




Miles Weatherseed

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 mweatherseed

Quantitative researcher with PhD in applied mathematics and experience in machine learning, mechanistic modelling, and financial markets.

Education

University of Oxford

2019 – 2024

PhD in Applied Mathematics

- › Thesis: "POEM: prediction of immunogenic epitopes using mechanistic modelling of the MHC class I antigen processing pathway".

University of Oxford

2015 – 2019

Master of Mathematics

- › First-class honours.
- › Dissertation: "Mathematical models of DNA-protein interactions" (80/100).

Experience

Oxford Centre for Immuno-Oncology

2024 – present

Senior Postdoctoral Researcher

Oxford

- › Engineered a novel immunological risk-scoring system using variance-based sensitivity indices to prioritise epitope targets with high robustness against evolutionary escape.
- › Developed a hybrid algorithm ("POEM") combining mechanistic modelling with machine learning to predict the immunogenic potential of any neoepitope with high generalisability.
- › Early promotion to Senior Postdoctoral Researcher based on impact in attracting industry investment from GSK and algorithm development leadership.
- › Ongoing inter-disciplinary collaboration to drive innovative solutions.

Dysrupt Labs

Mar 2025 – present

Research Analyst

Melbourne

- › Worked remotely with macroeconomists to refine a prediction markets-based trading strategy leveraging selective crowd forecasts for macroeconomic indicators (e.g. CPI).
- › Engineered a bootstrap-based framework to quantify performance uplift: benchmarked realised PnL distributions against randomised signal baselines, providing statistical evidence of alpha.
- › Optimised exit logic (e.g. stop-loss, crossover, signal decay) and validated forecast superiority over persistence using time-series metrics.

Synteny Biotechnology

Sep 2023 – Dec 2023

Machine Learning Intern

Cambridge

- › Developed and tested efficient, scalable code for integrating new algorithms and methods into the main codebase, prioritising speed and memory optimisation.
- › Fine-tuned protein language model (ESM-2) to deconvolute large mass spectrometry datasets, doubling the training data for the company's binding prediction model.
- › Researched and manually benchmarked emerging algorithms for generating ensembles of protein structures from AlphaFold2.
- › Competed in [IMMREP23 Kaggle challenge](#), finishing 4th.

J.P. Morgan

Jun 2018 – Aug 2018

Sales & Trading Summer Analyst, European Repo Desk

London

- › Built VBA macro for near-optimal netting of repo trades under FIN 41 haircut regulations, improving capital efficiency and automation.
- › Ranked 2nd among EMEA interns in summer trading challenge on Sales & Trading floor.
- › Received full-time return offer.

Technical Skills

Programming	Python (expert), Julia (intermediate), Java (intermediate), R (basic), Fortran (basic)
Libraries	scikit-learn, PyTorch, TensorFlow, LightGBM, Optuna, AnnData
Tools	Git, LaTeX

Projects

POEM: Hybrid Algorithm for Predicting Immune Response

2024 – present

- › Developed a hybrid model combining mechanistic ODEs and ML to quantify the likelihood of immune recognition for any genetic mutation.
- › Demonstrated that POEM predictions correlate with real-world outcomes in cancer (e.g. patient survival, tumour evolution), outperforming existing clinical biomarkers.
- › Used in signal prioritisation for immunotherapy targets; under review at *Nature*, with strong interest from leading pharma companies.

Mechanistic Modelling of Antigen Presentation

2020 – 2024

- › Built a high-dimensional ODE-based model to simulate peptide processing dynamics and generate synthetic training data under biological constraints.
- › Combined parameter fitting via supervised learning (SVR) with Bayesian inference (MCMC), enabling robust estimation from sparse, noisy observations.
- › Outperformed purely data-driven ML models in out-of-distribution generalisation, validating the value of mechanistic priors.

Extracurricular

Vincent's Club

May 2021 – May 2022

Club President

Oxford

- › Elected President of 150-member club; led record financial recovery post-COVID

Oxford University Athletic Club

May 2017 – May 2018

Club President

Oxford

- › Elected President of Oxford's largest sports club; established regular giving scheme; unbeaten season for all teams.

Running

- › England representative 2021; Olympic Trialist in 1500m; 3:42 1500m runner; 14:22 5k runner

Puzzles

- › Frequent competitor in coding/puzzle challenges (Jane Street, LeetCode, IMC 64BIDS finalist).