

Pursuing a **Dual Minor** Degree in **Artificial Intelligence and Data Science & Computer Science Engineering**

SCHOLASTIC ACHIEVEMENTS

- Achieved **Department Rank 3** out of **120+** students enrolled in Electrical Engineering B-Tech programme ('24)
- Received **Institute Award For Academic Excellence** for securing **Institute Rank 21** at IIT Bombay ('23)
- Secured **All India Rank 363** among **155,000** students in the **Joint Entrance Examination Advanced** ('22)
- Secured **All India Rank 961** out of **1 million** candidates in the **Joint Entrance Examination Main** ('22)
- Awarded **Academic Proficiency (AP)** Grade in the courses **Analog Circuits** and **Power Engineering-I** ('24)
- Represented IIT Bombay twice in **Mimamsa** olympiad conducted by IISER Pune standing **1st** of **1600** teams ('24)

RESEARCH EXPERIENCE

University Research Intern | *TU Braunschweig, Germany*

May- Jul '24

A 2-month **on-site** internship under Prof. Dr.-Ing Vadim Issakov in the field of **CMOS IC design**

- Achieved a loss reduction of **-90dB** in a 3-way **RF Power Splitter** using statistical methods and simulations
- Enhanced the existing circuit designs by reviewing research papers and preparing comprehensive documentation
- Utilized software like **MATLAB** for advanced circuit analysis & simplification, using transfer function analysis
- Created the schematic & layout for a Phase Shifter IC used in a **40GHz Frequency Multiplier**, & designed a **22nm CMOS IC** with **CadenceXL**, achieving higher than **67%** size-efficiency over the commercial standards.

Research Intern | *IIT Bombay*

Dec-Jan '23

Prof. Maryam Baghini, *Embedded Systems Lab*

- Developed an impedance analyzer with an Op-Amp-based **trans-impedance amplifier** & a **peak-valley detector**
- Analyzed data collected from **wearable sensors** during running & walking, identifying key trends & patterns
- Categorized & processed data of **50** people, creating **reports** and **visualizations** highlighting activity trends

KEY PROJECTS

Modern Portfolio Theory (MPT) Implementation | *FinSearch*

Jul '24

Finance Club, IIT Bombay

- Applied MPT with **NumPy** and **Pandas** to enhance the portfolio, achieving a **15%** increase in expected returns
- Utilized **Plotly** & **SciPy** to model **Efficient Frontiers** & implemented **diversification** optimizing asset allocation
- Analyzed risk-return trade-offs with **variance-covariance**, improving other metrics and the **Sharpe Ratio** by **20%**
- Developed a robust quantitative framework to address data anomalies & **outliers**, integrating **Monte Carlo simulations** to stress-test **portfolio resilience** under varying market conditions including economic downturns

Genetic Algorithms for Portfolio Optimization | *Winter in Data Science*

Dec '23 - Jan '24

Web and Coding Club, WnCC, IIT Bombay

- Designed and implemented a genetic algorithm to optimize a portfolio consisting of m stocks selected from a pool of n candidates, using financial ratios such as **P/E**, **P/B**, and **ROI** to evaluate the stock performance & returns
- Incorporated advanced genetic operators-**mutations** & **crossovers**, to refine the **stock selection** & diversity
- Achieved **25% improvement** in portfolio performance, leveraging **backtesting** to validate strategy effectiveness

Quantum Computing For Flight Schedule Optimization | *Inter IIT Tech Meet 12.0* Dec '23

Mphasis Foundation

- Surveyed literature to formulate the cost function & applied quantum algorithms, including **Quantum Annealing** and **Quantum Ant Colony Optimization** to minimize airline losses from flight rescheduling & cancellations
- Formulated a **Quadratic Unconstrained Binary Optimization(QUBO)** problem to incorporate all constraints
- Utilized **D-Wave APIs** & **IBM's Qiskit** to address the optimization, using a Constrained Quadratic Model
- Created an **API** allowing passengers to choose any option they prefer, via a **Gmail-based** option selection system

- Developed an **LSTM neural network** in **PyTorch** for binary classification and sentiment analysis of film reviews
- Utilized Python libraries like **Scikit-learn**, & **NLTK** for text preprocessing and implementing word embeddings
- Implemented **RNN** layers, like **Sigmoid**, **LSTM**, & **Dropout**, and optimized the model with Gradient Descent

COMPETITIONS

International Quant Championship(IQC) | *WorldQuant*

Jan '24-ongoing

A challenge to build alphas using historical market data and defined operators, simulating equity positions.

