Zacch Lines

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Experience

Aglaia Investment Management | Quantitative Risk Analyst — Singapore | Jul 2024 - Aug 2024

- Engineered a **GARCH** risk model, enhancing risk assessment across **30** portfolios totaling over **$4B**.
- Automated client portfolio monitoring using **VBA**, cutting processing time by over **90%** (from 3 days to 2 hours) and improving reporting efficiency for **3** portfolio managers.
- Developed a **Python** tool to calculate risk-neutral densities from **option** volatility smiles, providing actionable insights for equity market trading opportunities.
- Collaborated with traders and risk team to align analytical outputs with real-time trading objectives.

NatWest Group | Machine Learning Engineer — London, UK | Jul 2023 - Dec 2023

- Developed a **Python** and **SQL** - based carbon dashboard with integrated machine learning, facilitating system-wide test-plan sustainability evaluation.
- Created a tree-search algorithm for a **12M+** database, automating key metric calculations and improving operational efficiency.
- Presented technical findings to diverse stakeholders, bridging gaps and enhancing workflow collaboration.
- Adapted to a fast-paced environment by balancing projects and meeting tight deadlines.

Durham University Finance Society | Quant Analyst — Durham, UK | Jan 2023 - Jan 2024

- Engineered a trading strategy utilising delta hedging and options market data from **Bloomberg** API.
- Attended regular algorithmic trading workshops and meetings focusing on HFT algorithms.

Education

EDHEC | MSc Financial Engineering — Nice, France | 2024 - 2025

- ***Percentage:*** 76%
- ***Relevant Modules:*** Advanced Fixed Income and Credit, Advanced Derivatives, Structured Products, Equity Derivatives, Deep Learning, Volatility Strategies, Risk Management, Decentralised Finance.

Durham University | BSc Mathematics — Durham, UK | 2020 - 2024

- ***Grade:*** 1:1
- ***Relevant Modules:*** Stochastic Processes, Mathematical Finance, Machine Learning and Neural Networks, Probability, Statistical Computing, Numerical Analysis, Statistical Modelling, Calculus.

Skills

Programming & Tools:	Python (TensorFlow, QuantLib), C++ (OpenMP), SQL, VBA, Git, Excel, Power BI, Bloomberg Terminal.
Financial Modelling:	Monte Carlo Simulation, VaR, GARCH, Rough Volatility, NSS, Jump-Diffusion, Sensitivity Analysis, Vasicek Model.
Markets & Products:	Interest Rate Derivatives, FX Derivatives, Credit Derivatives, Swaps, Equity Derivatives, Structured Notes.
Interests:	Sailing, Violin (Grade 8), Chorister, Chess, Award-Winning Podcaster.

Research & Projects

MSc Research Thesis: *Deep Hedging Under Rough Volatility Models* — *Python (TensorFlow), LaTeX, FFT*

- Built a **deep hedging** framework to optimise hedge ratios under the **rBergomi** model.
- Applied **optimal control** techniques to minimise risk and transaction costs in dynamic hedging.

Computational Geometry: *Shortest Vector Problem* — *C++, OpenMP, Python (testing)*

- Designed a high-performance **OOP** solution for the SVP, focusing on low-latency execution in **C++**.
- Implemented multi-threading and memory optimisation to manage lattices up to **80** dimensions.

Fixed Income: *Yield Curve Construction and Hedging* — *Python, LaTeX, Excel*

- Bootstrapped zero curves from **bond** prices and fitted and analysed term structure using **NSS**.
- Computed key rate **durations** and built long-short trading strategies to express curve steepening views.