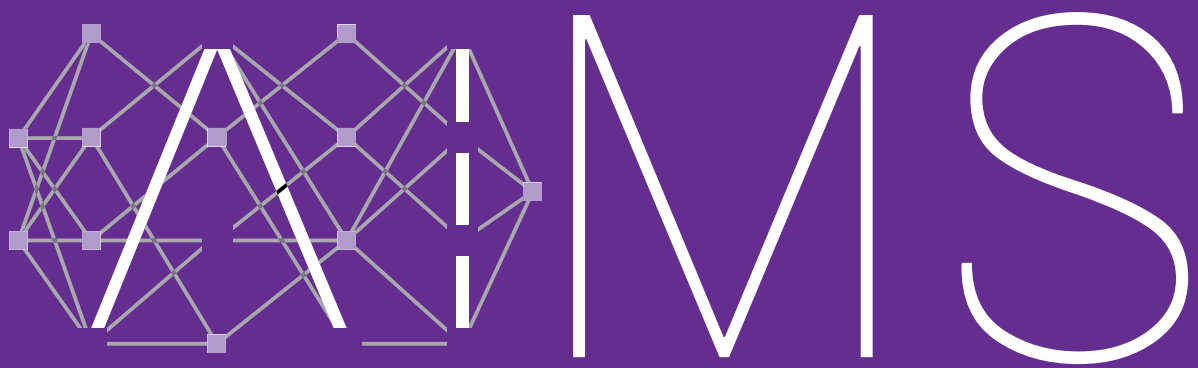




EPSRC Centre for Doctoral Training in
Autonomous Intelligent Machines & Systems

Annual Review 2025/2026

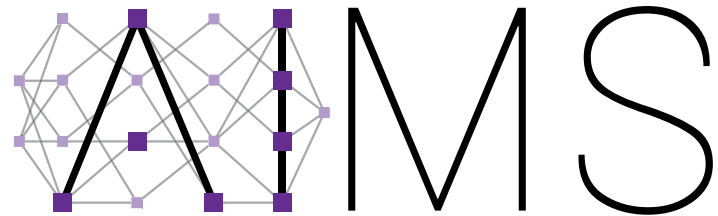


Engineering and
Physical Sciences
Research Council





Robotics week



EPSRC Centre for Doctoral Training in
Autonomous Intelligent Machines & Systems

Foreword

In this document we highlight what has happened in the past year of the AIMS CDT.

Welcome to the eleventh annual review highlighting key aspects and activities of staff and students in AIMS during 2025/2026. This has been the twelfth full year of the EPSRC Centre for Doctoral Training in Autonomous Intelligent Machines & Systems. The CDT is thriving with applications in excess >300 in the past year.

Thanks to the generosity of our partners, we have been able to fully-fund more students this past year, and for future years.

The last year has been another successful year for publications to top conferences, students submitting their dissertations, and going to work for several companies, as well as in academia.

We held a very successful AIMS seminar series with speakers from the AIMS supervisory pool, industry representatives, including Amazon, Nvidia, Satellite Catapult, Iconic Interactive and Toshiba as well as universities across the worlds.

We would like to warmly acknowledge EPSRC and our industry partners for their continued support of studentships and internships.

