
THE UNIVERSITY of EDINBURGH
Leading
Artificial
Intelligence

Introduction

The University of Edinburgh is the birthplace of Artificial Intelligence (AI) in Europe. It has been part of our history for more than six decades, and continues to influence and drive our extraordinary work today and into the future.

We would like you to join us as we continue to push the boundaries and harness this revolutionary technology for good.

Done well, we believe AI has the ability to unlock economic growth, create previously unimagined jobs and industries, offer solutions to over-stretched public services, and make the lives of everyone in the UK – and beyond – better.

We believe this because at Edinburgh we are already doing it.

We are stoking our region's buzzing startup culture through initiatives like the AI Accelerator. Our experts work closely with the NHS to create virtuous cycles of health data helping to devise AI-powered tools which improve diagnoses and lead to novel treatments.

We are leading research into the next generation of chips, algorithms and software that will power AI, making the underlying infrastructure cheaper, greener and more accessible. Our Data Driven Innovation programme is empowering thousands of young people and companies to unlock data's potential, including in the adoption and development of AI.

Underpinning all this is a commitment to using AI to reduce inequalities, not entrench them; to nurture the environment, not degrade it. We have world-leading researchers studying the ethics, regulation and law of AI.

We are only able to do all this thanks to our unique combination of talent concentration, computing power, datasets and partnerships with the public and private sectors.

We have the people, the machines, the experience and the ambition to do more.

Please join us, work with us. There is much to learn.

Professor Sir Peter Mathieson
Principal and Vice-Chancellor,
The University of Edinburgh

The University's Central Campus in Edinburgh

We are using AI to change lives

We are innovating with AI to improve the worlds of health, finance and climate action.

We believe AI can make societies healthier, wealthier and more sustainable. It has a vital role in delivering on Edinburgh's three research missions – to shape the future of health and care, to tackle the climate crisis, and to harness data and digital for public good.

In healthcare, we are pioneering how AI can transform how we care for some of the most vulnerable in society. Backed by £6 million investment, our **Centre for AI for Assistive Autonomy** is enabling research into assistive robots, autonomous surgical tools and enhanced driving features.

Our £21 million **Causality in Healthcare AI** (**CHAI**) **Hub** is developing a fully explainable causal AI platform to address unique challenges in areas such as prevention, diagnosis and treatment.

As a trusted partner to NHS Scotland, our researchers have access to health data to develop advanced diagnostic tools for the health and care sector. **Edinburgh Medical School** researchers have developed an AI tool that uses patient data to diagnose heart attacks more accurately and quickly than traditional methods, for example. The result is faster treatment that saves lives.

We are leading in the use of AI to tackle the climate crisis. Our experts apply AI models to scour huge amounts of near real-time satellite data to identify harmful emission hotspots such as power stations, cities and pipelines. Others are using AI to reveal for the first time the climate impact of the UK's food consumption.

We also know that AI's huge energy demands bring its own environmental challenges. That is why we are researching how to make the systems and hardware that drive AI – the semiconductors, the data farms – greener.

And in finance, we are using AI to unlock the power of financial data for good. The technology has the ability to help people manage their money more effectively and financial institutions to make more astute decisions.

We have partnered with global asset manager abrdn to create the **Centre for Investing Innovation**. Using abrdn's datasets, we are exploring how large language models can improve the investment process by synthesising the huge amount of data needed to make decisions.

Elsewhere, our **Smart Data Foundry**, in partnership with NatWest, has developed a Cost-of-Living Dashboard for councils. The tool overlays financial well-being indicators with contextual information, empowering policymakers to understand and intervene more effectively to support their communities.

Researchers at Edinburgh are using AI to analyse methane emission data captured by the Sentinel-5P satellite

Our world-leading foundations

Our work in AI is enabled by some of the richest datasets in Europe combined with revolutionary computing infrastructure, including the UK's most powerful computer.

AI relies on a trio of fundamental elements to work: hardware, algorithms and software. All three are embedded in our infrastructure.

We are home to the UK's most powerful computer, **ARCHER2**. Its home, the **Edinburgh International Data Facility** (**EIDF**), is the epicentre of our hardware, and features two Cerebras CS-2 systems, which are dedicated to largescale AI and powered by the world's largest silicon chip.