- Engineered over **15 alpha factors** through **statistical arbitrage** & **mean reversion**, boosting the Sharpe Ratio by **20%** & capitalizing on market inefficiencies like **price momentum**, liquidity imbalances, & market sentiment
- Attained **Gold** level with a score of **23,000** securing an international rank of **568** among **47,000+** participants
- Leveraged **machine learning** to enhance predictive accuracy and reduce **out-of-sample error** rates by **25%**

COURSES UNDERTAKEN

Time Series and Financial Derivatives Analysis | *Summer Of Quant IIT Bombay*

Jul '24

- Explored and implemented time series models including **ARIMA**, **GARCH**, **RNN**, and **Exponential Smoothing**
- Analyzed statistical properties and relationships using **ACF**, **PACF**, **Granger Causality**, and **VARMA**; applied probability models such as **GBM**, **Martingales**, and **Markov Chains** for portfolio optimization and asset pricing
- Implemented financial models and options pricing methods including **Black-Scholes** and **Monte Carlo** in Python
- Conducted risk assessment for financial instruments including **Options**, **ZCBs**, and **Interest Rate Models**

Markov Chains And Queuing Systems | *Prof. Prasanna Chaporkar, IIT Bombay*

Jan-May '24

- Reviewed foundational probability concepts, including laws of large numbers & the **Central Limit Theorem**
- Studied **Renewal & Poisson processes**, including **Wald's** & **Blackwell's theorem** for stochastic processes
- Analyzed **Discrete** & **Continuous-time** Markov Chains including Q-matrix formulation and birth-death processes
- Applied queueing theory fundamentals- **Little's theorem** and **Markovian** queue models, to real-world systems

POSITIONS OF RESPONSIBILITY

Joint Secretary | *Electrical Engineering Students' Association*

May '23-Apr '24

- Oversaw the handling and distribution of **700+** department merch worth **INR 900K** and streamlined registration for 250+ students, culminating in receiving an **Organizational Color** Award for outstanding contribution
- Led & organized a variety of high-impact events, including the **G20 Youth Summit workshop** with 20 college principals & the **Freshers' Party** for **150+** students, managing an overall budget of **INR 55k** efficiently
- Coordinated **Impulse**, the department fest with a budget of **INR 380K**, managing the logistics and execution

Teaching Assistant | *MA110: Linear Algebra And Differential Equations*

Jan-May '24

Instructor: Prof. Ananthnarayan Hariharan, Department Of Mathematics, IIT Bombay

- Held weekly problem-solving sessions for **35+** students, helping them understand difficult concepts & problems
- Developed and delivered **supplementary materials** and assisted in the **grading** and **feedback** of the quizzes

Department Academic Mentor | *Electrical Engineering, IIT Bombay*

Jul '24- ongoing

Part of a 50+ member team to help with the onboarding process for new sophomores

- Selected from a pool of **176** candidates to guide upcoming sophomores based on a comprehensive interview process
- Providing mentorship & guidance to **12 sophomore students**, assisting them in making informed decisions regarding their academic pursuits & extracurricular activities & helping them in navigating their curriculum

STARTUP EXPERIENCE

Teenage Dreams Pvt. Ltd. | *Founder and Director*

'23-ongoing

Youth-Centric Real-Estate Advisory Empowering Early Financial Success

- Launched the first venture, **5QUARE**, providing real estate advisory to young adults in the age group of 20-30
- Headed a team of **10+** aligned people and provided clients with customized investment strategies in real estate
- Educating youth on health, wellness, & financial literacy, promoting early prosperity & holistic development

EXTRACURRICULAR ACTIVITIES

- Represented IITB at the Inter-IIT Tech Meet, Madras, and secured an overall position of **3** among **21 IITs** ('23)
- Recipient of the Kishore Vaigyanik Protsahan Yojana (**KVPY**) fellowship with an **All India Rank 1035** ('22)
- Conducted a **Ground Station Workshop** for **100+** people from all over Maharashtra with speaker sessions('24)
- Among the **top 5** of 900+ freshmen in the Mr. Fresher competition organized by StyleUp, IIT Bombay ('24)
- Conducted a **Tutorial Session** for Analog, Digital Electronics, & Power Systems for a total of **100+** freshers('23)
- Involved with the Logic Centre And Community Welfare Association (**LCCWA**), an NGO based in Mumbai('23)