Maike Osborne

Director

Alex Rogers

Co-Director

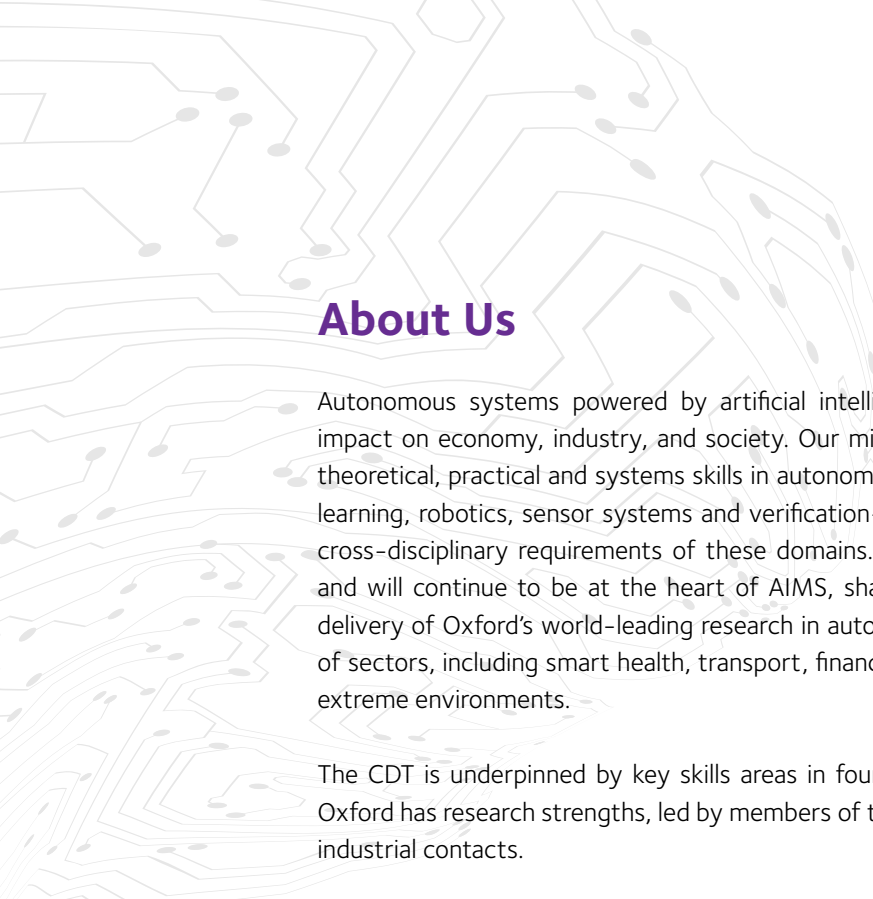
Xiaowen Dong

Co-Director

Wendy Poole

Centre Administrator





About Us

Autonomous systems powered by artificial intelligence will have a transformative impact on economy, industry, and society. Our mission is to train cohorts with both theoretical, practical and systems skills in autonomous systems – comprising machine learning, robotics, sensor systems and verification– and a deep understanding of the cross-disciplinary requirements of these domains. Industrial Partnerships have been and will continue to be at the heart of AIMS, shaping its training and ensuring the delivery of Oxford's world-leading research in autonomous systems to a wide variety of sectors, including smart health, transport, finance, tracking of animals, energy, and extreme environments.

The CDT is underpinned by key skills areas in four interconnected themes, in which Oxford has research strengths, led by members of the CDT team, and strengthened by industrial contacts.

Key Skills Areas

What's holding up the real-world impact of Artificial Intelligence? Today, too often, innovation is overly focussed on new component algorithms, particularly those from Machine Learning. To realise impact on the world, however, such algorithms must be integrated with complete autonomous systems – in which there are far-too-few trained experts. AIMS imparts unified training in four important and intimately connected components of such systems:

- Machine Learning, as a unifying core.
- Robotics & Vision.
- Cyber-Physical Systems (e.g., sensor networks); and
- Control & Verification.

As examples of autonomous systems, AIMS aim is at building systems to impact upon

- sustainable urban development (transport, financial services, and smart infrastructure),
- extreme and challenging environments (space robots and satellite data) and
- smart health (cancer diagnosis).

To deliver training in these core research themes, we delivered a series of modules in 2025/2026 in the following areas: AI Safety & Alignment, Machine Learning, Signal Processing, Optimization, Systems Verification, Reinforcement Learning, Introduction to Modern Control, Discriminative & Deep Learning for Big Data , Computer Vision, Autonomous Systems Safety & Governance, Systems Verification, Privacy & Security, Reinforcement Learning, Sensors, Smarter Devices and the Internet of Things, Autonomous Robotics, Cooperative AI: Foundations & Frontiers and Deep Learning in Distributed and Constrained Systems.



