Thomas M. S. Smith

PhD Candidate – Reinforcement Learning

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RESEARCH INTERESTS

Reinforcement learning, particularly temporal abstraction and continual learning. I want to research and apply machine learning techniques to solve meaningful problems.

EDUCATION

Doctor of Philosophy in Computer Science   expected August 2025
University of Bath, UK
Supervisor: Professor Özgür Şimşek

Master of Science in Robotics and Autonomous Systems   2021
University of Bath, UK
Grade: Distinction

Master of Engineering in Mechanical Engineering   2012
Imperial College London, UK
Grade: 2:1 (Hons)

PUBLICATIONS

Daniel Beechey, **Thomas M. S. Smith**, and Özgür Şimşek. Explaining Reinforcement Learning with Shapley Values. In *Proceedings of the 40th International Conference on Machine Learning*, pages 2003–2014. PMLR, July 2023.

INDUSTRY EXPERIENCE

Dyson Automotive, UK   2017 – 2019
Mechanical Engineer (Advanced)

- Design and development of a cutting-edge automotive battery pack as part of a small team.
- Improved battery pack safety by improving understanding of battery cell failure conditions. Specified, sourced, and managed a series of battery cell abuse tests.
- Resolved a critical issue in battery pack assembly through an analytical investigation of defects in prototype parts. Identified the root cause of the issue, and proposed a successful fix.

Ricardo UK Ltd, UK   2015 – 2017
Engineer

- Proposed and implemented an algorithm for estimating vehicle mass using an Extended Kalman filter. Demonstrated real-time estimations during real world driving.
- Developed a parameterised fuel-cell powertrain simulation and conducted an efficiency study. Presented the simulation, results, and recommendation to the client.
- Advised and supported battery pack design and development for a major UK automotive manufacturer.

BAE Systems Applied Intelligence, UK   2012 – 2015

Senior Consultant

- Collaborated with colleagues across the business to prepare and present complex project proposals to clients.
- Supported the successful large scale deployment of bespoke business critical software, impacting 1,000 users globally.
- Planned and delivered software and process training to 200 new users.

TEACHING &
SUPERVISION

Lecturer (Teaching)   2022 – 2023

University of Bath, UK

Teaching:

- Reinforcement Learning (Postgraduate level).

Supervision Projects:

- Neural Ordinary Differential Equations in Deep Reinforcement Learning.
- Hierarchical Active Inference as Subgoal Discovery in the Successor representation.
- Analysing the Performance of Reinforcement Learning Algorithms on Mastermind.
- Developing Dynamic and Hybrid Personalised Recommendation Systems using Deep Reinforcement Learning.

Teaching Assistant   2021 – 2022

University of Bath, UK

- Planning and delivering tutorials for postgraduate level units in Robotic Platform Engineering and Reinforcement learning.

SERVICE

Reviewer, European Workshop on Reinforcement Learning   2024

Lab Manager, Bath Reinforcement Learning Lab   2021 – present

Organise and facilitate various lab activities to encourage collaboration across our 20 members. Activities include weekly research meetings, paper reviews, and annual meetings.

SKILLS

Regular use: Python, PyTorch, NumPy, Matplotlib, LaTeX

Past professional use: MATLAB, Simulink, NX (CAD)

University modules: ROS, TensorFlow, Java