

DANIEL BEECHEY

[Email](#) ◇ [Google Scholar](#) ◇ [Website](#) ◇ [GitHub](#)

RESEARCH INTERESTS

Reinforcement Learning, LLM-based Agents, Explainable AI, Hierarchical RL, Continual Learning, Open-ended Learning, Exploration, Bounded Rationality

EDUCATION

PhD in Reinforcement Learning present

University of Bath, UK

Supervisors: Özgür Şimşek (Computer Science), Emma Carmel (Social Policy)

Dissertation: *Explaining Reinforcement Learning with Shapley Values: Theory and Algorithms*

MRes in Accountable, Responsible, and Transparent AI 2022

University of Bath, UK

Dissertation: *Explaining Reinforcement Learning with Shapley Values*

Grade: Distinction

MSc in Data Science 2021

University of Bath, UK

Dissertation: *Autonomous Routing of Printed Circuit Boards with Hierarchical Reinforcement Learning*

Grade: Distinction

BSc (Hons) in Mathematics 2020

University of Bath, UK

Grade: First Class

WORK EXPERIENCE

Research Scientist, Huawei Noah's Ark Lab 2025 - present

Leading a research team focused on open-ended reinforcement learning for LLM-based agents.

Developed *Darwin Mobile Agent*, the first fully open-source, end-to-end pipeline for large-scale online reinforcement learning and inference of mobile GUI agents.

Co-Manager of the Bath RL Lab, University of Bath 2023 - 2025

Organised lab activities, including weekly lab meetings, research sessions, paper discussions, and social events.

Teaching Assistant, University of Bath 2020 - 2025

Modules: Reinforcement Learning; Statistics for Data Science; Software Technologies for Data Science; Programming, Foundations, and Connections; Programming and Discrete Mathematics; Mathematical Methods and Applications

Supervised 10 MSc and 5 BSc students.

AI Lecturer, University of Bath 2022 - 2023

Lectured MSc Reinforcement Learning.

Supervised 5 MSc and 2 BSc students.

AWARDS

University of Bath, **Doctoral Recognition Award** 2024

Bath Conference of Computer Science, **Best Overall Contribution** 2023

Inter-CDT Conference on AI, **Best Poster** 2023

PUBLICATIONS

- Darwin Mobile Agent: A Roadmap for Self-Evolution* *Preprint, 2025*
Daniel Beechey, Derek Yuen, Jianheng Liu, et al.
- A Theoretical Framework for Explaining Reinforcement Learning with Shapley Values* *Preprint, 2025*
Daniel Beechey, Thomas M. S. Smith, and Özgür Şimşek
- Approximating Shapley Explanations in Reinforcement Learning* *NeurIPS, 2025*
Daniel Beechey and Özgür Şimşek
- Reformulating Reactivity Design for Data-Efficient Machine Learning* *ACS Catalysis, 2023*
Toby Lewis-Atwell, **Daniel Beechey**, et al.
- Explaining Reinforcement Learning with Shapley Values* *ICML, 2023*
Daniel Beechey, Thomas M. S. Smith, and Özgür Şimşek

OPEN-SOURCE PROJECTS

- Darwin Mobile Agent** (*core contributor*): An end-to-end pipeline for large-scale online reinforcement learning of mobile GUI agents.
- FastSVERL** (*lead developer*): A scalable library for approximating Shapley value explanations in reinforcement learning.

SELECTED TALKS

- Explaining Reinforcement Learning with Shapley Values: Theory and Algorithms**
MARBLE Research Group, University of Edinburgh *2025*
- A Theoretical Framework for Explaining Reinforcement Learning with Shapley Values**
ART-AI Colloquium Series *2025*
Bath Doctoral Festival of Ideas *2024*
- An Introduction to Explainable and Hierarchical Reinforcement Learning**
Bath AI Society *2024*
- Explaining Reinforcement Learning with Shapley Values**
Bath Conference of Computer Science *2023*
Alan Turing Institute *2023*

TECHNICAL SKILLS

Frameworks & Libraries	PyTorch, HF Transformers, VeRL, Ray, Gym, NumPy, Matplotlib
Programming Languages	Python (Proficient), Bash, R, Matlab
Tools & Platforms	Git, Linux, SLURM, wandb, Jupyter, Conda
RL Algorithms	PPO, GRPO, DQN, DDPG, SAC, Hierarchical RL
Model Architectures	LLMs, Transformers, VAE, CNN, MLP

REVIEWING

- Reinforcement Learning Conference (RLC) *2025*
- European Workshop on Reinforcement Learning (EWRL) *2024*