

2023/24

POWER OF INNOVATION

The annual review of innovation activity
at the University of Edinburgh



THE UNIVERSITY
of EDINBURGH



EDINBURGH
INNOVATIONS



Data-Driven
Innovation

Foreword



Professor Christina Boswell
Vice-Principal of Research and Enterprise



Dr Andrea Taylor
CEO, Edinburgh Innovations

This has been an exceptional year of impact as we deliver a significant step change in our support for innovation across the University and apply more world-class research to tackle the world’s biggest challenges.

We launched our first Research and Innovation Strategy 2030, setting out the University’s plans and ambitions including the creation of three research Missions; specific areas where a critical mass of outstanding work will be marshalled to find solutions.

The University’s inaugural Impact Festival was a wonderful celebration of the engagement and impact of the University’s research. A full programme of events gave colleagues insights and further support to work with partners to develop impact, influence policy and practice and maximise impact from fundamental and interdisciplinary research.

We also appointed five Innovation Fellows under our new Innovation Fellowship Scheme. The new scheme builds on our strong record of investing in early career researchers and aims to propel new technologies from the lab into market-

ready applications. Our Fellows, featured later in this publication, are singularly motivated and innovative researchers poised to revolutionise everything from medicine to AI.

The opening of the new Edinburgh Futures Institute building marked a significant milestone of the Data-Driven Innovation programme with the transformation of the iconic, category-A listed Old Royal Infirmary into a space for multidisciplinary collaboration, data-led innovation, education, research and partnership.

And the launch of our Generative AI Laboratory (GAIL) will push the forefront of generative AI to benefit society and stimulate economic growth. GAIL unites the University’s world-leading research and innovation in AI to develop safe solutions and systems for industry and government and bring substantial benefits to those who use them.

“
Our research without boundaries has delivered world-class innovation that is making ideas work for a better world.”

This integrated approach enabled the University to achieve joint first in the world for SDG 9: Industry, Innovation and Infrastructure in the 2024 Times Higher Education Impact Rankings in recognition of our research, patents citing university research, research income from industry and number of University spinouts.

Our research without boundaries, be they between disciplines, countries or sectors, has delivered world-class innovation that is making ideas work for a better world.

Our Values

Excellence and ambition

Diversity and inclusivity

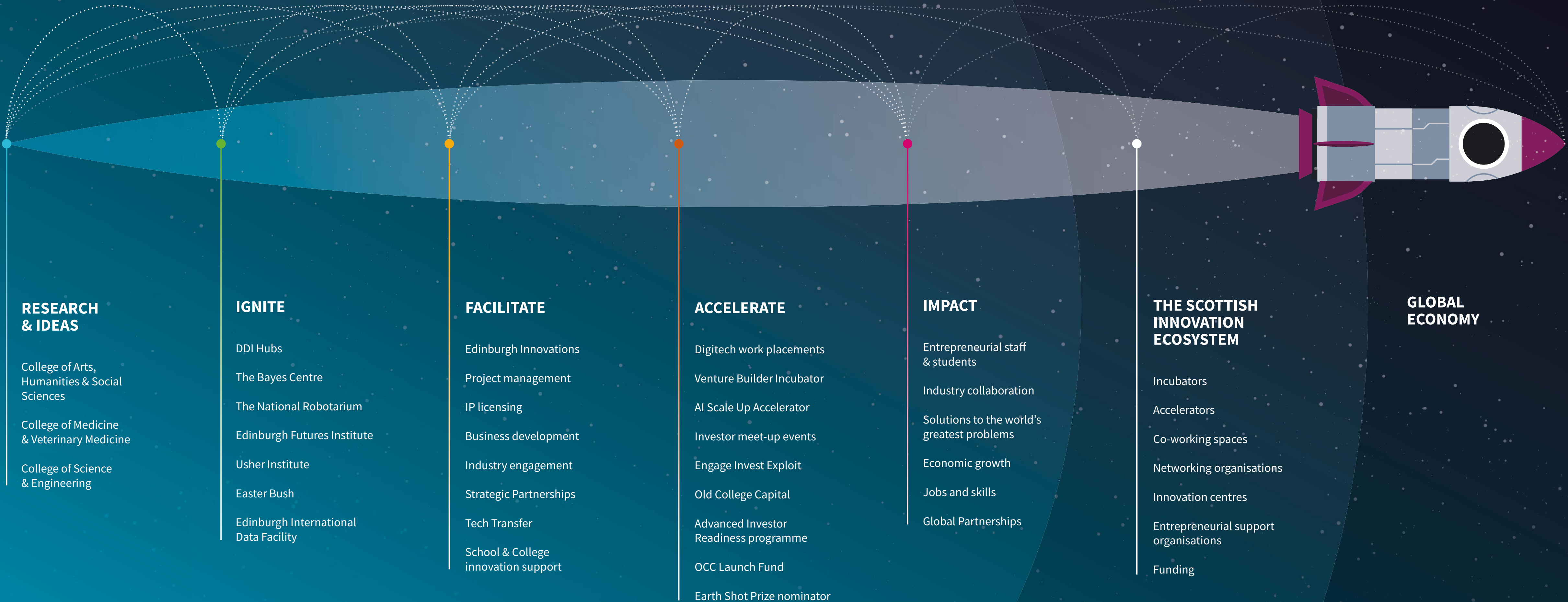
Internationalism

Relevance to society and community

Self improvement and transformation

Integrity

The University of Edinburgh Innovation Ecosystem



Our Innovation in Numbers 2023/2024*



*Figures represent the period 1 August 2023 - 31 July 2024. ** As of 6 August 2024.