Events, highlights, outreach, and publications

AIMS students have taken part in a wide range of research and outreach this last year. They have also published many papers at top conferences. These include: ICML (International Conference on Machine Learning), CVPR (Conference on Computer Vision and Pattern Recognition), NeurIPS (Neural Information Processing Systems), RLC (Reinforcement Learning), AAAI (Association for the Advancement of Artificial Intelligence).

Publications

(A full list of publications can be found at: <https://aims.robots.ox.ac.uk/publications/>) but here are just a few from the last year.

- **Samuele Marro**, Jialin Yu, Emanuele La Malfa, **Oishi Deb**, Jiawei Li, Yibo Yang, Ebey Abraham, Sunando Sengupta, Eric Sommerlade, Michael J. Wooldridge, Philip Torr. Benchmarking at the Edge of Comprehension. ICML 2026.
- Bidipta Sarkar, Mattie Fellows, Juan Agustin Duque, Alistair Letcher, Antonio León Villares, Anya Sims, Dylan Cope, **Jarek Liesen**, Lukas Seier, Theo Wolf, Uljad Berdica, Alexander David Goldie, Aaron Courville, Karin Sevegnani, Shimon Whiteson, and Jakob Nicolaus Foerster. *“Evolution Strategies at the Hyperscale”*. ICML 2026.
- **Alexander D. Goldie**, Zilin Wang, Adrian Hayler, Deepak Nathani, Edan Toledo, Ken Thampiratwong, Aleksandra Kalisz, Michael Beukman, Alistair Letcher, Shashank Reddy, Clarisse Wibault, **Theo Wolf**, Charles O’Neill, **Uljad Berdica**, Nicholas Roberts, Saeed Rahmani, Hannah Erlebach, Roberta Raileanu, Shimon Whiteson, and Jakob N. Foerster. *“Procedural Generation of Algorithm Discovery Tasks in Machine Learning”*. ICML 2026.
- **Uljad Berdica**, Fernando Acero, Anton Ipsen, Parisa Zehtabi, Michael Cashmore, and Manuela Veloso. *“When Do We Need LLMs? A Diagnostic for Language-Driven Bandits”*. RLC 2026.
- Mattie Fellows, Clarisse Wibault, **Uljad Berdica**, Johannes Forkel, Michael A. Osborne, and Jakob N. Foerster. *“SOREL and TOReL: Two Methods for Fully Offline Reinforcement Learning”*. RLC 2026.
- **Niki Amini-Naieni** and Andrew Zisserman. *Open-world object counting in videos*. AAAI 2026.
- **Niki Amini-Naieni** and Andrew Zisserman. *CountGD++: Generalized Prompting for Open-World Counting*. CVPR 2026.