1st*

in the world for **industry**, **innovation** and **infrastructure**

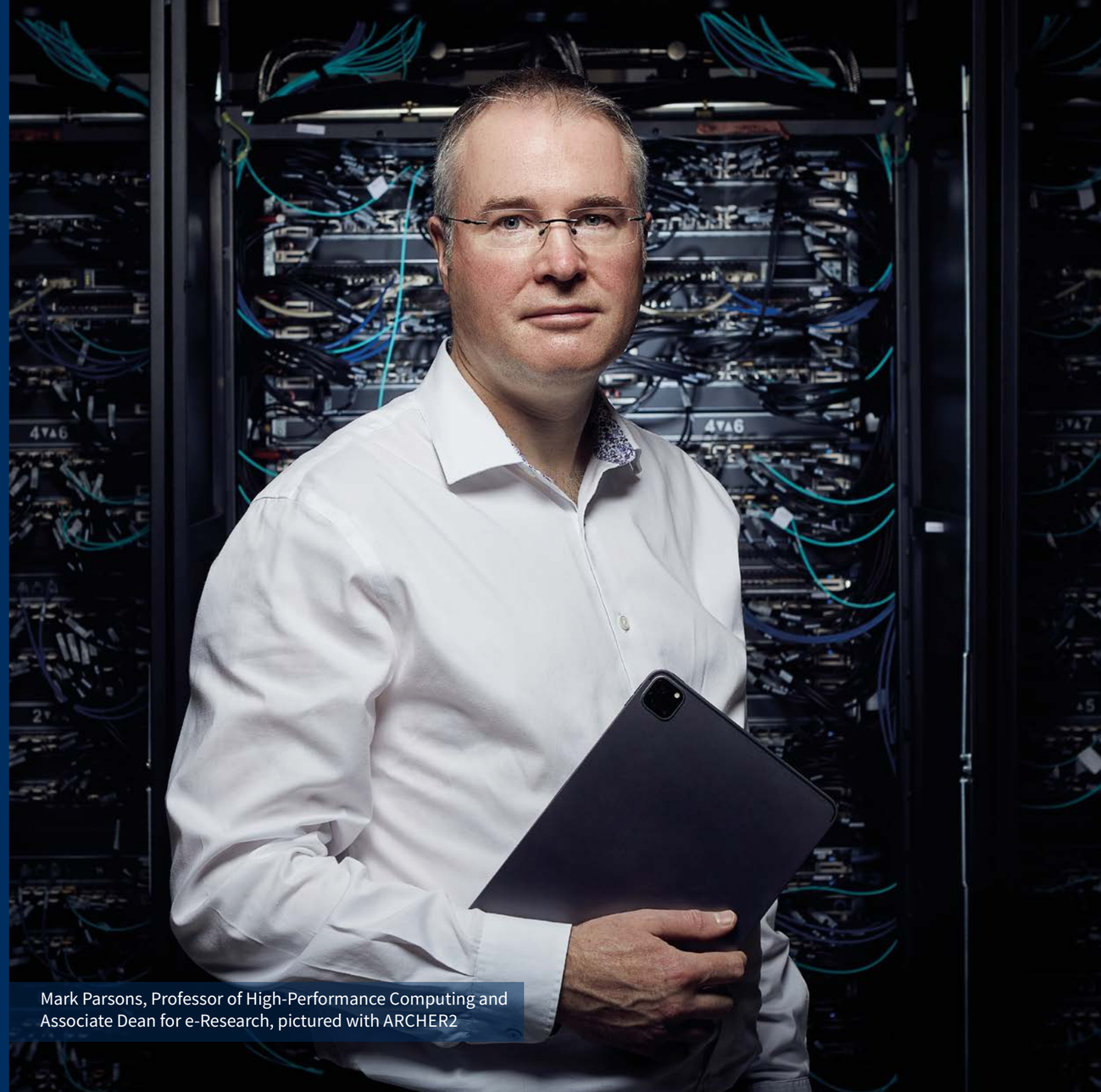
*Times Higher Education Impact Rankings 2024

AI is driven by robust algorithms. Our **Generative AI Laboratory** (**GAIL**) unites the diverse research expertise across the University. GAIL taps into a thriving AI landscape with recognised strengths in natural language processing, machine learning, and data-driven innovation. It forms part of our unique ecosystem as one of Europe's largest centres of AI research.