Mission: Tackling the climate and environmental crisis

We are responding to the climate emergency by marshalling our research to understand the causes and effects of climate change and to help communities adapt to and mitigate its effects.

We are world-leading in areas as diverse as earth systems, biodiversity, farming and food, energy and manufacturing, space and satellites, health and inequalities, the circular economy, climate finance and corporate responsibility, public attitudes and environmental politics. By applying our pioneering research to the most urgent environmental challenges our world faces, we are helping to build a more sustainable future.

The Edinburgh Geobattery project

Announced in 2023/24, the Edinburgh Geobattery project is a three-year pilot study that aims to use disused mine workings to capture excess heat from a large computer facility and redirect it to heat homes. Led by Edinburgh-based geothermal company, TownRock Energy, the project is being spearheaded by industry and academic partners from Scotland, the US and Ireland. The University of Edinburgh is the lead research partner on the project and is providing £500k of funding as part of its own net zero objective. The £2.6m feasibility study is investigating whether the large amounts of energy required to power the University's Advanced Computing Facility could be harnessed and recycled to heat thousands of homes in Scotland's capital.

Offshore renewable energy programme

The Industrial Centre for Doctoral Training for Offshore Renewable Energy (IDCORE) programme trains exceptional scientists and engineers working closely with industry to address future challenges and develop leading technologies essential to upholding the UK's global status in the Ocean

Renewable Energy (ORE) sector. Launched in 2011 by the Engineering and Physical Sciences Research Council (EPSRC), the IDCORE programme has placed 107 students in 57 companies, with around half of those students going on to employment with the same company and 80 percent within the sector.

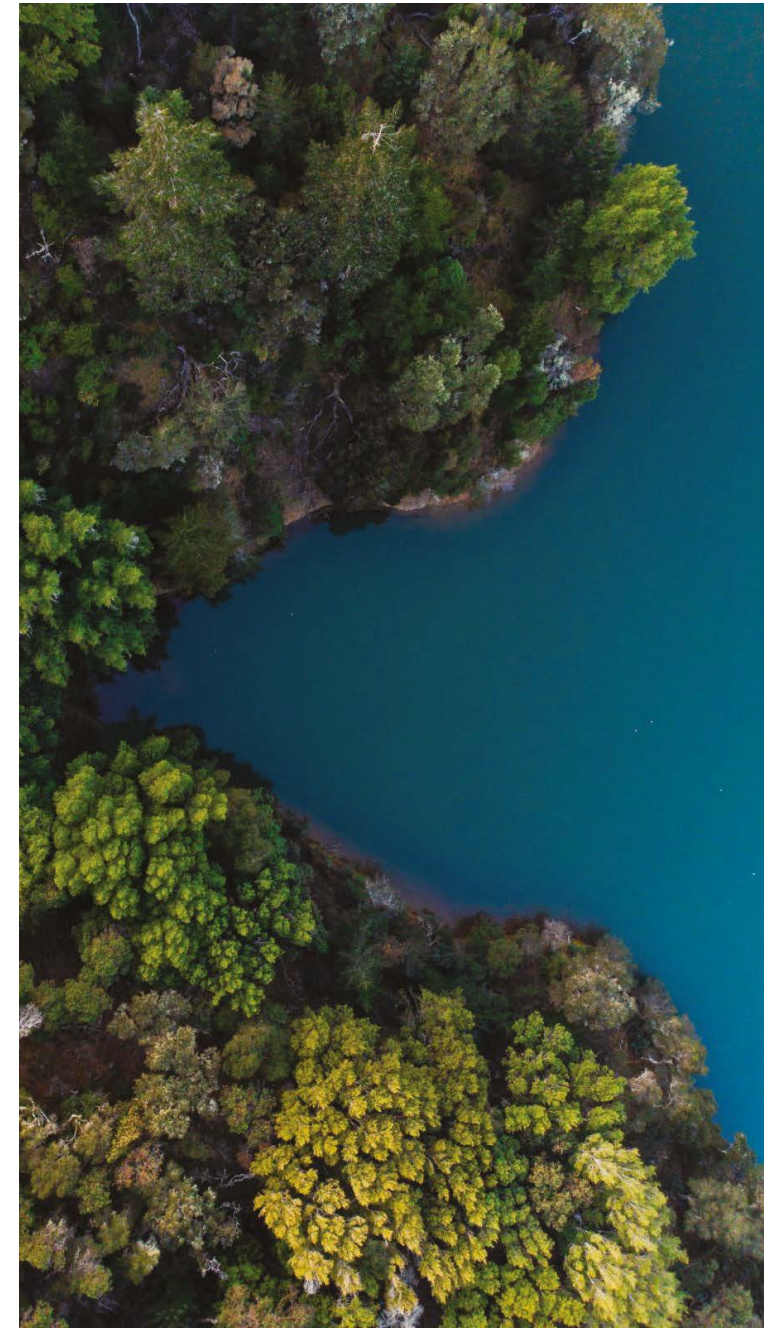
In 2023/24 it was announced that the programme would receive £6m from EPSRC to fund a further five years of its award-winning work.