- **Mark C. Eid** and Ana I.L. Namburete and João F. Henriques. *UltraGauss: Ultrafast Gaussian Reconstruction of 3D Ultrasound Volumes*. ICLR 2026
- **Eid, Mark C.** and Yeung, Pak-Hei and Wyburd, Madeleine K. and Henriques, João F. and Namburete, Ana I.L. *RapidVol: Rapid Reconstruction of 3D Ultrasound Volumes from Sensorless 2D Scans*. IEEE 22nd International Symposium on Biomedical Imaging 2025
- **Angel Y. He** & David Parker. *Robust Verification of Concurrent Stochastic Games*. TACAS 2026
- Schnitzer, Y.*, **Jackermeier, M.***, Abate, A., Parker, D. (2026). Probabilistic Performance Guarantees for Multi-Task Reinforcement Learning. *ICML 2026*.
- Abate, A., De Giacomo, G., **Jackermeier, M.***, Křetínský, J., Prokop, M.*, Weinhuber, C.* (2026). Semantically Labelled Automata for Multi-Task Reinforcement Learning with LTL Instructions. *IJCAI 2026*.
- **Dulhan Jayalath**, Shashwat Goel, Thomas Foster, Parag Jain, Suchin Gururangan, Cheng Zhang, Anirudh Goyal and Alan Schelten. “*Compute as Teacher: Turning Inference Compute Into Reference-Free Supervision*”. ICML 2026.
- **Dulhan Jayalath** and Oiwi Parker Jones. “*MEG-XL: Data-Efficient Brain-to-Text via Long-Context Pre-Training*”. ICML 2026.
- **Alexander Pondaven**, Ziyi Wu, Igor Gilitschenski, Philip Torr, Sergey Tulyakov, Fabio Pizzati, Aliaksandr Siarohin. “*ActionParty: Multi-Subject Action Binding in Generative Video Games*”. <https://arxiv.org/abs/2604.02330>
- **Malik, S. A.**, Doherty, T. A., Colmey, B., Roberts, S. J., Gal, Y., & Midgley, P. A. (2026). Hybrid physics-machine learning models for quantitative electron diffraction refinements. *Nature Communications*. <https://doi.org/10.1038/s41467-026-71673-9>
- **Malik, S. A.**, Doherty, T., Tigas, P., Razzak, M., Roberts, S. J., Walsh, A., & Gal, Y. (2026). MADE: Benchmark Environments for Closed-Loop Materials Discovery. ICML 2026 (to appear, preprint <https://arxiv.org/abs/2601.20996>)
- Samuele Marro, Jialin Yu, Emanuele La Malfa, Oishi Deb, Jiawei Li, Yibo Yang, Ebey Abraham, Sunando Sengupta, Eric Sommerlade, Michael J. Wooldridge, Philip Torr. Benchmarking at the Edge of Comprehension. ICML 2026.
- Dalal Alrajeh, Vesna Nowack, **Patrick Benjamin** et al. “*Data-Dependent Goal modeling for ML-Enabled Law Enforcement Systems*”. 48th International Conference on Software Engineering (ICSE 2026).



Internships

- Odyssey, Amazon, JP Morgan Chase, Microsoft and Spotify.

Impact/Achievements

- Oishi Deb from our AIMS CDT, along with a team, won third place in the “AI for Good” Hackathon hosted by Reuben College, University of Oxford, for their project “Fail Forward Therapeutics” – which uses AI for Drug Discovery.
- Oishi Deb wins \$6000 dollars of compute grant
- Oishi Deb wins \$6000 dollars of computer grant. \$1000 dollars from **Mithril** – one of the winners at the **ICLR’s Generative AI for Genomics Compute Challenge** – more details on the compute challenge here <https://genai-in-genomics.github.io/index.html>
- \$5000 dollars of Researcher’s Grant from **Thinking Machine Lab**, more info on the Grant [here](#).
- Oishi Deb from our AIMS CDT was featured in the Brazilian TV news documentary *Digital Minds: Era of Artificial Intelligence*, where she discussed Generative AI and her research. The programme was broadcast on *Fantástico* (TV Globo), Brazil’s largest and most-watched TV news show, reaching over 20 million viewers each week and available in 118 countries. The documentary also featured Prof Philip Torr from our Department of Engineering Science; Pushmeet Kohli, a former member of the Torr Vision Group (TVG) and now Vice President at Google DeepMind.



Public Engagement

This year's Public Engagement with Research (PER) training, delivered in partnership with Statistics for Machine Learning, aimed to build students' confidence, understanding, and practical skills in communicating their research with public audiences. Through a day-long interactive workshop, students explored what makes engagement purposeful and effective, learned how to design hands-on activities for festivals, and worked in teams to create and deliver their own research-inspired public engagement projects. Mentors provided guidance throughout, and a dedicated demo day enabled students to test and refine their ideas before taking them to live events.

