Zain Mughal

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London | Portfolio | LinkedIn: */mughalzain*

Education

Imperial College London – *Physics MSci* **Oct 2022 - Jun 2026**

- Predicted First Class Honours.
- Comprehensive study of Differential Equations, Probability Analysis and Distributions, Monte Carlo methods, Regression Analysis, Multivariate Statistical methods, Data Science and Machine Learning.
- Business School electives: Accounting & Finance and Business Economics.

Bishopshalt School **Sep 2020 - Aug 2022**

- Achieved 3 A*s at A-levels in Maths, Physics, and Computer Science.

Professional Experience

Allasso – *Quant Analyst Intern* **Apr 2024 - Present**

- Designed and deployed a production-grade options analytics pipeline leveraging classical time-series, machine-learning, and deep-learning techniques to identify and forecast seasonal and cyclical trends in volume and open interest across the options surface, achieving $\sim$60 % trend-detection accuracy and driving actionable trading insights.
- Collaborated with a 5-person cross-functional team to integrate Python (Polars, REST APIs) modules into Docker-based CI/CD production pipelines, delivering analytics to senior quants, traders, risk teams, and large banking clients.
- Projected a 5% uplift in client engagement via actionable trend-adjusted signals, enhancing tradeability and extending the firm's options analytics suite offering.

Queens Tower Capital – *Equity Research Analyst (TMT)* **Oct 2024 - Present**

- Conducting market analysis to evaluate industry trends and identify investment opportunities in the TMT sector.
- Crafting detailed reports and client-facing pitch books, synthesising complex data into actionable strategies through advanced modelling techniques and comprehensive market insights, supporting high-stakes, data-driven decision-making.

Personal Trader – *Portfolio Manager* **Feb 2020 - Present**

- Developed a diversified portfolio using quantitative strategies, achieving an average annual return of 18%, outperforming major benchmarks through a combination of data-driven analysis and systematic risk management.
- Engaged in short-term algorithmic trading by leveraging technical indicators and predictive models, attaining a 63% success rate in trades, with emphasis on volatility exploitation and rapid market adaptation.

Projects and Leadership Experience (See Portfolio)

FinLLM-HALO – *Undergraduate Research Intern* **Jun 2025 – Aug 2025**

- Manually curated and open-sourced FinHALO-500, a 500-pair SEC finance Q&A benchmark and mitigation library, introducing two novel evaluation metrics: NIWH (materiality-weighted errors) and BAHE (cost-performance optimisation), peer-reviewed and slated for top NLP conference publication and commercial release.
- Developed an end-to-end mitigation pipeline combining RAG with QLoRA fine-tuning on 8B–70B-parameter frontier models, reducing GPT-4o hallucinations by > 20 pp on SEC filing numeric tasks while slashing inference costs by 78%.

Enhancing Black-Scholes volatility – *BSc Project Lead* **Oct 2024 - Jan 2025**

- Improved the traditional Black-Scholes model with adaptive volatility, evaluating multiple stochastic volatility and ML models to successfully cut pricing error spread by 50%, with a final optimal SABR + GAN-LSTM ensemble model.
- Deployed Monte Carlo stress tests on simulated datasets for varying range of market volatility events, to gauge pricing robustness, achieving a narrower $\pm 0.2\sigma$ error range (vs $\pm 0.4\sigma$ in standard BS) and significantly fewer outliers.
- Working to publish a thesis and open-source library on a dynamic volatility approach for option pricing, balancing accuracy and efficiency.

Skills

Programming & Data: Python (NumPy, pandas, Polars, scikit-learn, plotly, matplotlib), C++, SQL (PostgreSQL, MySQL, SQLite), MATLAB, Excel/VBA, Bash/Shell scripting.
Quantitative Methods: Time-series Analysis, Stochastic Calculus, Factor Modeling, Portfolio Optimisation, Option Greeks, Monte Carlo Simulation, Backtesting Frameworks.
Platforms & Frameworks: Git, CI/CD, Docker, SLURM, Apache Spark, Dask, Airflow, TensorFlow, PyTorch, QLoRA, FastAPI, Flask, MongoDB, Redis, PostgreSQL, AWS (S3, EC2), Bloomberg AP.
Languages: English (Native), Urdu/Punjabi/Hindi (Fluent).

Activities and Interests

Networking & Insight Days: HRT Insight Day; Citadel Quant Workshop; Bloomberg Terminal Workshop.
Hackathons & Competitions: BNY Manchester Hack (1st place); ICHACK 25; Algothon; Fintech 3-Day Hackathon.
Hobbies: National RC Car Racing Champion (U18), Basketball, Gym, Mountain Biking, Community Volunteer.
Affiliations: SEO London, Investment Society (Securities Education Certificate course, modelled on CFA levels 1 & 2), Finance Society (Investment Banking Training Programme), AlgoTrading Society (AlgoCourse).