As quantum computing revolutionises data processing and complex problem-solving, it stands to significantly enhance AI capabilities. As home to the largest UK grouping of quantum computing researchers, we are working with partners to solve problems beyond the reach of classical computing. Our **Quantum Software Lab** – in collaboration with technology giant Cisco, UK Government and other academics – is exploring ways this new technology can meet the needs of our economy and society.

£100m+

investment into the **Edinburgh International Data Facility**



Mark Parsons, Professor of High-Performance Computing and Associate Dean for e-Research, pictured with ARCHER2

Our people make AI extraordinary

We are a global hub for leaders in AI. Our students, staff and alumni are shaping AI internationally.

Our extraordinary collection of AI experts – one of the biggest concentrations in Europe – is why the University of Edinburgh is ranked as the top institution in the UK for research power in Computer Science and Informatics according to Times Higher Education based on the 2021 Research Excellence Framework.

Our leaders are shaping the future of AI research in the UK. We are home to six EPSRC/UKRI **AI Centres for Doctoral Training**, training the next generation of AI innovators and researchers, more than any other UK institution.

As well as offering a first-class education in core AI areas, our trailblazing **Executive Education** programmes are empowering leaders and senior managers across industries to harness the transformative potential of AI to drive innovation within their organisations.

By bringing together experts from the University's **School of Informatics**, **Business School** and **Edinburgh Futures Institute** – and also in collaboration with international law firm Pinsent Masons on training for financial services leaders – we are helping professionals to navigate AI's opportunities and risks.

Our community of alumni and supporters – many of whom are major figures in AI – plays a vital role in ensuring access for talented students.

From helping to fund scholarships at undergraduate and postgraduate level, to offering invaluable career insights and guidance, their support allows exceptional students to realise their potential, and imagine and deliver a better AI-powered future for us all.

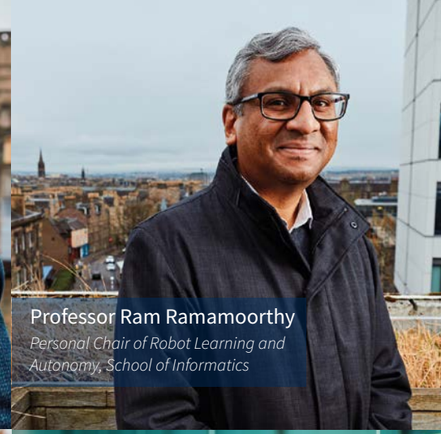
No.1*

in the UK for research power in **Computing Science** and **Informatics**

*Times Higher Education based on the 2021 Research Excellence Framework

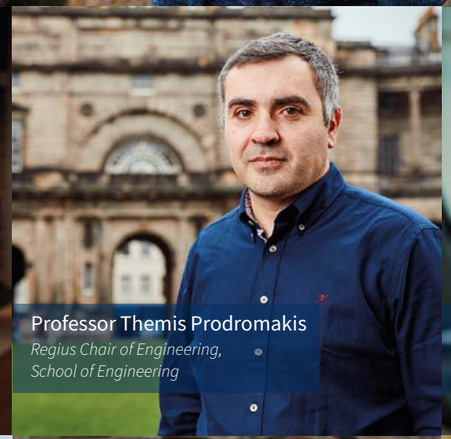
Professor Sotos Tsaftaris
Personal Chair of Machine Learning and Computer Vision, Institute for Imaging, Data and Communications

Professor Shannon Vallor
Baillie Gifford Chair in the Ethics of Data and Artificial Intelligence; Director of the Centre for Technomoral Futures



Professor Ram Ramamoorthy
Personal Chair of Robot Learning and Autonomy, School of Informatics

Professor Julie Jacko
Chair of Health Informatics and Data Science, Centre for Medical Informatics