Two student-led teams delivered activities at established engagement events, reaching hundreds of participants. Team **Turing Detectives: Can You Beat the Turing Test?** The activity involved a fast-paced, interactive game where participants used a magnifying glass to examine large printed images and press a big push-button to lock in their answer, racing against a timer to score points and appear on a leaderboard. Stickers and stick-on detective moustaches were awarded as prizes. Children were also invited to wear novelty detective costumes such as a hat, glasses and trenchcoat while taking part to help with their immersion. We had two identical stations within our stand operating in parallel to ensure as many children could take part as possible. We had around ~200 AI generated images of three different difficulties (hard, harder, and impossible) showing animals with various incorrect aspects such as: their habitat (e.g. a polar bear in a jungle), the number of limbs or features, or other conditions e.g. lighting and shadows. These images were inserted into plastic wallet display folders and the answers were inserted on the reverse so that we could provide instant feedback. The team showcased **Turing Detectives: Can You Beat the Turing Test?** at the "Super Science Saturday" event at the Oxford University Museum of Natural History (OUMNH). This was a non-ticketed, public event, with around ~3500 attendees over four hours, with participants being primarily aged between 5-10 years old.



Team Turing Detectives

Team **Can you Roar like a Dinosaur** created an opportunity for the children to engage with the concept of sound waves, exploring the medium in which sounds travels, how different sounds and materials in the environment impact the waveform, as well as how we can visualise this waveform in real time.

The participants explored how and why different sounds produced different shapes as well as what happened when different sounds were played together as chords. Allowing the children to guess how the projection on the wall would change when the sound was made louder/quieter and when a high/lower note was played, then allowed them to make this change on the board and see if the outcome was what they guessed was particularly effective. Even the younger participants had good intuition on this and clearly enjoyed getting to press combinations of buttons on the sound board to produce different patterns of frequencies.

The team also showcased at the “Super Science Saturday” event at the Oxford University Museum of Natural History (OUMNH).

Both teams reflected thoughtfully on the challenges of simplifying complex ideas, adapting to real-world festival dynamics, and designing activities that invite curiosity and conversation. Their achievements were celebrated at the joint AIMS–StatML showcase event, where **Can you Roar like a Dinosaur** won the People’s Choice Award Collectively, these projects demonstrated the value of experiential learning in PER, building students’ skills in teamwork, communication, creativity, and reflective practice while meaningfully connecting research with public audiences.



Team Can you Roar like a Dinosaur



AIMS CDT Cohort 2026



their flight software.

Ethan D'Alessandro - I am originally from Iowa in the United States but did my undergrad at the University of Michigan in Computer Science and Aerospace Engineering. I then came to the University of Oxford for a master's in computer science. My master's thesis investigated methods of attacking SAR and AIS-based fusion algorithms which are commonly used for maritime monitoring. Previously, I worked at SpaceX on their Falcon 9 Recovery team, and at NewOrbit Space, a VLEO satellite manufacturer writing

My main areas of interest are space, security and robotics.

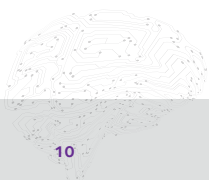


Liam Edwards - Before joining AIMS, I completed my Bachelor's and master's in mechanical engineering at the University of California, Los Angeles. Specializing in controls, I performed research in tactile manipulation, locomotion, and robotic learning, including work in Professor Masayoshi Tomizuka's lab at Berkeley, motivated by a desire to create adaptable systems capable of performing in human environments. Pursuing this goal, I became interested in how foundation models might provide the necessary counterfactual reasoning and spent my Master's in Professor Neil Lin's lab pushing the capabilities of these models in the biomedical space. There I worked on drug property prediction and pathology classification, with a particular focus on pushing models to extract signal through minimal training data. During my time at AIMS, I'm excited to bring this work with foundation models back to robotics, focusing on world modeling for embodied systems. Outside of work, I also enjoy hiking, board games, and cooking.



Helen Fan - Before AIMS, I completed the MEng in Engineering Science at the University of Oxford. My master's thesis worked on fusing sensing modalities for assistive exoskeletons and was carried out at the Oxford Robotics Institute. I have done research internships in neurosymbolic AI, computer vision and deep learning, across Europe, China and Singapore. In the AIMS CDT, I am excited to explore AI4Science, neuroscience and AI safety.

I am Chinese, and I was raised in London. In my free time I enjoy film, literature and the occasional game of tennis.