Research Venture Catalyst (RVC) programme funds sustainable initiatives

Two research initiatives at the University received £100k in seed corn funding from the Department of Science, Innovation and Technology (DSIT) to develop detailed technical plans and partnerships with industry, philanthropy and venture capital. If successful, DSIT will match the investment they raise with up to £25m each. CybergenX is pioneering intracellular technology that could accelerate the potential of engineering biology to replace fossil fuels in manufacturing, while the Edinburgh Venture Builder for AI-hardware (EVA) will push the frontiers of next-generation semiconductor technologies for sustainable and socially responsible AI.

Energy-efficient wind turbine modelling

Wind farms play a key role in delivering green energy, and using computers to model the interaction between wind and turbines helps inform both design improvements and the optimal turbine placement within a farm. The energy required to run these computer simulations is an important consideration, so EPCC is building on expertise in novel energy-efficient computer hardware developed in the EXCALIBUR Exascale software programme to model wind farms at very reduced energy cost. By working with vendors and exploring different hardware designs, EPCC will undertake co-design of the entire ecosystem - from the hardware to the application software - with the aim of delivering new capabilities in wind turbine modelling.



Towards net zero for weather and climate modelling

Pushing High Performance Computing (HPC) towards net zero is crucial if the scientific community is to justify the use and cost of large-scale HPC resources in the face of climate change. EPCC, together with the National Centre for Atmospheric Science (NCAS), secured funding from EPSRC to set up an international collaboration with the US National Center for Atmospheric Research (NCAR). Through an ambitious, interdisciplinary programme of research, the International Collaboration Towards Net Zero Computational Modelling and Simulation (CONTINENTS) project will bring together world-leading centres of HPC research and service provision, atmospheric science experts and numerical and machine learning application developers. This will help drive innovations in data centre and system operation, with the aim of minimising energy consumption and reducing waste.

Sustainable AI

AI is transforming science, but its computational demands raise serious environmental concerns and could potentially offset its benefits if sustainable practices aren't adopted. EPCC has been investigating the performance of AI on high performance computing (HPC) systems to address how we can select the best hardware for a given workload and prioritise "green AI". Key challenges include inconsistent energy measurements across platforms and a lack of simple yet representative test cases that reduce the overall time and energy spent when testing and not yet performing useful science. EPCC has addressed these obstacles by providing clear recommendations for the community to adopt and take action towards achieving sustainable and green AI.

AI tool to predict fruit crops

A new AI system that counts flowers on fruit trees is helping farmers to predict harvest sizes months in advance, making crop yields more efficient, sustainable, and profitable. Developed by a researcher at the National Robotarium alongside scientific partners in Chile and Spain, the system uses images taken with a standard smartphone to estimate the number of flowers on a fruit tree with 90% accuracy. This presents a significant improvement on manual methods currently used by farmers, which can have error rates of 30 to 50%. It's estimated that agriculture uses 65% of the world's fresh water, almost half of which is wasted. However, this AI-powered system could help growers optimise water use, allocate human and economic resources more efficiently, and better plan harvesting and distribution logistics. The approach could be adapted for other important crops, benefiting fruit growers in Britain, Europe and beyond.

SeaSat

Student startup SeaSat, part of the 2023/24 Startup Summer Accelerator and Venture Builder cohorts, is addressing the temporal data gap in marine environments. Its pioneering Machine Learning (ML) algorithm leverages satellite remote sensing data to classify water types, estimate salinity and temperature. It also helps to predict heatwaves and extreme events that could threaten marine stocks. Fisheries and governments have faced obstacles in accurately monitoring changes in fish stock activity and marine environments, but SeaSat can provide accessible, real-time data models of water conditions. The company's technology has the potential to revolutionise environmental monitoring and management and bolster marine conservation efforts.

The University of Edinburgh takes an institution-wide approach to its Climate Strategy. This includes our commitments to support and conduct research on global challenges, with impact that feeds into climate change mitigation and adaptation strategies. At Edinburgh Innovations (EI) and Social Responsibility and Sustainability (SRS), we understand the importance of measuring and monitoring our contributions within the environmental sustainability space so we can continue to report on our impact.

We developed a framework to baseline, analyse and communicate the environmental sustainability contribution we are making through our commercialisation activity. Our methodology utilises EI's Key Performance Indicators and determines what percentage of our activity is focused on the themes of carbon, biodiversity, circular economy, water, and novel entities.

Environmental sustainability is a critical mission area where other themes contribute, which is why we will continue to critique and adapt our methodology where necessary.

% of total awards 2023/24 focused on environmental theme

Industrial & translational awards

12.8%

£150.8m

Consultancy awards

24.3%

£16.3m

Investment in associated companies

23%

£141m

Number of student and staff startups and spinouts

14.2%

127

Number of licenses

20%

55

Number of patents

16.4%

140

Mission: Harnessing data, digital and AI for public good

We are marshalling cutting-edge data, digital and AI technologies to unlock solutions to a range of environmental, social and economic challenges.

