Rajit Datta

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Summary

Quantitative Researcher with industry experience in global equity long-short research, NSE options trading, and rates derivatives model validation at WorldQuant, AlphaGrep, and Goldman Sachs — including live NSE options strategies with AUM of 20Cr INR and Sharpe up to 3.8. Ph.D. in theoretical computer science (9+ papers in top-tier venues including STOC and ITCS, including solving a 10-year-old open problem posed by a Gödel Prize winner). Proficient in Python and C++, with hands-on experience building alpha signals, factor models, and backtesting systems.

Work Experience

WorldQuant Research

Mumbai, Maharashtra, India

Quantitative Researcher — *Sept 2025 - Sept 2026*

Long-Short equities portfolio research covering multiple geographies.

- Built and deployed 200+ alpha signals from fundamental datasets — sales, earnings, institutional flow — across global equity markets, achieving Sharpe > 1.
- Applied Barra multi-factor risk models to control for style/industry exposures and isolate idiosyncratic alpha in the long-short book.
- Engineered mid-frequency trading (MFT) signals from aggregated limit-order-book data.

Independent Research

Quantitative Researcher — *Aug 2026 - present*

Market-neutral, multi-alpha NSE single-stock futures strategy research in Python.

- Researched and built a dollar-neutral, daily-rebalanced portfolio of ∼180 NSE stock futures blending uncorrelated alpha signals; net Sharpe 2.6 after costs (2019–2026 backtest), every year positive, beta to Nifty ≈ 0.
- Built a cost-realistic execution simulator — whole-lot sizing, rollover costs, point-in-time transaction cost schedule — using a square-root market-impact model calibrated to NSE's data.
- Built a framework to source data and construct a point-in-time database for quant research.

Nifty options strategy research in Python.

- Created end-to-end framework for backtesting intraday options strategies on 1 minute bars.
- Onboarded historical data starting 2021 from external sources.
- Created efficient signals and backtesting framework for quick research cycles (4-year backtest runs in 15 minutes on a standard 4-core, 16GB RAM machine).
- Ideated and constructed 30+ new features. Created a research pipeline to test them systematically.
- Created a strategy with Sharpe 2.8, Calmar 4.6 (over backtest period 2022-01-01 to 2026-06-16).

AlphaGrep Securities

Bengaluru, Karnataka, India

Served Non-Compete — *Sept 2024 - Sept 2025*

- Mentored students from my alma mater as part of LogicLabs. Gave lectures on quant finance topics and prepared them for interviews. Guided them through the application process and helped them get jobs.
- Read the book Active Portfolio Management by Grinold and Kahn and implemented the techniques in Python.

AlphaGrep Securities

Bengaluru, Karnataka, India

Quantitative Research and Trading — *Apr 2023 - Sept 2024*

Trading mid-frequency strategies in India NSE F&O. Co-managed a long-short equities portfolio (NSE Futures) as part of a five member team. Independently developed strategies on NSE index options, deployed and trading with AUM of 20Cr INR (∼ 2.5M $).

- Independently developed two NSE Index option strategies with Annual Sharpes 2.5, 3.8 and Calmar 3.2, 7.6.
- Improved risk management for options, reducing shock risk from 60% of margin to 40% of margin.
- Improved existing alphas and contributed 3 new technical alphas to the long-short portfolio, each having Annual Sharpe > 1.5.
- Performed post-market analysis and risk reporting tasks for the long-short portfolio.
- Briefly explored limit-order-book data for short-horizon signal ideas — early-stage investigation.

Goldman Sachs Group, Inc. *Bengaluru, Karnataka, India*

Vice President, Model Risk Management *Aug 2021 - Feb 2023*

Worked on pricing models for interest rate products — cancellable swaps, range accrual features, options on average rates — using stochastic calculus techniques including American Monte Carlo and Whaley's approximation. Validated the following models:

- Model for difference of swap rates (eg: 30yUSD - 5yUSD) using diffusion of Ornstein-Uhlenbeck processes; validated a new model for pricing Caplets on daily compounding Risk Free Rates, a generalization of SABR with a decay function for the compounding period's decaying volatility.
- Models for pricing Caplets on average of Risk Free Rates and Bond Future Options, each with an independent benchmark model (Hull-White / SABR-like diffusion).
- Market making model for treasury future options (American premium via Whaley's approximation), and a CCAR PPNR Credit Flow model based on regression over macroeconomic factors.

Education

Ph.D. in Computer Science *Chennai, Tamil Nadu, India*

Chennai Mathematical Institute *Aug 2016 - July 2021*

- Advisors: Partha Mukhopadhyay (C.M.I.), V. Arvind (IMSc.)
- **Solved a 10 year old open problem posed by a Gödel prize winner [FSTTCS'19].**

M.Sc. in Computer Science (CGPA: 9.06/10) *Chennai, Tamil Nadu, India*

Chennai Mathematical Institute *Aug 2014 - July 2016*

- Courses: Complexity Theory, Approximation Algorithms, Optimization Techniques, Stochastic Processes.

B.Sc. (Hons.) in Math and Comp. Sc. (CGPA: 7.17/10) *Chennai, Tamil Nadu, India*

Chennai Mathematical Institute *Aug 2011 - July 2014*

- Courses: Algebra, Calculus, Probability Theory, Algorithm Design, Measure Theory, Machine Learning.

Class 9th – 12th (Avg: 82.4% / 88%) *Barrackpore, West Bengal, India*

St. Augustine's Day School, Barrackpore *May 2007 - April 2011*

Skills

Probability & Statistics	Martingales, Markov Chains, Monte Carlo, Time Series Analysis
Programming	Python (Numpy, Scipy, Pandas, Scikit-learn, Selenium), C++, SQL, Git, Linux, Bash
Machine Learning	Regression, Classification, Feature Engineering
Quantitative Finance	Factor Models, Backtesting, Risk Management, Portfolio Construction
Stochastic Calculus	Brownian Motion, Ito's Lemma, Black-Scholes Formula
Algorithms	Graph Algorithms, Dynamic Programming, Newton Raphson

Awards and Contests

Regional Mathematics Olympiad *ISI Kolkata, India*

NBHM's national olympiad pipeline — qualified RMO (1 of ∼1,000 from 25,000) and sat INMO *2010*

International Collegiate Programming Contest (ACM-ICPC) *IIT Kharagpur, India*

Asia Regional Finals — from 29,826 contestants, 2,322 universities, 91 countries (2013) *2013*

TCS Research Scholarship *Tata Consultancy Services, India*

1 of 40 scholars selected nationally each year, from India's premier institutes *2017*

Invited Talks

Highlights of Logic, Automata and Games *Held Online*

Title: Multiplicity Equivalence Testing over Partially Commutative Domains *Sept 2020*

Dartmouth Theory Group *Dartmouth College, New Hampshire*

Oct 2020 & May 2021

- Title: Fast Exact Algorithms Using Hadamard Product of Polynomials
- Title: Lower Bounds for Monotone Arithmetic Circuits Via Communication Complexity

Research and Publications

My research is focused in Arithmetic Circuit Complexity (theoretical computer science). I have published 9 papers in conferences ranked A and A* (as ranked by C.O.R.E.); full list tracked here.