Caitlin Haddow - I started my career working in project management, after completing a BA in History with Maths at Lancaster University. During covid I taught myself Python and started working on personal programming projects. I then worked a split role between project management and machine learning research, confirming that machine learning – specifically computer vision – is where my interests really lie. I completed a master's in computer science with the University of Bath, alongside my job as a Senior Software

Developer for the UK government – leading a computer vision research team to investigate novel machine learning techniques. During my master's I achieved first prize at the BCS Lovelace Colloquium poster competition for my research on smoke removal in real wildfire imagery. In my free time, I enjoy going to the theatre, board games, and picking up random new crafts.



Scott Jones - Hello everyone! I'm Scott. I grew up in London and studied here too.

Coming into the AIMS programme, I am excited to research visual world models for robotic control. In particular, I am interested in investigating unsupervised strategies in training such models, using latent actions extracted from videos. However, I remain open to discovering new topics from other domains and am keen to absorb as much as possible in the first year of the programme.

My background is computer science. I completed my BEng at Imperial, where my thesis focused on applying computer vision methods to predict online image popularity. I then undertook an MPhil in Machine Learning and Machine Intelligence at the University of Cambridge, where I investigated the efficacy of pretrained visual models in model-based reinforcement learning.

More recently, I completed a machine learning internship at Epic Games, working on a feature to bring about LLM-enabled NPCs to Fortnite! I now leave with a greater appreciation for language modelling, having been exposed to cool topics such as LLM post-training and automated red teaming.

Apart from research, I like picking up hobbies and becoming only mildly good at them. For example, I am mediocre at climbing, cycling, running, rowing, padel, skiing/snowboarding and much more.





Benjamin McCartney - I grew up in Cornwall and completed an MEng in Engineering Science at the University of Oxford, specialising in Control and Information Engineering. During my studies, I developed a particular interest in how these areas can be applied to robotics. In 2025, I interned at the Oxford Robotics Institute, where I explored how deep reinforcement learning can enable quadruped robots to perform 'parkour'. This involved training a robot to navigate a variety of challenging and

discontinuous terrains, including stairs, gaps and stepping stones. I continued exploring this area through my Master's thesis, focusing on how robots can learn locomotion that generalises to previously unseen terrains. On AIMS, I'm excited to continue working in reinforcement learning, exploring its intersection with multi-agent systems and large language models.

In my free time, my main passion is running, with a focus on cross-country, although I also dabble in road, track and trail. I compete at national level and was awarded a Full Blue in the final year of my undergraduate degree.

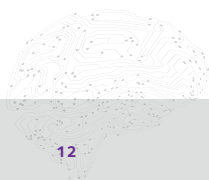


Andrew Platt - I grew up in the north-west of England, and from a young age I was fascinated by mathematics, algorithms and optimisation. I brought this fascination to my engineering undergraduate at Oxford, which I graduated from with first class honours in 2022. I specialised in planning for autonomous robotics systems under uncertainty, and my final year project led to a paper published at the European Conference on Mobile Robotics. After a few years working in industry my interest in building

AI systems that can work in the real world only grew stronger.

I'm particularly interested in building AI systems that can work for and with people. This includes using language models to improve the usability and interpretability of standard learning and planning techniques, and also efficient solution methods for multi-objective problems which can more faithfully model human preferences in robot behaviour.

Outside of work/study, I'm a keen powerlifter, a music enthusiast, and I'm slowly learning french and Spanish.



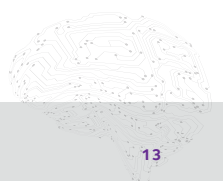


Matthew Vandergrift - I am a Canadian student from Ottawa, Ontario, interested in learning about learning. Prior to joining AIMS, I was a master's student at the University of Alberta where I did research focused on reinforcement learning. Before that I got a bachelor's degree at Queen's University. During my master's and undergraduate I got excited by the idea of trying to understand some of the computational principles driving decision making. This interest brought me to studying reinforcement learning, and from there my interests continue to bounce around in machine learning. I am looking forward to learning as much as possible in the AIMS program. Outside of research I enjoy rock climbing, cycling and ice skating. Website: <https://matthew-vandergrift.github.io/>



Brindan Yasodaran - I grew up on the Isle of Man before completing my undergraduate in Discrete Mathematics at the University of Warwick. Alongside my studies, I completed internships in software engineering and data science. Most recently in 2024 at UBS, I trained neural networks to estimate the local stochastic volatility model for pricing derivatives. I then became interested in understanding the internal mechanisms within neural networks that emerge during training and which enable them to generalise so well. This led me to pursue personal projects in mechanistic interpretability of transformers.