Our advanced computing capacity and world-leading Informatics enable us to harness data and computational methods across all our disciplines to address key challenges in a responsible and ethical way. In 1963, Edinburgh was the first university in Europe to create a research group in AI and computer science, and today we continue to build on that rich heritage and pioneering reputation by building an interdisciplinary and cutting-edge tech ecosystem, working collaboratively across the interface of academia and industry, and fostering the next generation of innovative talent.

Generative AI Laboratory (GAIL)

GAIL is a bold new multi-million-pound initiative that will push the forefront of generative AI to benefit society and stimulate economic growth. Generative AI is a type of machine learning that can be used to generate various types of content including text, images, audio, video and computer code. GAIL will unite the University's world-leading research and innovation in AI to develop safe solutions and systems for industry and government, and bring substantial benefits to those who use them. The major initiative aims to develop techniques for generative AI in key areas such as robotics, drug discovery, medical diagnoses, semi-conductor development, and tackling climate change. Experts will also work in partnership with Edinburgh Futures Institute's Centre for Technomoral Futures to take a fresh look at the ethical, legal and regulatory frameworks necessary to ensure the safe and responsible use of AI.

Scottish Prevention Hub

A co-directed national partnership between Public Health Scotland, Police Scotland, and the Edinburgh Futures Institute at the University of Edinburgh, the ground-breaking Scottish Prevention Hub was launched in 2023/24 to improve national public health and reduce inequalities. A major focus of the group is to convene wider partner and stakeholder involvement, building shared understanding, knowledge and resources to address some of the nation's health and wellbeing challenges. The Hub has been referenced in the Scottish Parliament, and provides insights to the Open Innovation Team, a cross-government unit that generate analysis and ideas for policy innovation. In spring 2024 the Hub established its physical base in the new Edinburgh Futures Institute building.

Income Volatility Dataset

Smart Data Foundry announced the launch of its Income Volatility Dataset in partnership with the Joseph Rowntree Foundation, an independent social change organisation working to end UK poverty. Income volatility presents a growing challenge for many households, and innovative data-driven approaches are essential for developing solutions. The Income Volatility Dashboard is a free, online interactive tool that allows users to view summaries

and aggregations of near real-time banking data by geography, demographics, and financial activities. In addition, researchers and academics can access raw data by submitting and getting approval for research proposals focused on income volatility and related issues. This initiative will provide unprecedented access to information on economic insecurity trends and enable better analysis informed by transactional data, leading to a robust knowledge bank of research and insights. Over time, this will enhance our understanding of income volatility and help identify potential solutions to this pressing societal issue.

Bridging Responsible AI Divides (BRAID) programme

BRAID is a new programme designed to drive responsible innovation in AI by fully integrating arts and humanities research. The Arts and Humanities Research Council (AHRC)-funded programme is led by the University (with support from Edinburgh Innovations) in partnership with the BBC and the Ada Lovelace Institute. As well as integrating arts and humanities research more fully into the Responsible AI ecosystem, the £15.9m, six-year programme is dedicated to bridging divides between academic, industry, policy and regulatory work on responsible AI.

As part of the programme, 17 BRAID Fellows appointed from universities across the UK will partner with an organisation from the public, private or third sector to unite expertise for tackling existing or emerging AI challenges. These Fellowships will play a vital role in ensuring AI is developed and used responsibly to provide benefits for all of society.



The Centre for Purpose-Driven Innovation in Banking

The University's strategic, data-driven partnership with NatWest Group is based on challenge-led research and innovation that will improve how data is used to benefit bank customers, students, researchers and policy makers. The Centre counted nine projects underway in 2023/24, including the successful delivery of its first projects: Healthy Habits, which explored correlations between health and spending data; and Quantum Technologies for Machine Learning, which aimed to narrow the gap between academic research and business applications.

AI investment tool

The University and global asset management company, abrdn, announced a pioneering project that will harness generative AI to create a research companion and support the firm's investment research process. The project comes out of the Centre for Investing Innovation, a £7.5m strategic partnership between the University and abrdn to address challenges facing the investment and asset management sector across three main areas: sustainability, thematic investing and innovating investing. The Centre is hosted by the Edinburgh Futures Institute and has been co-developed with the School of Mathematics and the School of Informatics.

Services and product launches

The Edinburgh International Data Facility (EIDF) launched a suite of services in 2023/24 to support collaborative data science. EIDF offers the potential to store up to hundreds of terabytes of data per project. The Simple Storage Service (S3) enables the easy movement of data into and out of EIDF, facilitating the controlled sharing of data with external collaborators. It also gives users a simple protocol to move data around its heterogeneous compute services.

The sharing of data with other researchers and innovators through the EIDF data publishing service has been enabled as part of the process of applying for a project on the EIDF Portal. The EIDF Data Catalogue makes this data discoverable by providing a searchable index of analytics-ready research datasets, while S3 makes it easy to put this data to use. The first donation of data was by Prof. Henry Thompson of the School of Informatics, who

augmented the Common Crawl dataset by adding timestamps to its index files. Common Crawl is a multi-petabyte longitudinal dataset containing over 100 billion web pages that is widely used as a source of language data for sequence model training and in web science research.

