DR JOSEPH EARLY

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Last Updated: January 11, 2025

WORK HISTORY AND EXPERIENCE

Helsing 2024 - Present

AI Research Engineer

· Helsing is a new type of defence company - artificial intelligence to protect our democracies.
· Machine learning development; product design; customer interaction; interviewing; workstream lead.

Amazon 2023

Applied Science Internship

· 6-month internship with Amazon Prime Video, leading a research project intended for publication.
· Development of novel machine learning approaches for interpretable time series classification.
· Improved technical research abilities; learnt and applied new skills on the use of AI in industry.

BOON 2018 – 2019

Machine Learning Developer

· Worked for a start-up as part of the University of Southampton Future Worlds accelerator.
· Developed significant improvements to machine learning systems (50% increase in model performance).
· Contributed to the overall progress of the company by attending events and networking.

Defence Science and Technology Laboratory (DSTL) 2018 - 2019

Project Leader, Backend Engineer, and Machine Learning Developer

· Lead a team of four for the UoS Master's Group Design Project in collaboration with DSTL.
· Specialised development using machine learning to detect anomalies in IoT sensor activity.
· Awarded best project and developed leadership skills to co-ordinate a team of different specialities.

University of Southampton 2018

Research Assistant Internship

· 12-week summer internship developing a Responsible AI platform for Multi-UAV Coordination.
· Worked with in an academic research team with industrial partners (Thales).

Roke Manor Research 2017

Full-stack Developer Internship

· 8-week summer internship on a data consolidation and web development project.
· Took an active role in project development such as organising meetings with clients.

TECHNICAL STRENGTHS

Programming	Python, PyTorch, Jupyter Notebooks, Bash, Java, C/C++, JavaScript, Rust
Software	Git, LaTeX, Google Colab, MacOS, LinuxOS, VirtualBox, Microsoft Azure, AWS
Techniques	Supervised Learning, Reinforcement Learning, Computer Vision, Generative Models, Deep Learning, Genetic Algorithms, High Performance Computing, Time Series, Machine Learning Engineering, Embedded Devices

EDUCATION AND QUALIFICATIONS

The Alan Turing Institute and University of Southampton 2019 - 2023

PhD: Computer Science (AI)

- PhD with the Agents, Interaction, and Complexity group at the University of Southampton (UoS).
- Member of The Alan Turing Institute (ATI) Doctoral Studentship Scheme (2019-2023 Cohort).
- Completed a thesis titled *Interpretable Multiple Instance Learning: Theory, Methods, and Applications.*

Research Outputs

- Published 13 papers in major conferences and journals (such as NeurIPS and ICLR).
- Collaborated with Amazon Prime Video, Bristol University, QMUL, and Georgia Institute of Technology.
- Reviewed for Nature Scientific Reports, AAMAS, ICML, NeurIPS, and ICLR.
- Presented work at international conferences and the Climate Change AI Summer School (2022).
- Published software (600+ downloads per month) and articles (6000+ reads per month).

Communication

- Interviewed on AI topics by the BBC World Service Digital Planet podcast and Newsweek.
- Co-founder of the ATI's Entrepreneurship Interest Group. Hosted five events in 2021/2022.
- Student representative for the ATI 2019-2023 Doctoral Cohort. Engagement with ATI Management.

Awards

- UoS Three Minute Thesis Finalist with *Explainable AI for High Resolution Images* (2022).
- UoS Teaching Award Winner for Undergraduate and Master's Lecturing and Lab Demonstration (2021).

University of Southampton 2015 - 2019

Integrated MEng: Computer Science *First Class Honours, Average Grade: 83%*

Key Modules

- Computer Vision (86%)
- Deep Learning (86%)
- Evolution of Complexity (91%)
- Intelligent Agents (81%)
- Intelligent Systems (88%)
- Machine Learning (80%)
- Programming Language Concepts (86%)
- Reinforcement and Online Learning (86%)
- Simulation Modelling (92%)
- Third Year Individual Project (Dissertation) (81%)

Awards

- Winton Capital Management Prize for Top Student in Computer Science (2019).
- Best Master's Group Design Project Award for *Detection of Anomalies in IoT Environments* (2019).

KEY PUBLICATIONS (MOST RECENT FIRST)

- Inherently Interpretable Time Series Classification via Multiple Instance Learning
  International Conference on Learning Representations (ICLR), 2024.
- Extending Scene-to-Patch Models: Multi-resolution Multiple Instance Learning for Earth Observation
  Environmental Data Science (Journal), 2023.
- A Risk-based Approach to AI Regulation: System Categorisation and Explainable AI Practices
  SCRIPTed: A Journal of Law, Technology & Society, 2023.
- Non-Markovian Reward Modelling from Trajectory Labels via Interpretable Multiple Instance Learning
  Neural Information Processing Systems (NeurIPS), 2022.
- Model Agnostic Interpretability for Multiple Instance Learning
  International Conference on Learning Representations (ICLR), 2022.
- Scene-to-Patch Earth Observation: Multiple Instance Learning for Land Cover Classification
  Tackling Climate Change with Machine Learning (NeurIPS Workshop), 2022.