Shivam Gupta

Major: Engineering & Computational Mechanics
Email: shivam3002@gmail
College: Indian Institute of Technology (IIT) Delhi | **Ph.No.**: +91 7503030314
GitHub: `https://github.com/revmag`

Year	Degree/Board	Institute	CPI/%
2024	B.Tech in Computational Mechanics	Indian Institute of Technology, Delhi	7.43
2020	CBSE	Aspam Scottish School, Noida	96.2%
2018	CBSE	Aspam Scottish School, Noida	94%

SCHOLASTIC ACHIEVEMENTS

- **Joint Entrance Examination (JEE) Mains, 2020:** Secured **99.11 percentile** among 1 Million participants.
- **Joint Entrance Examination (JEE) Advanced, 2020:** Secured **AIR 4127** among 200k participants.
- **National Science Concours (NSC):** Awarded **National Rank 1** among 10,000 participants all across India.
- **SOF International Maths Olympiad:** Secured **International Rank 62** among 500k participants worldwide.
- **INFER EA Forecasting Tournament: Global Rank 1** competing with Yale, Cambridge, Stanford groups in a team of 6
- **Regional Mathematics Olympiad(RMO):** Qualified for RMO from Uttar Pradesh region among 200k students all over India

WORK EXPERIENCE

- **Entrepreneur In Residence** | **Entrepreneur First, UK organisation** *(Aug, 2024 – Jan,2025)*
  - Among **50 fellows** selected all over India to explore entrepreneurship, working on wide ideas ranging from Ed-tech, agriculture, real state industry learning about **financial modeling, idea validation, business plan, customer discovery**
- **Mechanistic Interpretability Research Fellow** | **Impact Academy** *(June, 2024 – Aug,2024)*
  - Studied **residual stream** activations across layers and explored emergence of **dominant directions** using **refusal features** in **Gemma-2B and Meta LLaMa-7B Model**, using both base and instruction fine tuned models
- **Research Intern** | **National University of Singapore** *(May,2023 – July,2023)*
  - Employed **Reinforcement learning** to **optimize Traffic Control** by allowing communication between **CAVs** in a partially observable environment and decentralized setting; setting network for **V2I, V2V** using speed of vehicle, queue lengths
  - Worked on high level framework of **platoon formation**, deriving design of a physical model to define **state, action, reward**
  - Used **SUMO** to assign FVA same speed, acceleration, lane as LVA if same route, and form a platoon based on **FCFS**

PROJECTS

- **Transformers for NMT task for Eng-French** | *Prof. Souvik Chakraborty* *(Jan, 2024 – Feb,2024)*
  - Developed a PyTorch-based Transformer model from scratch with **8 attention heads** and **5 encoder and decoder layers**.
  - Achieved **40% accuracy** on Eng-French translation task after training for **100 epochs**.
- **Probabilistic ML Model for Hyperelasticity Modeling** | *Prof. Rajdip Nayek* *(June,2023 – Dec,2023)*
  - Implemented **Bayesian Variational Learning** algorithm with sparsity-promoting **spike-slab priors** (to reduce computation) to obtain the best-fitting hyperelasticity model from force & displacement data (generated artificially) using **Gibbs Sampling**
- **Video Vision Transformers(ViVIT) for Biomedical Classification** | *Prof. Souvik Chakraborty* *(Jan,2024 – April,2024)*
  - Implemented **Pytorch version of ViVIT** to classify MedMNIST dataset, sampling 3D frames using **Tubelet Embedding Sampling method**, dissecting video into spatial and temporal tokens, and inputting this as embedding to Transformer
- **RUL Estimation using Machine Learning** | *Prof. Rajdip Nayak* *(Jan,2023–Apr,2023)*
  - Implemented Linear **Regression, Random Forest, Logistic Regression, KNN, and SVC** to find Remaining Useful Life (RUL) in NASA's C-MAPSS turbofan simulator dataset.
- **Data Structure and Algorithms** | *Prof. Parag Singla* *(Jan,2022–Mar,2022)*
  - Built a **unique Tree Data Structure** in which each Node contains attributes of both an AVL Tree and a General Tree.
  - Employed AVL logic to achieve **O(*log n*)** search complexity, and implemented **insert & delete** via General Tree approach.
- **Infinity Hyperloop** | *Prof. Amit Kumar Jain* *(May, 2022 – Jan,2023)*
  - Worked on design & material of the hyperloop pod, performed **FEA analysis** and validation of the chassis using **Ansys**
  - Conducted Literature survey on **composites** for the shell and monocoque chassis, **design matrix** to select the material
  - Coordinated with other departments like **Suspension, Aerodynamics, Brakes and Propulsion** for dimensions and force