Venture Builder Incubator

This year has seen the considerable growth of our entrepreneurship programmes at the Bayes Centre in its role as the DDI Hub for Entrepreneurship. This saw the Venture Builder Incubator (VBI) programme support 26 founding teams. The programme specialises in helping PhD students and research staff bridge the gap between academia and entrepreneurship, guiding participants to develop a robust commercialisation and funding strategy.

VBI not only acts as a gateway for accessing expertise around data, but also links into the University's work with robotics and automation. A partnership with Barclays Eagle Labs, funded by the Department for Science, Innovation and Technology, enabled the programme to support founders in the Robotics and Autonomous Systems sector, with specialist support from the National Robotarium. VBI also partnered with Cancer Research Horizons to accelerate innovative cancer research from the laboratory to clinical application.

Sensing, Processing, and AI for Defence and Security

A new programme to bring industry and academia together to meet national security challenges was announced in 2023/24, in partnership with Heriot-Watt University and with funding of £8m from the Engineering and Physical Sciences Research Council (EPSRC).

Hosted at the University, The Centre for Doctoral Training (CDT) in Sensing, Processing, and AI for Defence and Security (SPADS) will place doctoral students with defence industry companies for three years to co-design solutions to industry problems, and aims to train 80 students over five years. SPADS will focus on supplying the UK's growing need for AI-driven generation-after-next technologies for intelligence, surveillance and reconnaissance operations, which has been identified by the Ministry of Defence as a national security priority.

AI innovation hubs

The University is establishing two research and innovation hubs that will focus on developing AI tools to help revolutionise the fields of electronics and healthcare. Both hubs, which will each receive £12m from the EPSRC, are led by academics in the School of Engineering and involve researchers from the School of Informatics, School of Mathematics, the College of Medicine and Veterinary Medicine.

- APRIL: the AI Hub for Productive Research and Innovation in Electronics will develop AI tools to accelerate the development of key components such as new semiconductor materials, complex microchip designs and system architectures, leading to faster, cheaper, greener and overall more power-efficient electronics.

- CHAI: The EPSRC AI Hub for Causality in Healthcare AI with Real Data aims to develop AI that can empower decision-making tools to improve challenging tasks such as the early prediction, diagnosis and prevention of disease, and to improve the safety of such technology in healthcare.

The hubs will be delivered with the Bayes Centre and have over 70 public and private sector organisations playing an integral part in both the delivery and strategic direction.

EIE24

In May 2024, the Bayes Centre successfully relaunched EIE, a series of in person events connecting Scotland's vibrant tech ecosystem with global investment. EIE24 welcomed over 80 investors to the exclusive Investor2Investor evening at Edinburgh Castle, which was followed by the EIE24 Showcase at the John McIntyre Conference Centre. Emerging Scottish startups were highlighted to an audience of 300 founders, tech ecosystem partners and investors from the UK and beyond.

Keynote speakers at the event included Mark Logan, Scotland's Chief Entrepreneur and Hannah Jones, CEO of the Earthshot Prize. Since its inception in 2008, EIE has supported over 550 enterprises, many at seed stage, which have gone on to secure more than £1.2 billion in finance.

Mission: Shaping the future of health and care

We are marshalling cutting-edge data, digital and AI technologies to unlock solutions to a range of environmental, social and economic challenges.

We bring together biomedical and life sciences, physical sciences, and humanities, arts and social sciences in multidisciplinary centres and projects to address challenges of health, disease, ageing, health inequalities and health systems locally and globally. These are the stories of how we are innovating to shape what health and care will look like for years to come.

Prothea Technologies targets lung cancer

Investment of €12m has launched deep-tech spinout Prothea Technologies Ltd, which is developing tech to 'see and treat' cancerous lung tissue in a one-stop procedure. The ambitious spinout has emerged from a ten-year collaboration between the Universities of Edinburgh, Bath, Dundee and Durham, alongside NHS Lothian and Heriot-Watt University. Lung cancer is the third most common cancer in the UK, but the team behind Prothea say their technology could alleviate hospital pressures and pave the way for diagnosis and treatment to be carried out in a single hospital visit.

Body-on-chip device

A 3D printed device invented at the University's Centre for Cardiovascular Science (CVS) can mimic how a drug moves through the body's organs, using PET imaging to validate its journey. The body-on-chip device was developed through a National Centre for Replacement, Refinement and Reduction of Animals in Research (NC3Rs) and Unilever co-funded PhD Studentship award of £90k. The CVS team's pioneering work to transform drug testing in a human-cell-based model has received further funding from the Medical Research Council (MRC) and has the potential to reduce the number of animals used in drug testing worldwide.

Gene editing tackles bird flu

Bird flu is a major global threat, with a devastating impact on both farmed and wild bird populations. A research collaboration funded by UKRI-BBSRC and led by the Roslin Institute has used revolutionary gene editing techniques to identify and change parts of chicken DNA that could limit the spread of the bird flu virus in the animals. The technique offers a promising route towards permanent disease resistance, which could be passed down through generations, protecting poultry and reducing the risks to humans and wild birds.

