# DANIEL BEECHEY

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## RESEARCH INTERESTS

Reinforcement learning, interpretable artificial intelligence, alignment, LLMs in reinforcement learning, hierarchical reinforcement learning, bounded rationality, exploration and continual learning.

## EDUCATION

**PhD in Computer Science** *Expected 2026*
*University of Bath*, United Kingdom.
Supervisors: Özgür Şimşek (Computer Science), Emma Carmel (Social Policy)
Thesis: Self-Explaining Continual Reinforcement Learning Agents

**MRes in Accountable, Responsible and Transparent AI** *2022*
*University of Bath*, United Kingdom.
Supervisors: Özgür Şimşek (Computer Science), Emma Carmel (Social Policy)
Dissertation: Explaining Reinforcement Learning with Shapley Values
Grade: Distinction

**MSc in Data Science** *2021*
*University of Bath*, United Kingdom.
Supervisor: Özgür Şimşek
Dissertation: Autonomous Routing of Printed Circuit Boards with Hierarchical Reinforcement Learning
Grade: Distinction

**BSc(Hons) in Mathematics** *2020*
*University of Bath*, United Kingdom.
Grade: First Class

## WORK EXPERIENCE

**Co-Manager of the Bath RL Laboratory,** *University of Bath* *2023 - present*
Organising lab activities, including weekly lab meetings, research sessions, paper discussions and social events.

**Graduate Teaching Assistant,** *University of Bath* *2020 - present*
Supervised 10 MSc students,    Reinforcement Learning,    Statistics for Data Science,
Software Technologies for Data Science,    Programming, Foundations and Connections,
Programming and Discrete Mathematics,    Mathematical Methods and Applications.

**Fixed-Term Lecturer,** *University of Bath* *2022 - 2023*
Reinforcement Learning (110 MSc students, 29 MSc students).
Supervised 5 MSc students and 2 BSc students.

## PUBLICATIONS

**Daniel Beechey**, Thomas M. S. Smith and Özgür Şimşek
*Explaining Reinforcement Learning with Shapley Values*
ICML 2023

Toby Lewis-Atwell, **Daniel Beechey**, Özgür Şimşek and Matthew N. Grayson
*Reformulating Reactivity Design for Data-Efficient Machine Learning*
ACS Catalysis, 13(20), 2023

## AWARDS

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| University of Bath, **Doctoral Recognition Award** | *2024* |
| Bath Conference of Computer Science, **Best Overall Contribution** | *2023* |
| Inter-CDT Conference on AI, **Best Poster** | *2023* |

## TALKS

**How to Explain Reinforcement Learning with Shapley Values** *2024*
Bath Doctoral Festival of Ideas

**An Introduction to Explainable and Hierarchical Reinforcement Learning** *2024*
Bath AI Society

**Explaining Reinforcement Learning with Shapley Values** *2023*
Bath Conference of Computer Science

**Explaining Reinforcement Learning with Shapley Values** *2023*
Alan Turing Institute Student Presentations

## TECHNICAL SKILLS

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| **Conceptual** | Mathematics, statistics and machine learning. |
| **Programming** | Excellent Python skills. Experience with R, Matlab and Git. |
| **Libraries** | TensorFlow, PyTorch, Matplotlib, NumPy and many other Python libraries. |
| **Algorithms** | DQN, PPO, DDPG, SAC, Option-Critic and many other algorithms. |
| **Models** | MLP, CNN, VAE, diffusion models, transformers and many other architectures. |

## SERVICE

**Co-Organiser of the Bath Reinforcement Learning Workshop** *2024 - present*
*University of Bath*, United Kingdom
The student lead on the organising committee.

**Reviewing**
European Workshop on Reinforcement Learning (EWRL) *2024*