Matthew Marsh

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Education

Imperial College London - PhD in Probabilistic Machine Learning and Optimisation 2024-2028

- Project Title: Probabilistic Machine Learning for Modelling, Optimisation and Control of Process Systems under Uncertainty
- Developing probabilistic machine learning algorithms with embedded inductive biases and hard constraints, and implementations applied to optimal control and decision-making under uncertainty.
- Supervised by Dr. Antonio Del Rio Chanona and Prof. Benoit Chachuat, in Optimisation and Machine Learning PSE Group (OptiML), awarded Departmental Scholarship.

Imperial College London - MEng Chemical Engineering 2020 - 2024

- Overall Grade: **First Class**, achieved in each year of the course
- Specialised in Process Systems Engineering, with elective modules in advanced optimisation, dynamic programming and modelling, and machine learning.
- Final Year Research Project: Use of Artificial Intelligence in Process Control of Separation Systems

Merchant Taylors' Boys School, Crosby 2013 - 2020

- A-Levels – Mathematics – **A***, Further Mathematics – **A***, Physics – **A***, Chemistry – **A***, best in school cohort.
- GCSEs – six grade 9s, iGCSEs – three A* grades, best in school cohort.

Work Experience

Imperial College London - Graduate Teaching Assistant September 2024 – Present

- Teaching and supervision across undergraduate and MSc-level courses including Mathematics for Machine Learning, Machine Learning for Chemical Engineering, Advanced Python Programming, and MEng/MSc Research and Design Projects.

HSBC - Global Markets Trading Summer Analyst June 2023 – September 2023

- Rotated through Prime Securities Financing and Equity Cash Trading, applying Python to analyse large client position datasets and optimise inventory allocation under balance sheet constraints
- Developed and presented a Monte Carlo–based trade idea identifying S&P 500 equities resilient to market downturns, ranked top among the intern cohort. Decided to pursue PhD instead of returning to take up full time analyst role

Projects

Automating Fantasy Football via Machine Learning and Model Predictive Control

- Designed and implemented a Machine-Learning based mixed integer MPC framework to optimise weekly Fantasy Premier League squad selection under constraints
- Developed an ensemble of hybrid LSTM-ANN forecasting models to predict player performance distributions from historical and contextual features and aid optimal decision-making

Stochastic Modelling of Financial Time Series

- Developed a modular JAX-based package for simulating and learning stochastic processes for financial time-series modelling
- Implemented models ranging from classical random walks and lognormal SDEs to Gaussian Processes with more expressive kernels and likelihoods, and Neural SDEs for learning correlated and non-linear dynamics

Leadership & Extra-Curricular

Imperial College Hockey Club - Executive Committee

- Served as Club Captain (24–25), Treasurer (23–24), Men's 1XI Captain (22–23), and Sponsorship Secretary (21–22), leading the Executive Committee, managing finances, and representing the University's largest sports society at Union level.
- Developed leadership, strategic planning, financial management, and team-building skills through oversight of operations, budgeting, and coordination across elite and beginner squads.

London Academicals Hockey Club - Fixtures Secretary

- Elected as Fixtures Secretary, responsible for organising match schedules across multiple men's and women's teams.
- Automated the fixture scheduling process using mixed integer programming: improving efficiency, reducing clashes, and ensuring fair pitch allocation.

Miscellaneous

Relevant Prizes / Courses

- Foundations of Big Data and Machine Learning in Finance - Semyon Malamud, PhD course, Imperial College Business School
- Information Theory, Pattern Recognition, and Neural Networks - University of Cambridge, David JC Mackay
- Control Bootcamp, Data-Driven Control, Probability Bootcamp, Introduction to Statistics and Data Analysis - Steve Brunton
- Python for Financial Analysis and Algorithmic Trading (Udemy)
- RSC Olympiad & Cambridge Chemistry Challenge - Gold Award
- Great Crosby Exhibition Scholar & Harrison Scholar - Merchant Taylors' School, Crosby

Summer Schools

- Probabilistic Machine Learning - Cambridge ELLIS, June 2025
- Bayesian Optimisation - Sargent Centre, September 2024

University Societies: Data Science Society, Investment Society, Finance Society, Algorithmic Trading.

Additional Interests: Hockey - previously played National League level at Preston HC, currently Regional Premier Division at London Academicals HC, additionally captained regional and county age group squads (U18).

Others include: Cricket, Football, Cycling, Cooking, Travelling, Poker.