Data, health and social care courses at the Usher Institute

There was further development of the Usher Institute's education and training programme for both students and healthcare professionals in 2023/24. The first cohort began their MSc Leading Digital Transformations in Health and Care programme, with over 40 participants from the health, social care and housing sectors. New short courses were also launched to upskill the health and social care workforce in the Edinburgh and South East Scotland City Region, providing CPD and PPD training for nearly 300 professionals.

RIFLE

Rotational Internal Flow Layer Engineering (RIFLE) is a patented technology that creates ultra-thin layers of human cells in tube-like structures that could be used to develop lifelike tubular tissue, such as blood vessels and intestines, for lab research. RIFLE is a fast and low-cost alternative to existing methods of biofabrication, which can lack the detail needed to mimic these complex structures, and has clear potential as an important model for drug development. University scientists have been able to demonstrate the efficacy of RIFLE by manufacturing cells into incredibly thin structures that mirror those seen in the thin muscle layers that make up a human blood vessel. Tissue created using the RIFLE technology could be a viable alternative for commercial and academic researchers who currently rely on animal experimental models.

CanCan Diagnostics

A spinout company from the Easter Bush Campus has developed a technology to monitor and support treatment of cancer in dogs, as well as to aid difficult diagnoses. CanCan Diagnostics' DNA-based liquid biopsy provides results in seven to ten days, and could help manage a disease that affects 30 to 50% of dogs. The technology allows for patient monitoring at greater sensitivity than the currently used imaging method, while being much quicker and less invasive.

Macrophage therapy for liver cirrhosis

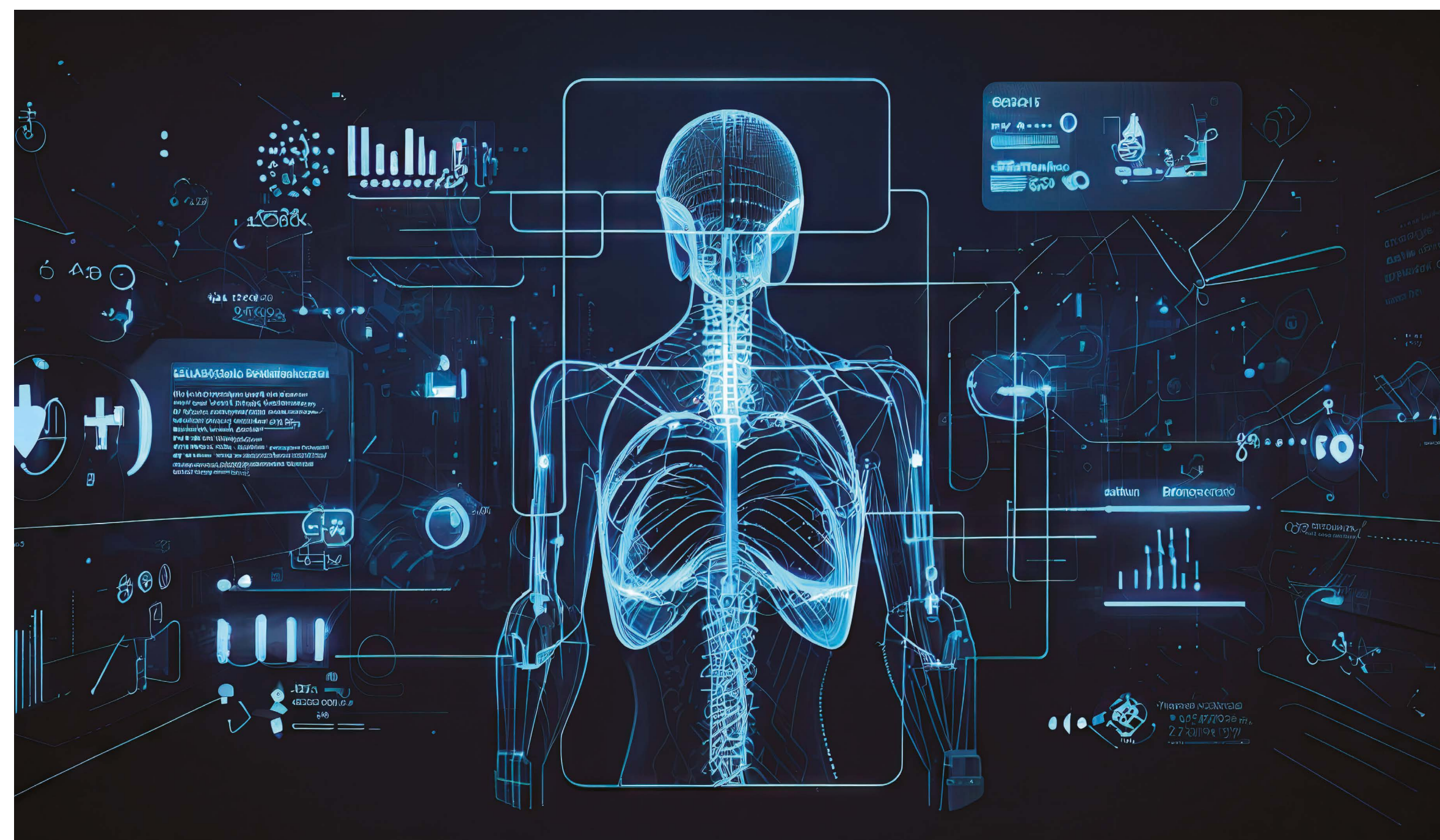
The results of a clinical trial that treated liver cirrhosis patients with macrophage immune cells - the cells associated with tissue repair - have shown that the innovative treatment dramatically reduced serious liver-related complications during the one-year study. The results indicate the new treatment may help delay the need for a liver transplant, which is currently the only treatment option available to patients with advanced liver disease. This pioneering work from the Stuart Forbes Lab at the Centre for Regenerative Medicine shows real promise of becoming the first cell therapy treatment for what is a common, lethal yet neglected condition. The MRC-funded research forms the backbone of Professor Forbes' spinout company Resolution Therapeutics, which was formed in 2020.