Professor Themis Prodromakis
Regius Chair of Engineering, School of Engineering

Professor Jane Hillston
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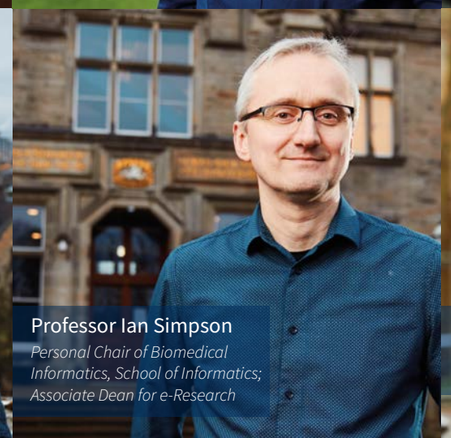
Professor Miguel Bernabeau Llinares
Personal Chair in Computational Medicine, Centre for Medical Informatics



Professor Ian Simpson
Personal Chair of Biomedical Informatics, School of Informatics; Associate Dean for e-Research

Dr Alexandra Birch-Mayne
Reader in Natural Language Processing, School of Informatics

Our AI partnerships are transforming businesses

Collaboration is key. Working with global partners, we are fast tracking AI solutions to transform businesses and lives.

Our experts are working with partners to harness and unlock AI in academia, government, industry and the public sector. Several partnerships are already delivering AI-driven breakthroughs.

NEURii is utilising AI and machine learning to deliver patient-focused, digital health solutions for dementia. The collaborative partnership involves global pharmaceutical company Eisai, technology giant Bill Gates' private office Gates Ventures, and medical research not-for-profit LifeArc.

Two NEURii projects are underway. Scottish AI in Neuroimaging to predict Dementia and Neurodegenerative Disease (SCAN-DAN) and NeurEYE have respectively collected data from brain scans and almost one million eye scans from opticians across Scotland to develop software tools to predict a person's risk of dementia.

£11m

Series A investment in **Aveni**

£350m

economic impact from research in patient care, digital services and sustainable energy

SteatoSITE is the world's first data commons for research into MASLD, one of the most common types of chronic liver disease. The pioneering project integrates digital pathology, hepatic RNA-sequencing and 5.67 million days of electronic health records from 940 patients.

It advances medics' ability to group patients to better treat them, discover biomarkers and develop drugs. Crucially, it is fostering collaborations in NHS AI adoption and digital pathology to create AI-driven tools for immediate use.

Award-winning fintech company **Aveni** is spearheading a revolution in financial services productivity by fusing advanced AI with human ingenuity. The University startup company's solutions are accelerating financial services workflows by providing automated admin support and quality assurance, analysing customer interactions and providing actionable insights.

Blackford Analysis, a University spinout recently acquired by global life science company Bayer, is creating tailored tools and services to unlock the value of medical imaging AI for healthcare providers. Driving efficiencies and improving patient outcomes, the company is having a lasting impact on the healthcare sector.

Baljean Dhillon, Professor of Clinical Ophthalmology at the University of Edinburgh and NeurEYE co-lead, is using AI and machine learning to analyse retinal images and then link it with patient information

We are harnessing the power of AI for public good

At Edinburgh, AI is more than technology. People come first.

We are equipping our leaders – both current and future – to advocate for and practically develop AI that is responsible and sustainable.

Edinburgh is fusing its deep history in ethics, law, sociology and philosophy with the progression of this world-changing technology.

The result is a vision of AI that enhances human health, prosperity and creativity. We are not afraid to use our expertise to challenge those that may pull AI in the other direction. Our researchers and students ask not just whether we can do something, but if we should.

A pioneer in this field, Edinburgh was the first UK university to establish a dedicated centre for AI ethics and data. **The Centre for Technomoral Futures** is advancing research into the ethical, legal and societal implications of AI, shaping global policy and guiding responsible AI development.

Through the Centre's programmes we are training the next generation of experts who will shape the AI landscape – whether in academia, industry or policy. By bridging disciplines and fostering critical inquiry, the Centre ensures AI serves the public good.

There are other ways we are embedding this vital perspective at the heart of AI at Edinburgh and beyond. We lead the AHRC-funded **Bridging Responsible AI Divides** (**BRAID**) programme in partnership with the BBC and the Ada Lovelace Institute. BRAID integrates arts and humanities research into the responsible AI ecosystem, and fosters collaboration across industry, policy and regulatory sectors for public good.

