LUKE ROSS

+44 7940 900 720 | luke.ross200121@gmail.com
https://www.linkedin.com/in/lukeross18/
https://github.com/lross123/
https://lross123.github.io/Portfolio/

Skills

- **Mathematical Modelling:** Stochastic Processes, Signal Processing, Time-Series Analysis, Linear Algebra, Statistical Inference
- **Programming:** Python (scikit-learn, PyTorch, PySpark), R, MATLAB, C++, Java, SQL
- **Data Engineering:** Docker, Git, GitHub Actions, AWS (S3, Glue, SageMaker), Azure (Synapse, Databricks), GCP (BigQuery, Vertex AI), Apache Spark (Scala, PySpark), Kubernetes, APIs
- **Visualisation:** Excel (VLookup, Pivot Tables, VBA), Power BI, Tableau, Looker Studio
- **Machine Learning:** Regression & Classification, XGBoost, Neural Networks (CNNs, Autoencoders), Transformers, NLP, LangChain

Open-Source Contributions

FRAUD DETECTOR | Python | XGBoost | Natural Language Processing | PyTorch Nov 2025

- Performed data preprocessing, **feature engineering**, class-imbalance handling, model training, evaluation & threshold optimisation
- Developed a high performing machine learning model which stacked **XGBoost, LightGBM & CatBoost** which improved the recall on rare fraud scenarios while precision still remained high
- The class imbalance was handled with **SMOTE** & by controlling factors which affect overfitting so the impact on **recall & false-positive** rates could be mitigated
- **Hyperparameters** were tuned systematically by utilising grid search & **Bayesian optimisation**

DERIVATIVES PRICING & RISK ENGINE | C++ | Stochastic Processes | Multithreading Nov 2025

- Developed a library covering yield-curve bootstrapping, Monte Carlo and PDE option pricers, stochastic process simulators (GBM, Merton jump-diffusion, Variance-Gamma), a full limit-order-book & backtesting framework
- Implemented high-performance numerical methods including multithreaded and vectorised Monte Carlo, Crank–Nicolson finite differences for the Black-Scholes PDE & a reverse-mode automatic differentiation system to compute Greeks
- Multi-asset simulation engine developed for real-time risk prototype of options portfolios (PnL, Greeks, simple VaR), and alpha-discovery components such as a pairs-trading strategy

GENERATIVE PRE-TRAINED TRANSFORMER (GPT) | Python | Microsoft Azure | PyTorch Oct 2025

- Developed a GPT utilising self-attention, layer norms, embeddings & residuals using **PyTorch** in **AWS SageMaker** & **Docker** replicating the **124-million-parameter** GPT-2 model
- Data pipelines produced with tiktoken; used multiprocessing developed for tokenisation, sharding & **ingesting datasets**
- Tuned models using cross-entropy loss & optimised with cosine learning-rate scheduling, dropout & mixed precision acceleration

STOCHASTIC MODELLING DASHBOARD | Python | Github Actions | APIs | Statistical Modelling Sep 2025

- Developed a **full-stack interactive dashboard** utilising **Python** & **REST API** to simulate **stochastic processes** & financial models
- Developed **numerical methods** in **Python** for on-demand **parameter exploration** & **statistical modelling** within the **dashboard**
- Built Monte Carlo, Gillespie, Brownian models in **Python**, deployed on **GitHub** & used **Docker** containers for reproducibility

AMAZON PRODUCT WEB SCRAPER & EDA | SQL | Python | Microsoft Azure | R | Power BI Jul 2025

- Scraped & ingested product data using **Python (BeautifulSoup)** identifying & parsing key **HTML** structures to extract attributes
- Stored & managed the **large datasets** in **Azure Synapse Analytics** building **ETL pipelines** to **clean, aggregate & standardise** data
- Performed **SQL queries** through **Microsoft Azure** & connected **Azure Synapse Analytics** to **Power BI** for creating **dashboards**
- Interactive dashboards were created in **Power BI** as well as further **exploratory data analysis** in **Python & R**

MODELLING THE EFFECTS OF CANCER DRUGS ON TUMOURS | MATLAB | Python | Monolix Mar 2024

- Collaborated with **GlaxoSmithKline,** utilising **MATLAB**, **Python & Monolix** to **forecast** an optimal dosing strategy for cancer drugs
- **Transformed, cleaned & standardised** datasets**;** performed **missing value imputation, outlier detection & signal processing**
- Model parameters were **validated, fitted, visualised** & then reported the developed novel strategy to **stakeholders**
- Followed **sensitive data compliance** and carried out **risk assessments** performing **statistical modelling** & **visual predictive checks**