AGE-WELL partnership

The Advanced Care Research Centre (ACRC) has partnered with AGE-WELL, a unique Canadian network that brings stakeholders together to develop technologies and services to support healthy ageing. AGE-WELL is involved in training the next generation of innovators in the field, and aims to make Canada a world leader in technologies that help ageing populations everywhere. Their goals and visions align closely with those of the ACRC, and in 2023/24 the partnership entered an exciting new phase with a joint funding call. The partners encouraged researchers from AGE-WELL and ACRC to come together to identify transdisciplinary research projects for the partners to collaborate on, with a view to securing external funding.

Blantyre LIFE

Researchers at the National Robotarium are working with an innovative new health and care facility in Lanarkshire to advance development of the next



generation of assistive robotics. Blantyre LIFE has forged an international reputation as a groundbreaking care development pioneering increasingly sophisticated care and expertise. In 2023/24, South Lanarkshire University Health and Social Care Partnership welcomed the arrival of the National Robotarium's ARI, a 'social robot' with human-like characteristics, to Blantyre LIFE. Two weeks of research was supported by experts from the Human-Robot Interaction Research group at the National Robotarium to gather feedback from health and social care staff on an early robot prototype that aims to assist people recovering from critical injury.

Key collaboration into cirrhosis

Announced in 2023/24, the ADVANCE (Accelerating Discovery: Actionable NASH Cirrhosis Endpoints) study is a collaboration between the Universities of Edinburgh and Newcastle and global biopharmaceutical company Boehringer Ingelheim.

The £30m observational study, funded by Boehringer Ingelheim, will be the most detailed of its kind enrolling the largest number of patients, and will provide a detailed analysis of liver health as well as accelerating the development of future therapies.

One Health Living Lab

Led by scientists at Easter Bush in partnership with Makerere University, Uganda, the One Health Living Lab promotes the One Health approach, which is vital for global health strategies. Supported by the Quadripartite organisations WHO, OIE, UNEP, and FAO, the One Health initiative outlines necessary actions but faces implementation challenges in low- and middle-income countries due to a lack of standardised protocols.

The One Health Living Lab is proposing the creation of a One Health resource to examine factors influencing community and individual health.

This resource will feature a living laboratory for co-designing integrated solutions; a community laboratory for health and environmental data enhancement; a biobank for sample storage; and an integrated database.

Makerere University Centre of Health and Population Research (MUCHAP) has maintained a cohort of 110,000 individuals since 2005, linked to a dataset of 1.2 million health and socio-economic records. By enriching this data with details on livestock ownership and environmental factors, the partnership aims to create one of the world's largest One Health longitudinal studies. This resource will help global health stakeholders analyse community challenges and develop tailored, scalable solutions.

Impact: Investment

We support exciting ideas and technologies emerging from the University through Old College Capital (OCC), the University's in-house venture investment fund, managed by Edinburgh Innovations.

Comprising an experienced team of deep-tech, early-stage investment specialists, OCC manages the University's early-stage shareholdings and investment activities, accelerating the journey of startups and spinouts at pre-seed, seed and growth stages.

OCC works with founders, investor partners and the University ecosystem to get ideas from our staff, students and research out into the world where they can make a difference.

In 2023/24, a record-breaking £141m was invested into University-associated companies, up nearly a third from the previous academic year. This is an especially noteworthy outcome given continuing market headwinds, which saw overall UK venture investment fall by between 25 and 40% over a similar period. OCC deployment rose to £3.8m into 34 companies, also a record-breaking level of activity.

As part of OCC's evergreen model, the University has committed to reinvest returns and proceeds into the next generation of founders, which should enable continued growth in our investment activities. Following several up-rounds in the portfolio, OCC's assets under management now exceed £70m (on a gross basis).

OCC were delighted to back 10 early-stage companies with £20k of investment as part of the first call of the fund's new Launch 20 pre-seed programme. Eight of the companies were student startups, with founders working on diverse problems, from Carbon Pricing to Soft Robotics for the care sector. In addition, OCC also

invested £50k in five companies as part of its Launch 50 programme, including Rise Nutrition and Yaldi Games, both female-founded student startups.

