

## Education

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**University of Oxford, Mansfield College - MSc Mathematical Modelling & Scientific Computing**

2023

*Dissertation: Singular Spectrum Analysis for Time Series, working with BlackRock.**Projects:*

- series\_scorer: A Python package to denoise (via SSA) and cross-score similarity for multiple time series.
- Adaptive Optimisation Algorithms: Analysis of recent ML algorithms with an application in house pricing.
- Computational Call Pricing: Examining a neural-network based call pricing algorithm.
- Image Recolourisation: Python GUI program to recolourise images using RKHS methods for the backend.
- Battery Modelling: Construction of a model to analyse battery degradation for electric vehicles.

**University of Oxford, St. Hilda's College - BA Physics (2.i)**

2019 - 2022

## Skills

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**Data Science**

- Python and MATLAB based numerical modelling (e.g. via RK4)
- Analysis and implementation of optimisation methods for numerical methods and ML algorithms e.g. AdaLoss
- Machine learning using the Scikit-learn, XGBoost, and custom-built libraries to e.g. predict trade settlements
- Denoising and spectrum analysis via PCA, SSA, and fourier modes for multivariate datasets
- Optimisation for constrained usecases in Python e.g. JIT via Numba, and NumExpr for memory

**DevOps & Computing**

- Java in enterprise high-throughput FX processing software, with testing using Cucumber, JUnit, AssertJ, Selenium
- Terraform with custom modules
- Orchestration with Kubernetes, Docker, Helm
- CI/CD using FluxCD, TeamCity
- Monitoring using VictoriaMetrics, Prometheus, Grafana
- Google Cloud Platform, focusing on Cloud Run, Kubernetes Engine, Pub/Sub, Cloudfunctions
- Automation scripting using Shellsript, Python for e.g. streamlining developer workflows
- Unix based operating systems (Linux, OpenBSD, Plan 9)
- Worked with both graphical (neo4j) and traditional databases, using tools such as Cypher Query Language, Tableau, MySQL

## Experience

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**SGX FX (Graduate)**

Sep 2023 - Present

- Developed an entire save-to-deployment pipeline to parse NLP notebooks into FastAPI-based Python containerised applications used internally via API to parse FX trade rejections, incorporating cross-region networking, load scaling, end-to-end request tracking using Cloud Trace, performance testing, and automated NLP testing & model generation
- Developed framework using Terraform & GCP to automate SSL rotations internally
- Introduced various tools and scripts to aide developers (e.g. team-based slack alerting, KEDA-based autoscaling cutting weekend costs by 12%, new Helm charts for Redis-equipped applications), as well as provided general day-to-day support for DevOps related tasks
- Maintained & developed CI/CD pipeline including configuring a “one-click” cluster recreation layout, introduction of custom Terraform modules, TeamCity pipelines
- Collaborated with the internal Data Team to provide an administrative database collecting users & FX subscriptions for a new application, and provided various endpoints and custom internal tools for management
- Aided the migration of our monitoring stack to incorporate both Kube State Metrics and VictoriaMetrics
- Aided in developing & end-to-end testing a brand new on-prem Java based applications used for data monitoring, including the initial configuration and developer pipeline setup
- Supported general development of various internal tools used by developers to generate isolated “miniaturised” software stacks to test breaking changes

**London Stock Exchange Group (Technology Intern with ForexClear, and RepoClear)**

Jun 2022 - Aug 2022

- Incorporated edge-case detection for trade rollovers on holidays
- Tested trade settlement behaviour within larger Java applications using both JUnit and Cucumber tests
- Utilised a BDD testing framework to incorporate these trade settlement tests
- Constructed a GUI using macros and VBA within Excel to automate data input to internal databases
- Aided the production of a machine learning model to predict trade failure utilising the XGBoost library
- Supported the initial migration to AWS CloudFormation, debugging and deploying the initial stacks
- Liased amongst departments and supported a pitch to initialise BDD testing amongst RepoClear development teams