

Zehaan Naik

✉ zehaan22@iitk.ac.in ☎ +91-8738-983-469 🔗 My Webpage in zehaannaik 🌐 Zehaan22

Education

BS	Indian Institute of Technology Kanpur , Statistics and Data Science	2022 – 2026
	<ul style="list-style-type: none"> • Awards: Academic Excellence Award (2022 & 2023) • Honors Track Student • Minor: Machine Learning and Applications 	CPI: 9.0/10
Grade XII	Delhi Public School, Surat	Score: 97.6% 2022
Grade X	Delhi Public School, Surat	Score: 98.4% 2020

Scholarships

Nalanda Merit Scholarship 2020: Fee waiver worth **INR 3,00,000** for securing 98.4% marks in AISSE
BYJU's Merit Scholarship 2020: Fee waiver worth **INR 1,50,000** for excellent academic performance

Work Experience

Boston Consulting Group, Associate Intern | 📍 Mumbai - Gandhinagar May'25 – Jul'25
 Received a pre-placement offer (**PPO**) to join as a full-time associate in the Mumbai office

- Partnered with **Gujarat Administrative Reforms Commission** as knowledge partners for policy modernisation
- **Benchmarked global best practices** (Estonia, Singapore, UK) to design strategic digital governance interventions
- Analyzed utilization across **1400+** PHCs to **optimize healthcare service** coverage and streamline delivery statewide
- Re-imagined **5+ best-in-class workflows** to enable **data-driven governance**, improve accountability and impact
- Implemented e-governance policy, impacting **60M+** citizens through enhanced digital access and service efficiency

IIM Bangalore, Research Intern | Prof. Sharkarsan Basu | [LOR](#) May'24 – Jul'24
 Got research featured in the **Research Symposium on Finance and Economics 2024** by IFMR

- **Optimized lending strategies** & establish equity trends for public and private sector banks in economic crises
- Analyzed public and private lending data for over **100,000** firms and top **50** banks to train a **predictive model**
- Validated the state double-engine government hypothesis on economic growth through **discriminant analysis**
- Analyzed **dividend stickiness** by analyzing agency cost issues with large shareholders and corporate governance
- Analyzed executive structures of **17,000** firms to assess their impact on **company growth & dividend stickiness**

Completed Projects

SWAP Regression | Prof. Sharmishtha Mitra | IIT Kanpur | [//SWAP-Regression](#) Aug'23 – Sep'25
 Advancing towards **publication** in collaboration with Prof. Mosuk Chow, Dept. of Statistics, Penn State University

- Developed an EM based **Label-imputation mechanism** to predict response – predictor roles for SWAP regression
- Implemented a **weighted LAD M-step** (L_1 loss) with **MAD-based scale updates** for a stable fit robust to outliers
- Validated the approach on **USD/INR – SENSEX** data outperforming standard model with **81.6%** reduction in RMSE
- Auto-imputed alternating **causality regimes** that align with established **empirical findings and economic theory**

PHASR | Prof. Indranil Saha | ERA | IIT Kanpur | [//ERA](#) Sep'23 – Apr'24
First Indian team to qualify for the RoboCup MSL Challenge out of **100+** international applicants

- Designed & developed robots capable of **autonomously** playing football using real-time vision and swarm robotics
- Worked in a **2-tier** team with **13** members to implement electronic and mechanical design for the swarm of robots
- Developed subsystems such as **solenoid based kicking mechanism** and **automated ball handling mechanism**
- Indigenously designed and manufactured the chassis for a prototype robot capable of agile movements at **4m/s**

Tempered Hamiltonian Monte Carlo (THMC) | Prof. Dootika Vats | IIT Kanpur

Jan'25 - May'25

- Designed a **novel variant of HMC** to enhance sampling efficiency in complex **multi-modal distributions**
- Incorporated **adaptive tempering** into leapfrog integrators, **improving mode traversal** over high energy barriers
- **Proved theoretical guarantees** of reversibility and volume preservation under the proposed THMC dynamics
- Achieved **superior sampling coverage** across 20-mode targets and Neal's Funnel, **outperforming standard HMC**

The Knight and Bishop Algorithm | Research Project

Jan'25 - May'25

- Developed a **hyperparameter tuning scheme** for Magnetic HMC using dual averaging and recursive exploration
- Proved the **invariance and ergodicity** of the Magnetic HMC kernel, necessary for a valid MCMC sampler
- Identified **critical gradient-based failure modes** by benchmarking the algorithm on complex multi-modal targets

No U-Turn Sampler | Prof. Dootika Vats | IIT Kanpur

Jul'24 - Nov'24

- Built a solid foundation in advanced MCMC and implemented the **No-U-Turn Sampler (NUTS)** from first principles
- Mastered the recursive algorithm for **adaptive path-length construction** for hyper-parameter tuning
- Validated the sampler by **replicating experiments** on complex targets, confirming its efficiency over HMC

Ongoing Projects

Barker's DP-SGD | Prof. Dootika Vats | IIT Kanpur

July'25 - Present

- Developed a **differentially private SGD variant** using a Barker's proposal-inspired robust gradient scaling
- **Improved utility-privacy tradeoffs** in model training, achieving faster convergence on similar privacy guarantees

Coordinate Descent for LAD Estimation | Prof. Debasis Kundu | IIT Kanpur

Aug'25 - Present

- Developed a novel **coordinate-wise descent strategy** to compute **LAD estimates** for linear regression parameters
- Demonstrated stability in **high-dimensional regimes** ($p > n$) and performed on-par with simplex-based solvers

Technical Skills

Languages: R, C, C++, Python, \LaTeX , MATLAB, HTML, JavaScript, CSS, SQL

Technologies: Bloomberg Terminal, Fusion360, Gazebo, SKLearn, Matplotlib, Quarto, RShiny, PyTorch, TensorFlow

Relevant Course Work

★★: Outstanding Performance | ★: Excellent Performance

Machine Learning & Algorithms	Applied Statistics	Theoretical Courses
Data Structure and Algorithms Fundamentals of Computing ★★ Introduction to Machine Learning ★ Probabilistic Machine Learning Techniques in AI & Data Mining ★ Markov Chain Monte Carlo ★	Data Science Labs ★ Computational Statistics ★ Time Series Analysis Linear Regression and Anova Multivariate Analysis Bayesian Analysis	Linear Estimations and Modeling ★ Applied Stochastic Processes ★ Theory of Statistics ★ Real Analysis Complex Variables Language and Society ★★

Positions of Responsibility

Coordinator, Debating Society | Media and Culture Council, IIT Kanpur

Apr'24 - Apr'25

- Led a 3-tier team of **40+** students; training for competitive **national and international** debate tournaments
- Convened the **first edition** of IITKAPD with **300+** participants from **6** countries making **INR 50,000** in profit

Editor, Vox Populi | Writing and Investigative Journalism

Apr'24 - Apr'25

- Led a **3-tier** team of **40+** Core Group Members & **20+** Asst. Editors working on reports, infographics & videos
- Conducted IIT Kanpur's first journalism conclave, **Fleet Street**, with a footfall of over **1,000** participants