

JOSEPH ARTHUR EARLY

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EDUCATION AND QUALIFICATIONS

The Alan Turing Institute and University of Southampton 2019 - 2023 (Ongoing)
PhD Candidate

- PhD with the Agents, Interaction, and Complexity group at the University of Southampton (UoS).
- Fully funded by The Alan Turing Institute (ATI) Doctoral Studentship.
- Researching Interpretable Multiple Instance Learning, with applications in high-resolution imaging.
- Collaborated with UoS Cancer Sciences department. Lead to an award-winning publication.
- Worked within the ATI on regulation of AI. Lead to two publications in law journals.
- Attended the inaugural Climate Change AI Summer School (2022). Lead to publications in machine learning for climate change.
- UoS Three Minute Thesis 2022 Finalist with *Explainable AI for High Resolution Images*.
- Involved in the academic peer-review process, such as reviewing for Nature Scientific Reports and the conference on Autonomous Agents and Multiagent Systems (AAMAS).
- Co-founder of the ATI's [Entrepreneurship Interest Group](#). Hosted four events in 2021/2022.
- Student representative for the ATI 2019/20 Doctoral Cohort. Engagement with ATI Management.
- Teaching and marking for UoS undergraduate and master's modules. UoS 2021 Teaching Award winner.
- Published [software](#) (500+ downloads per month). Published [articles](#) (3000+ views per month).
- Contributed to open source software: PyTorch and PyTorch Vision.

University of Southampton 2015 - 2019
Integrated MEng Computer Science *First Class Honours, Average Grade: 83%*

Key Modules

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|---------------------------------------|---|
| · Computer Vision (86%) | · Intelligent Agents (81%) |
| · Machine Learning (80%) | · Evolution of Complexity (91%) |
| · Simulation Modelling (92%) | · Deep Learning (86%) |
| · Intelligent Systems (88%) | · Reinforcement and Online Learning (86%) |
| · Programming Language Concepts (86%) | · Advanced Machine Learning (74%) |
- Awarded the Winton Capital Management Prize for top student in Computer Science.
 - Won the Master's Group Design Project award for *Detection of Anomalies in IoT Environments* (81%).
 - Completed a dissertation *Reducing Catastrophic Forgetting when Evolving Neural Networks* (81%).

KEY PUBLICATIONS

- 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, *NeurIPS Workshop: Tackling Climate Change with Machine Learning*, 2022.
- Revisiting Deep Fisher Vectors: Using Fisher Information to Improve Object Classification, *British Machine Vision Conference (BMVC)*, 2022.

- A Risk-based Approach to AI Regulation: System Categorisation and Explainable AI Practices, *SCRIPTed: A Journal of Law, Technology & Society*, 2022.
- Digital Pathology and Machine Learning for Prediction of Response to Neoadjuvant Chemotherapy in Oesophageal Adenocarcinoma, *Journal of Pathology*, 2021.
- Non-Asimov Explanations Regulating AI Through Transparency, *Nordic Yearbook of Law and Informatics*, 2021.

TECHNICAL STRENGTHS

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|------------------------------|---|
| Programming Languages | Python, PyTorch, Bash, Java, C/C++, JavaScript (ReactJS) |
| Software & Tools | Git, LaTeX, Microsoft Office, Linux OS, VirtualBox, Microsoft Azure |
| Techniques | Supervised Learning, Reinforcement Learning, Computer Vision, Deep Learning, Genetic Algorithms, High Performance Computing |

WORK HISTORY AND EXPERIENCE

BOON

Machine Learning Developer

2018 – 2019

- 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).
- Heavy involvement in design and development of new systems, as well as contributing to the overall progress of the company by attending events and networking.

DSTL Group Design Project

2018 - 2019

Project Leader, Backend Engineer, and Machine Learning Developer

- Project leader for the Group Design Project in final year of University.
- Specialised development using machine learning to detect anomalies in IoT sensor activity.
- Developed leadership skills to co-ordinate a team comprising of different specialities.

University of Southampton Summer Internship

2018

Research Assistant

- 12-week summer internship between third and fourth year of University.
- Worked in a research team developing a Responsible AI platform for Multi-UAV Coordination.

Roke Manor Research Summer Internship

2017

Full-stack Developer

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

ACM and IEEEXtreme

2016 - 2017

Competitive Programmer

- Competed in the 2017 UK and North Western European ACM programming competitions (NWERC).
- Placed first in the UK, and top 10% worldwide in 2017 IEEEXtreme 24-hour coding competition.

INTERESTS

- University of Southampton Societies
 - Engineers Rugby, Road Cycling, Chess Club, and Mountaineering Club

REFERENCES

Available upon request