Thomas Falconer

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A keen data scientist with a passion for using machine learning to help mitigate climate change.

Education

May 2022 – present **Technical University of Denmark**, *Ph.D. Electrical Engineering*
Topics include: Economics of data, data markets and machine learning for revenue-maximizing auction design.
Working Title: *AI for Electricity Market Design*

2019–2020 **University College London**, *M.Sc. Energy Systems and Data Analytics*
Distinction
Courses include: *Statistical Data Analysis, Supervised Learning, Unsupervised Learning, Advanced Energy System Modelling, Spatial Analysis of Energy Data, Built Environment and Transport Analytics*
Thesis: *Reducing the computational cost of AC Optimal Power Flow with Geometric Deep Learning*

2014–2019 **Heriot-Watt University**, *BEng (Hons.) Chemical Engineering*
First Class (Top in Year)
Courses include: *Chemical Reactivity, Chemical Kinetics, Multi-Phase Thermodynamics, Fluid Mechanics, Separation Processes, Chemistry of Materials, Process Control and Optimisation*
Thesis: *Biofuel synthesis from Lignocellulosic Biomass using Fermentation and Borrowed Hydrogen Chemistry*

2016–2017 **University of Amsterdam**, *Econometrics and Operations Research*
Courses include: *Probability Theory, Statistics, Calculus, Linear Algebra, Econometrics, Operations Research, Microeconomics, Macroeconomics, Programming for Numerical Analysis*

Publications

arXiv Leveraging power grid topology in machine learning assisted optimal power flow, Presented at: *Stochastic optimization and machine learning applied to power systems*, INFORMS Annual Meeting, 2021

arXiv Deep learning architectures for inference of AC-OPF solutions, Presented at: *Tackling climate change with machine learning*, Conference on Neural Information Processing Systems, 2020

Awards

2019 **Heriot-Watt University**, *Chemical Engineering Departmental Prize*
Awarded for achieving the highest overall grade across the BEng (Hons.) Chemical Engineering cohort.

2019 **Heriot-Watt University**, *Chevron Prize for Best Student in a Team Environment*
Awarded for best demonstration of leadership and team working skills during engineering design projects.

Professional Experience

Jan 2021 – May 2022 **Arenko Group**, *Junior Data Scientist (+ Qualified European Power Exchange Trader)*
Using machine learning to model electricity market dynamics and optimise trading decisions for flexible assets

Oct 2020 – Jan 2021 **University College London**, *Research and Teaching Assistant (Energy and Artificial Intelligence Lab)*
Power systems research and delivery of postgraduate modules in statistics and machine learning

May 2020 – Oct 2020 **Invenia Labs**, *Machine Learning Researcher (Intern)*
Applied (geometric) deep learning to augment traditional optimisation methods for power grid operation

Sep 2019 – Feb 2020 **Engineers Without Borders**, *Partnership Project Executive*
Developed and monitored collaborative projects between UCL and Engineers Without Borders

Jun 2018 – Dec 2019 **PolSource**, *Salesforce System Consultant (x3 Certified Specialist)*
Delivered business value to clients through design and implementation of robust SaaS solutions

Technical Expertise

Data Analysis

Statistics GAMs, MLE, Hypothesis Testing, Stochastic Processes, Graph Theory

Machine Learning

Supervised Neural Networks, Kernel Methods, Decision Trees, Ensembles, Classical Methods
Unsupervised Clustering, VAE, (P)PCA / FA, Mixture Models, ICA, LDA, t-SNE

Computing

Programming Python, Julia, Golang, R, SQL, MATLAB
Tools Excel, PowerPoint, Jupyter, Git, LaTeX, ArcGIS, HTML, CSS, Markdown