

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	<i>present</i>
<i>University of Bath, UK</i>	
Supervisors: Özgür Şimşek (Computer Science), Emma Carmel (Social Policy)	
Dissertation: <i>Explaining Reinforcement Learning with Shapley Values: Theory and Algorithms</i>	
MRes in Accountable, Responsible, and Transparent AI	<i>2022</i>
<i>University of Bath, UK</i>	
Dissertation: <i>Explaining Reinforcement Learning with Shapley Values</i>	
Grade: Distinction	
MSc in Data Science	<i>2021</i>
<i>University of Bath, UK</i>	
Dissertation: <i>Autonomous Routing of Printed Circuit Boards with Hierarchical Reinforcement Learning</i>	
Grade: Distinction	
BSc (Hons) in Mathematics	<i>2020</i>
<i>University of Bath, UK</i>	
Grade: First Class	

WORK EXPERIENCE

Research Scientist, <i>Huawei Noah's Ark Lab</i>	<i>2025 - present</i>
Leading a research team focused on open-ended reinforcement learning for LLM-based agents.	
Developed <i>Darwin Mobile Agent</i> , 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, <i>University of Bath</i>	<i>2023 - 2025</i>
Organised lab activities, including weekly lab meetings, research sessions, paper discussions, and social events.	
Teaching Assistant, <i>University of Bath</i>	<i>2020 - 2025</i>
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, <i>University of Bath</i>	<i>2022 - 2023</i>
Lectured MSc Reinforcement Learning.	
Supervised 5 MSc and 2 BSc students.	

AWARDS

University of Bath, Doctoral Recognition Award	<i>2024</i>
Bath Conference of Computer Science, Best Overall Contribution	<i>2023</i>
Inter-CDT Conference on AI, Best Poster	<i>2023</i>

PUBLICATIONS

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

OPEN-SOURCE PROJECTS

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

SELECTED TALKS

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

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)	<i>2025</i>
European Workshop on Reinforcement Learning (EWRL)	<i>2024</i>