

Reece O'Mahoney

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About Me

I am Head of AI at a stealth-mode startup and a final-year PhD candidate at the Oxford Robotics Institute, University of Oxford. My thesis is on applying diffusion models to robotic control. Previously I was a machine learning engineer at Kinisi Robotics, did freelance full-stack development, and read Engineering Science at Oxford. I am currently trying to improve my handstands and my chess rating.

Education

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| University of Oxford , PhD in AI & Robotics | Oct 2022 – Present |
| <ul style="list-style-type: none">• Oxford Robotics Institute, final year (expected completion 2027)• Thesis on applying diffusion models to robotic control | |
| University of Oxford , MEng Engineering Science | Oct 2018 – Jun 2022 |
| <ul style="list-style-type: none">• First Class Honours | |

Experience

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| Head of AI , Stealth-mode startup | Sep 2026 – Present |
| <ul style="list-style-type: none">• Leading AI research and engineering at an early-stage robotics startup• Responsible for the full model development stack, from data collection and training through to deployment on hardware | |
| Robotics & Machine Learning Engineer , Kinisi Robotics | Jul 2025 – Jan 2026 |
| <ul style="list-style-type: none">• Built VLAs for humanoid robotics. Developing, scaling, and deploying infrastructure to cover the whole imitation learning pipeline, including teleoperation, data collection, model training, and inference. | |
| Full Stack Developer , Freelance | Dec 2024 – July 2025 |
| <ul style="list-style-type: none">• Developed and deployed full-stack applications for enterprise clients• Expertise in modern JavaScript/TypeScript frameworks including React, Next.js, and Astro | |
| Undergraduate Tutor & Admissions Interviewer , University of Oxford | Oct 2023 – July 2025 |
| <ul style="list-style-type: none">• Taught 2nd year mechanics and Masters' level machine learning courses to undergraduates at Oxford• Conducted admissions interviews for undergraduate engineering applicants | |
| Private Tutor , Freelance | Aug 2019 – Oct 2024 |
| <ul style="list-style-type: none">• Helped dozens of students secure places at top UK universities including Oxbridge and the G5 | |

Technical Skills

AI & Robotics:

- Extensive experience training, fine-tuning, and deploying vision-language-action models such as $\pi_{0.5}$, including offline RL and advantage-conditioned fine-tuning
- Subject matter expert on diffusion and flow matching policies for robotic manipulation and locomotion
- Proficient in real-time robotics systems and hardware integration using ROS, C++ , and embedded systems
- PyTorch, LeRobot, IsaacSim, MuJoCo, Newton, LIBERO

Web Development:

- Full-stack development with TypeScript/JavaScript, React, Next.js, and Astro
- Experience gathering requirements from enterprise clients and integrating cloud services

Publications

DetAug: Obstacle-Blind Trajectory Augmentation for Zero-shot Obstacle Avoidance [pre-print]

Sep 2026

R. O'Mahoney, M. Zoellner, I. Havoutis (2026) [Project Website] [Paper] [Code]

- Developed an obstacle-blind augmentation scheme that adds random detours to free-space demonstrations and conditions a flow matching policy on the detour parameters, enabling zero-shot obstacle avoidance by selecting over the label space at inference
- Exceeded the next best method by over 20pp on the SafeLIBERO benchmark and matched an obstacle-conditioned baseline on real hardware without ever seeing obstacles in training

DistAL: Distance-based Advantage Learning for VLA Fine-Tuning [pre-print]

Sep 2026

R. O'Mahoney, I. Havoutis (2026) [Project Website] [Paper] [Code]

- Replaced the sparse success/failure reward in advantage-conditioned VLA fine-tuning with a dense embedding-space distance reward derived from out-of-distribution detection, producing a more informative value function
- Improved success of a fine-tuned $\pi_{0.5}$ policy on LIBERO-10, LIBERO-plus, and dexterous bi-manual manipulation tasks on real hardware

Improving Trajectory Stitching with Flow Models [pre-print]

May 2025

R. O'Mahoney, W. Yu, I. Havoutis (2025) [Project Website] [Paper] [Code]

- Used a combination of techniques to improve the ability of flow matching models to produce flexible manipulation plans by targeting stitching abilities
- Demonstrated reduced error in out-of-distribution plans and greater obstacle avoidance capabilities than previous methods

Offline Adaptation of Quadruped Locomotion using Diffusion Models [ICRA 2025]

Sep 2024

R. O'Mahoney, A. L. Mitchell, W. Yu, I. Posner, I. Havoutis (2024) [Project Website] [Paper] [Code]

- Developed a novel diffusion-based framework for quadruped locomotion that was able to adapt to new reward functions after training and interpolate between multiple skills
- Demonstrated efficient real-time inference on a physical quadruped platform using an optimized model architecture

Projects & Contributions

LeRobot | Hugging Face

github.com/huggingface

- Open-source contributor to LeRobot, Hugging Face's PyTorch library for robotics training and deployment, with six merged PRs across datasets, environments, and policy configuration

SLURM Tools

github.com/reeceomahoney

- CLI for submitting SLURM jobs over SSH and a web GUI for monitoring them across clusters

Arxiv Library

arxiv-library.vercel.app

- A Web app for reading and organizing arXiv papers

Booking System | Leading Education

- Built a platform for taking and managing client bookings for a private tuition company
- Integrated platform with real-time email and Whatsapp notification services