ZACHARY TILLER

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EDUCATION

University of Cambridge | *MEng Information & Computer Engineering*   Oct. 2019 - July 2023

4th Year: Merit, Upper Second Class Honours
 Masters Thesis: 'Non-Gaussian Stochastic Processes for Financial & Tracking Applications':
 Implementing Sequential MCMC Particle Filters on Levy-Process-Driven Stochastic State Space
 Equations. Derived new modelling parameterisations & closed-form inference equations
 Key Modules: Probabilistic ML, DL & Structured Data, Statistical Signal Analysis, Computational
 Stats & ML
 Societies: Queens' College Entrepreneur Society
 Achievements: Ranked **7th** in 2nd Year | Queens' Foundation Scholar | Presidents Prize | Average GPA:
 69.8%

Bancrofts School | *Francis Bancrofts' Scholar*   Sept. 2012 - Sept. 2019
 A Levels: A*A*A*A* - Maths, Chemistry, Further Maths, Physics | **GCSEs:** 10A*'s
 Awards: Silver Cambridge Chemistry Olympiad, UKMT Kangaroo Award

PERSONAL PROJECTS

App Development [Ongoing]
- Frustrated with Football 'Suvivor' Pools WhatsApp group chats of 300+ people, I am developing my own 'Survivor' App to facilitate frictionless gameplay & accesibility to all audiences. Decided to build the app in React Native to support iOS and Android to be accessible to all users
- Selected Firebase as the backend, after thinking deeply about scalability and reliability
- Implementing custom hooks, contexts & cloud functions to facilitate complex user interactions and data transfer & handling. Learning continuously about best practises & problem solving on various architectural & database issues
- Consciously constructing the App to minimise the number of user read/writes to Firestore, as well as reading external Football data APIs, to minimise operating costs

Snooker Sports Betting Model [Live]
- Used power of Tensorflow & Mac M1 GPU to maximise a log-likelihood function to fit a snooker player-rating model, consisting of 3,000+ players and 300,000+ games collected via web scraping
- Implemented this model in an end-to-end sports betting system with a partner; automatically scans Betfair for value bets, based on the model outputs and +EV considerations, sending daily emails of bet recommendations

Football Predictor Web App - Click For App
- Implemented the Bivariate Poisson distribution in Python to sample (Monte Carlo) football game scorelines
- Created my own formula for the parameters of the distributions (expected goal-rate) to reflect a team's attacking strength & form, gathering data via an API. Turned project into a Web App to observe the score probability matrix

Real Time Hedge Calculator
- Developed software (CLI) to quickly examine the Risk/Reward & bet sizes when trading on sports exchanges

Experimental Trading Algorithm
- Used MQL4 to back-test ideas for systematic trend-following algorithms on FX pairs

WORK EXPERIENCE

Graduate Quantitative Analyst/Researcher, Smartodds   October 2023 - Present
- Using advanced Statistical & ML methods to produce sports betting models for Football (Soccer). These models are then implemented into a large scale system to place bets in the markets to generate alpha
- Given immediate responsibility of developing a model on a brand new research area; Conducted EDA (using R) on a dataset of 1million+ football games to inform modelling choice in forming a suitable class of models
- Analysed at correlations, regressions, residuals & hypothesis tests to give confidence to modelling assumptions made
- In the first 8 weeks on desk, engineered 6 specialised variants on a base model; fitted bespoke PMFs each with unique features & modifications to capture specific behaviours & nuances in the data

- Participating in Graduate Training; weekly masterclasses & assignments on Statistics, such as GLMs, GAMs & State Space Models. Self-directing my capstone research project on MMA; Owning the full pipeline of data-acquisition to model prediction by web scraping and applying Statistical & Deep Learning methods to MMA data to find betting opportunities

Quantitative Investment Strategy Intern (QIS): Vol Structuring, Macquarie   June 2022 - Aug. 2022

- Implemented a new PnL Explainer tool into the existing intra-day analytics software suite (Python) for S&P & Eurostoxx based strategies; required quick understanding of Macquarie's codebase architecture & libraries
- Improved the existing inaccurate Taylor-Series based methods to 8dp accuracy by learning new mathematical methodologies to brake down the PnL (change in an options value) in terms of the contributions from each Greek during the time interval of interest
- Due to the greatly improved accuracy, PnL data for intra-day multiple Delta Hedging VRP strategies can now be examined, unlocking the ability to understand the algorithmic trading strategies in more detail on any time-scale
- Wrote scripts (Python) to produce clear & understandable graphics of the PnL explainer output to provide the desk & clients insight into the performance of the strategies every day

Machine Learning & AI Intern (Part-Time), Memento VR   Aug. 2021

- Generated 14,800 labelled snaps from a video to use in a multi-output CNN to predict gyroscopic parameters
- Created a sign-language recogniser (CNN), at 70% testing accuracy, using techniques like data augmentation

McKinsey & Co. Spring Intern   April 2021

- Collaborated with McKinsey consultants and peers to construct and present a solution to a mock-case

Jane Street Trading Spring Intern   April 2021

- Practised market making, helping the team finish second place in a simulated open-outcry exchange

Lead Student Consultant, Unlock Consultancy   Oct. 2020 - Nov. 2020

- Directed a global team over 3 time-zones on a tech consulting project for 6 weeks, delivering a 40-slide report
- Leveraged skills in cloud-based software to ease project management and delivery, saving c.10 hours a week

EXTRA-CURRICULAR ACTIVITIES & ACHIEVEMENTS

Academic Mentor and Coach, Universify   Oct. 2020 - July 2021

- Year long coach for two Year 11 students from deprived backgrounds, helping them work toward University
- Led classes of up to 20 students for a week during the online summer school, collaborating with 15 volunteers

Treasurer, CATS Society Cambridge University   Oct. 2020 - July 2021

- Coded a programme to automate managing formal accounts with 100's of transactions a year
- Took initiative to modernise the accounting documents by re-drafting into a clearer format

Sports

- Queens' College Football 2XI. Arsenal FC Fan | Ex-Univeristy Water Polo | Gold DofE | School Swim Captain