TECHNICAL SKILLS

- **Programming & Scripting Languages**: C, C++, Python, HTML, CSS, Javascript, Solidity, Java, SQL, TraCI, Langchain, AWS, Docker, React, Node.js, Express.js, MongoDB, REST, Fastapi, Pytorch, Tensorflow
- **Tools & Software**: MATLAB, Solidworks, FreeCad, LATEX, Ansys, OpenFoam, SUMO, Google Earth Engine, SAM, ViViT

Shivam Gupta

Engineering & Computational Mechanics

shivam3002@gmail

Indian Institute of Technology Delhi | +91 7503030314

GitHub: `https://github.com/revmag`

COURSES DONE

Intro. to Electrical Engg., Intro. to Computer Science, Linear Algebra & Diffe. Equa., Electromagnetic Waves & Quantum Mechanics, Introduction to Chemistry, Calculus, Engineering Mechanics, Engg. Visualization & Communication, Language & Writing Skills, Microeconomics, Applied Mathematics for Engineers, Fluid Mechanics, Introduction to Materials Science and Engineering, Solid Mechanics, Digital Electronics, Macro Economics, Numerical Methods & Computation, Data Structures & Algorithms, Engineering Thermodynamics, Experimental Methods, Product Realization Through Manufacturing, Selected Topics in Economics, Basics of Computer-Aided Design, Biomechanics, Dynamics of Mechanical Systems, Basics of Product Design, Computational Neuroscience, Introduction to Computational Fluid Dynamics, Introduction to Finite Element Method, Smart Materials & Structures, Advanced Mechanics of Solids, Introduction to Soft Robotics, Machine Learning in Mechanics, Control Theory & Applications.

EXTRA CURRICULAR ACTIVITIES

- **EAGx Singapore** - Attended a fully funded conference in **Singapore** on wide topics like AI safety, Global warming, biorisk
- **GCP, London:** Selected among **30 students worldwide** to attend an AI safety & biorisk workshop in Oxford, UK.
- **IITD Quizzing League** - Silver Medal, IITD Quizzing League (July, 2021 - May, 2022)
- **Bronze Medal** (Quizzing Club League), IITD Quizzing League Leaderboard (October, 2020 - June, 2021)
- **Las Me(la)ninas: MELA League Quiz** - Third, Las Me(la)ninas: MELA League Quiz (July, 2021 - May, 2022)
- **Tea and Busquets: Sports League Quiz** - Second, Tea and Busquets: Sports League Quiz (July, 2021 - May, 2022)
- **Winner**, 36 Blocks Interhostel General Quiz (June, 2022 - May, 2023)
- **Research Coordinator, Blockchain Society, IIT Delhi:** Co-founded IITD's first blockchain society, conducted events in collaboration with Solana, Ethereum and participated in **ETHIndia Hackathon**, making a decentralized streaming site
- **AI Governance hackathon by Columbia EA Institute and Roosevelt Institute:**
  Among Top 5 across teams worldwide; presented a brief **policy memo on AI governance** and effective policy research.
- **Junior Editor, Tech Ambit:** Curated articles for the pan-IIT tech magazine (interviewed BotLab Dynamics).
- **AINA (An Initiative for National Advancement):** Designed curriculum and visited slums to teach underprivileged students.
- **Debating Society, IITD:** Qualified for **Top 32** among 600 participants in *Stalwarts*, IITD's annual Fresher's debating event

POSITIONS OF RESPONSIBILITY

- **Technical Engineer**, Infinity Hyperloop, CAIC (June, 2022 - May, 2023)
- **Research Coordinator**, BlocSoc, CAIC (June, 2022 - May, 2023)