We are creating new opportunities to bring together researchers from across the institution to explore the possibilities of AI. Our vision sees lawyers talking to medics, data experts mingling with artists, roboticists collaborating with anthropologists.

In doing so we are unlocking new people-centred AI that is driving discoveries in areas such as the future of health and care, tackling the climate crisis and boosting economic growth.

No.2*

for **research capability** in Europe

*AIRankings AI Index 2024

A trusted **NHS Scotland**

partner

Professor Shannon Vallor, Baillie Gifford Chair in the Ethics of Data and Artificial Intelligence and Director of the Centre for Technomoral Futures, is driving the conversation on responsible technology

Leading in Artificial Intelligence for 60 years

For more than six decades the University of Edinburgh has been at the forefront of AI. As the birthplace of AI in Europe in 1963, and the second university in the world after Stanford to teach the subject, we have shaped the field of AI globally.

Key milestones

1963: AI in Europe begins in Edinburgh
Professor Donald Michie establishes a pioneering machine learning research group at the University, building on his wartime code-breaking work at Bletchley Park.

1973: Freddy the robot II
After creating a breakthrough prototype in the 1960s, Professor Michie and his team develop the second version of the highly teachable machine FREDERICK, which can identify, select and assemble objects from a jumbled heap.

1980: CCS published
Professor Robin Milner publishes his Calculus for Communicating Systems (CCS), which laid the groundwork for computing systems' ability to have multiple processes working together – vital for cloud computing, smart phones and machine learning.

1998: Division of Informatics created
What would become the UK's leading School of Informatics is formed from the Department of Artificial Intelligence, the Centre for Cognitive Science and the Department of Computer Science, along with the Artificial Intelligence Applications Institute and the Human Communication Research Centre.

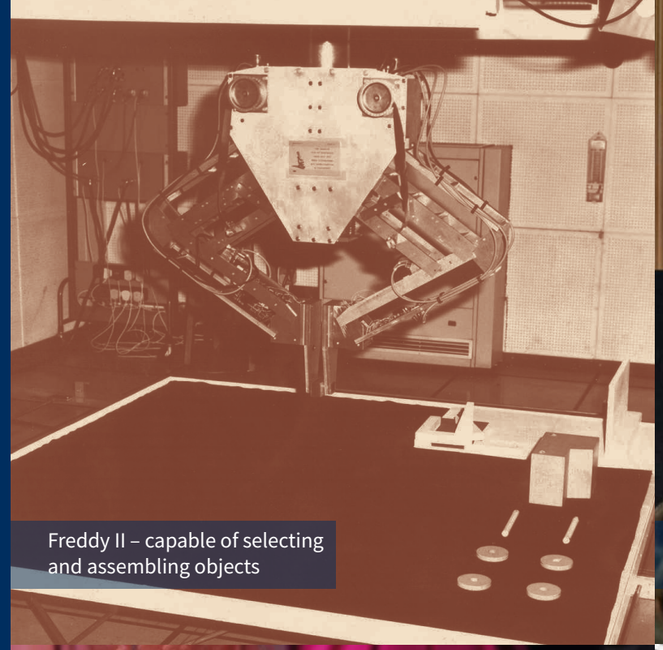
2008: The Informatics Forum opens
The award-winning facility brings together all School of Informatics – now one of the largest in Europe – research activities under one roof.

2020: ARCHER2 arrives
The latest version of the UK's national supercomputer comes online at Edinburgh, providing high-performance computing resources for scientific research, modelling and developing AI.

2020: The Quantum Software Lab launches
The UK's national hub for exploring how quantum technologies can be applied to solve complex issues opens for business.

2023: Welcoming GAIL
The University unveils the Generative AI Laboratory (GAIL), a centre for excellence dedicated to researching all aspects of generative AI in society.

2024: Geoffrey Hinton awarded Nobel Prize in Physics
The so-called Godfather of AI, Geoffrey Hinton, who received his PhD in AI from Edinburgh, is awarded the Nobel Prize in Physics for his groundbreaking work on machine learning.



Freddy II – capable of selecting and assembling objects

The Edinburgh Futures Conversations at the Edinburgh Futures Institute

Geoffrey Hinton receiving the Nobel Prize in Physics

The Informatics Forum on the Central Campus

edin.ac/ai

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