MUSCLE ACTIVATION DETECTOR FOR LIS | MATLAB | Python | AWS | XGBoost
Jan 2024

- **Signal processing** techniques such as Chebyshev, Butterworth filters & wavelet transforms performed in **MATLAB & Python**
- Trained a binary classifier in **AWS SageMaker** using **scikit-learn & XGBoost,** achieving **92.3% accuracy, 100% precision & 85.71% recall** on unseen data

- Designed **end-to-end ML pipeline**: **data ingestion, preprocessing, model training,** real-time prediction & reproducible via **Docker**

Work Experience

AI IMPLEMENTATION – JWA CNC Precision Limited **–** Leicester, UK Dec 2025 – Present

- Developing an AI-powered dashboard that streamlines stock visibility & material pricing, to reduce quoting time
- A project with direct impact on win rate, machine utilisation, and profitability
- Utilisation of PyTorch for designing, prototyping AI & machine learning workflows

CUSTOMER ASSISTANT & WAREHOUSE OPERATIVE – Marks & Spencer – Camberley, UK
Jul - Oct 2018 & Jul – Sep 2022 & Nov 2025 – Present

- Delivered consistent high-quality customer service making sure customers were listened to & supported
- Managed stock rotation and replenishment on the shop floor and in the warehouse to maintain availability and reduce waste
- Identified and resolved customer issues quickly making sure customers shopping experiences were positive through excellent service

QUANTITATIVE RESEARCHER – Queensland University of Technology **–** Brisbane, Australia Feb 2025 - Jun 2025

- Performed **mathematical modelling** for tissue growths with a specialisation in **stochastic processes, numerical methods, applied statistics, model validation, signal processing & stress testing**
- Developed **synthetic data** to validate the **practical identifiability** of mathematical models utilising statistical modelling techniques such as **profile likelihoods**; profiles were optimised through tuning measurement error models coupled with mechanistic models
- Utilised **Python, R, Julia & MATLAB** for producing **synthetic data, forecasting & validation**
- **Collaborated** with **data scientists, machine learning engineers** & biologists on cellular systems research as well as being supervised by researchers with collaborative links to The University of Oxford

ADMINISTRATOR – University of Surrey – Guildford, UK Oct 2024 - Jan 2025

- Utilised **CRMs (Dynamics365)** for **forecasting, data management, reporting & dashboard development**
- **Transformed, filtered & analysed** sensitive data in **Microsoft Excel**; updated compliance documentation & **identified KPIs**
- **Cross-functional collaboration** facilitated **data-driven insight** across teams & a reduction in student wait times

FOUNDER – Luke Ross Mathematics Tutoring – Sandhurst, UK Nov 2019 - Jan 2025

- Taught pupils individually & in small groups for GCSE, A-level & degree developing my ability to explain complex problems clearly
- Developed the business through word-of-mouth, social media platforms & a tutoring website helping students to hone their mathematical ability in areas such as probability theory, stochastic processes, mechanics & linear algebra
- Personalised students study plans with data-driven insights from resources such as mocks leading to a 100% pass rate

Education

MASTER OF SCIENCE IN BIOMEDICAL ENGINEERING – University of Warwick Oct 2023 – Jan 2025

Biomedical Systems Modelling 68% | Research in Biomedical & Clinical Engineering 76% | Tissue Engineering & Regenerative Medicine 73% | Pharmacokinetic-Pharmacodynamic Modelling Dissertation 73%

- Postgraduate Ambassador for Warwick Engineering Society
- Outreach Ambassador for Warwick Manufacturing Group
- Rowing squad member of Warwick University Boat Club

BACHELOR OF SCIENCE IN MATHEMATICS WITH ECONOMICS – Loughborough University Oct 2020 – Jul 2023

Probability Theory 79% | Stochastic Methods in Finance 84% | Computational Methods in Finance 79% | Mechanics 81% | Linear Algebra 80% | Applied Statistics 75% | Mathematical Methods 90%

- Developed a website for my mathematics tutoring business during the pandemic which increased the uptake of students taught
- Member of the Finance & Investment Society where I took part in trading simulation events hosted by AmplifyMe & Forage
- Squad member of Loughborough University Lacrosse Team