After my undergraduate, I joined the Advanced Computer Science master's at Oxford, where I have taken a variety of machine learning courses. For my dissertation, I worked on methods to control the output of pre-trained unconditional image generation models to align with an arbitrary reward function, without fine-tuning the generator itself. Starting AIMS, I am excited to continue working on both interpretability and control of AI systems, and believe both are necessary for deploying AI safely.





Jennifer Za Nzambi - I'm interested in agentic deployments, understanding when and how agents fail both individually and in interaction, and automation and coordination in fuzzy tasks.

I'm particularly drawn to applications in R&D. Previously, I was a research fellow at MATS and LASR, studying coding agents and monitorability. My background is in computer science and economics.



AIMS Contacts



MAIKE OSBORNE

Maïke Osborne is an expert in the development of intelligent algorithms capable of making sense of complex big data. His work in Machine Learning and non-parametric data analytics has been successfully applied in diverse and challenging contexts. For example, in astrostatistics, Maïke's probabilistic algorithms have aided the detection of planets in distant solar systems, and in autonomous robotics, his work has enabled self-driving cars to determine when their maps may have changed due to roadworks.

More recently, he has addressed key societal challenges, analysing how intelligent algorithms might soon substitute for human workers, and predicting the resulting impact on employment. Maïke is an Associate Professor in Machine Learning, an Official Fellow of Exeter College, and a Faculty Member of the Oxford-Man Institute for Quantitative Finance, all at the University of Oxford.



ALEX ROGERS

I originally studied Physics at Durham University before joining Schlumberger as a wireline logging engineer. After five years working in various oilfields around the world, I took suspended employment to study for a PhD applying statistical physics to models of evolving populations. Upon completing my PhD, I worked for a spin-out from the Santa Fe Institute applying complexity science to business problem before returning to academia, initially at the University of Southampton, and now at the University of Oxford.



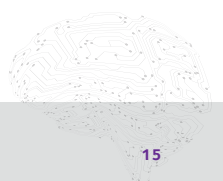
XIAOWEN DONG

Xiaowen Dong is an Associate Professor in the Department of Engineering Science, where he is an academic member of both the Machine Learning Research Group and the Oxford-Man Institute. He is also a Tutorial Fellow at Lady Margaret Hall. Prior to joining Oxford, he was a postdoctoral associate in the MIT Media Lab, where he remains as a research affiliate, and received his PhD degree from the Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland. Director 2025/2026)



WENDY POOLE

I have been working in the University for 32 years. I accepted the position as CDT Centre Administrator, after working in the Department of Computer Science for 20 years.



Academic Supervisors

A full list of academic supervisors can be found at:
<http://aims.robots.ox.ac.uk/academics-and-staff/>



Team Can you Roar like a Dinosaur



Team Turing Detectives



Team Turing Detectives



Robotics week



EPSRC Centre for
Doctoral Training in
Autonomous Intelligent
Machines and Systems (AIMS)
Department of Engineering Science
University of Oxford
Parks Road
Oxford OX1 3PJ

Director

Maike Osborne

Email: aims-cdt@robots.ox.ac.uk

Tel: 01865 616622

CDT Co-Director

Alex Rogers

Email: aims-cdt@robots.ox.ac.uk

CDT Centre Administrator

Wendy Poole

Email: aims-cdt@robots.ox.ac.uk

Tel: 01865 616632

www.aims.robots.ox.ac.uk



EPSRC Centre for Doctoral Training in
Autonomous Intelligent Machines & Systems