** with careful **hyperparameter tuning**.
- Applied essential **machine learning** techniques, including **rigorous data preprocessing** and **L2 regularization**, for improved model performance and **robust predictive accuracy**.
- Applied **K-Nearest Neighbors (KNN)** and **decision trees** to **real-world datasets**, enhancing **classification skills**.

POSITIONS OF RESPONSIBILITY

Member, Finance Committee Aug'24 - Apr'25

- Elected by **75+** Senate panel to the **4-member Gymkhana F.C.**
- Managed an **INR 2Cr+** budget and revised financial policies, achieving a **50% reduction** in unnecessary expenditures.

*IAEA, **ongoing