Roshan Surabhi

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EDUCATION

The University of Chicago — **Chicago, IL**
Master of Science in Financial Mathematics — **Expected December 2025**

- Courses: Probability & Stochastic Processes, Stochastic Calculus, Portfolio Theory & Risk Management, Option Pricing, Options: Numerical Methods, Fixed Income, Fixed Income Derivatives, Foreign Exchange, Market Design (Eric Budish), Advanced C++, Python, Blockchain and Cryptoassets for Finance, Algorithmic Game Theory

Birla Institute of Technology and Science, Pilani, Hyderabad Campus — **India**
BE in Electrical and Communication Engineering — **July 2022**

- Courses: Data Structures and Algorithms, Computer Architecture, Econometric Methods, Time Series Analysis, Financial Risk Analytics and Management, Business Analysis & Valuation, Game Theory, Behavioral Economics

WORK EXPERIENCE

NHBT Securities Private Limited
Quantitative Researcher — **June 2023 - June 2024**

- Researched predictive signals for liquidity provision and taking strategies in NSE equities and futures using options-derived features, delivering up to a 10% improvement in alpha (bps) over existing models during live trading.
- Extracted and engineered features from options data using option pricing models. Built real-time regression models in C++ and R to support the fair value prediction for live trading.
- Enhanced a web-based platform for monitoring live strategy performance and risk management, integrating Golang, Flask, RabbitMQ, Socket.IO, and gRPC for real-time data processing and visualization.

IRage Broking Services LLP
Quantitative Analyst, Option Market Making Trader — **January 2023 - May 2023**

- Executed options market-making strategies across multiple underlying's on NSE and MCX using a proprietary trading system. Conducted analysis of adverse selection in the desk trades to optimize execution quality.
- Managed multiple portfolios' performance and risk by manually adjusting volatility curves based on market conditions and risk-reward assessments.

Acqueon Technologies
Software Engineer, Engineering Department — **July 2022 - January 2023**

- Collaborated with cross-functional teams to migrate the company's core product tech stack from AngularJS to ReactJS, modernizing the user interface and enhancing overall application performance.

Nomura Services India
Intern, Fintech Division — **January 2022 - June 2022**

- Researched and produced reports on decentralized finance (DeFi), exploring innovative use cases and emerging trends across protocols. This included analysis of lending platforms, decentralized exchanges, stablecoin mechanisms, and Metaverse Initiatives.

PROJECTS

Advanced C++, CEX Trading System — **September 2024**

- Built a high-performance, low-latency system to process real-time order book updates from Binance, OKX, and Bybit using WebSocket APIs, implementing an epoll-based architecture with Boost Asio, Beast, and IPC.
- Designed a WebSocket-based order management system for order execution, state tracking, and real-time feedback, using a templated callback architecture to handle high-frequency market and order updates efficiently.
- Applied regression analysis to order flow imbalances across exchanges to estimate fair value and detect cross-exchange pricing inefficiencies.

Market Design, Defi Paper — **September 2024**

- Researched intent-based market design frameworks, a literature review of Andrea Canidio's academic work and protocol whitepapers from CowSwap, 1inch, and UniswapX, auction design in traditional and decentralized financial market structures.
- Reviewed auction theory and financial market structure, explored MEV mitigation and transaction fee designs, Proposer-Builder Separation (PBS), batch auctions, and PFOF
- Studied LP payoff structures through options theory, analyzing the short-covered options analogy of AMM LP positions and delta-hedged rebalancing strategies to earn fees while neutralizing market risk (LVR); reviewed Panoptic's approach to enabling DeFi-native options on top of liquidity positions.

Options Volatility Trading Dashboard NSE — **August 2024**

- Built analytical dashboards, including Real Vol vs. Implied Vol comparison, term structure visualization, volatility cone, skew analysis, Vol Scanner, and fitted volatility curves, to analyze option pricing anomalies and identify trading opportunities.
- Implemented a Pairs IV Scanner and Relative Term Structure tool to compare volatility across multiple assets, systematically analyzing IV ratios, forward IV spreads, and historical skew trends.

SKILLS

Computing: C++, R, Python, Golang, JavaScript, React.js, Node.js, ELK Stack, Flask, RabbitMQ, Linux
Certifications: Introduction to Financial Engineering and Risk Management, Term-Structure and Credit Derivatives, Optimization Methods in Asset Management, Advanced Topics in Derivative Pricing, Neural Networks and Deep Learning, Improving Deep Neural Networks: Hyperparameter Tuning Regularization, and Optimization (in Coursera); Bloomberg Market Concepts