Wobble Genomics

Roslin Institute spinout Wobble Genomics successfully fundraised £8.5m to help commercialise its technology, which enhances the efficiency of RNA and DNA sequencing to identify and detect nucleic acid biomarkers. By combining biochemistry with bioinformatics, the company has the potential to transform personalised medicine capabilities. This has a wide range of additional potential applications, from drug development and research to agriculture and ecology. The company has received significant media interest from press, including profiles in Sifted and Startups Magazine, with tech.eu naming Wobble as one of the 'European tech startups to watch'.

Carcinotech

Student medtech startup Carcinotech's technology enables the manufacture of 3D printed micro-tumours using patient-derived biopsies, primary cells, immune cells, and cancer stem cells, accelerating ethical drug screening and the delivery of more effective cancer treatments to market. The company has successfully secured several partnerships, including with Gothenburg-headquartered CELLINK, to develop cutting-edge cell line cancer models. In 2023/24 the company raised £4.2m in seed funding from investors, including OCC.

Neuranics

Bio-magnetic sensor technology company Neuranics, a joint spinout from the Universities of Glasgow and Edinburgh, secured £1.9m of investment in a pre-seed round that included OCC. Neuranics develops pioneering magnetic sensors integrated with semiconductor technology for health, fitness and metaverse applications. The company also showcased a live demonstration of their new magnetocardiography (MCG) sensors at the global Consumer Electronic Show (CES) 2024.



Case Study:

AVENI

Fintech startup Aveni is using cutting-edge artificial intelligence (AI) and natural language processing (NLP) to analyse customer interactions in real time, providing actionable insights and automation to financial services companies.

This powers efficiencies and improvements in how firms manage their Quality Assurance (QA), risk oversight, staff performance, product innovations and customer retention.

The University and EI supported Aveni and its founders, Executive MBA graduate Joseph Twigg and School of Informatics Senior Research Fellow Dr Lexi Birch to develop the initial idea. OCC invested in the company's first pre-seed round in 2020, investing twice more as the company piloted its early software with major banks and wealth managers. OCC has been actively involved with the company's development throughout, including at board level and via regular catchups with the investor group and founders.

The company recently announced an £11m Series A fundraising round, led by Puma Private Equity with participation from new investors Lloyds Banking Group and Nationwide. Part of this funding will be used to generate FinLLM, an industry-aligned Large Language Model, which aims to set the standard for transparent, responsible and ethical adoption of Generative AI across UK financial services. The FinLLM team is led by Dr Birch and is based at Edinburgh Futures Institute.

“
The University and EI supported Aveni... to develop the initial idea.”

Impact: Unlocking Innovation

We support our researchers to forge interdisciplinary collaborations and careers.

By enabling staff to collaborate through harmonised Impact Acceleration Account funding, STEM and SHAPE expertise matching, or creating new career pathways for impact-focused researchers, we unlock innovations that can help solve the world's greatest challenges and deliver a step change in innovation and research.

Introducing the University of Edinburgh Innovation Fellows

The Innovation Fellowship scheme cements the University's commitment to investing in early career researchers and aims to propel new technologies from the lab into market-ready applications. Our Innovation Fellows are outstanding researchers with extraordinary ideas to improve patient outcomes, challenge climate change and harness AI for public good.

Dr Dahlia Doughty Shenton is leading the delivery of her discovery in cyclophilin targeting and modulation into a full-fledged translational, pre-clinical research project at the Institute for Regeneration and Repair. Dahlia hopes to launch a spinout company centred around the development of the TCEs as antiviral agents, immunomodulators and neuroprotective agents to significantly improve patient outcomes.



Dr Lisa Golds is developing a digital platform that will provide both education and social support for caregivers with young infants. Using a co-production method, the platform is designed in consultation with caregivers who understand their own needs and current barriers to education and mental health support, and thereby more effectively targeted.



Dr Ian Holland invented Rotational Internal Flow Layer Engineering (RIFLE), a technology that creates ultra-thin layers of human cells in tube-like structures that could be used to develop lifelike tubular tissue such as blood vessels for lab research. Ian will expand RIFLE's tissue portfolio by developing vascular, skin and intestinal layer tissue types that surpass the accuracy of existing in-vitro models and provide alternatives to animal experimental models.



Dr Craig McDougall is developing and commercialising his own invention of an advanced yet low-cost lung sampling technology – a novel sampling system for bronchoscopy (a procedure that looks inside the lungs). Craig's technology enables specific and localised rapid real-time sampling of lung areas, which will enable better disease understanding, diagnosis and accelerate treatment development.



Dr Kwabena Nuamah is exploring interpretable inference methods for question answering to create a compositional, hybrid and interpretable AI framework. This framework for "whole system reasoning" will include explanations where the automated system learns to reason not only about specific predictions tasks, but also about how it dynamically combines different intelligent operations, and how it does this under data access constraints.



Dr Irene Yang is utilising engineering techniques and approaches to improve the care of fractures which are common and a major cause of disability and death worldwide. Irene's technology will enable clinicians to improve fracture diagnosis to reduce patient suffering and improve patient outcomes.



Dr Daniel Tolhurst is developing statistical models and methods that scope, estimate, and leverage Genotype by environment (GxE) interaction to propel plant and animal breeding programmes to increase genetic gain and feed a growing world. GxE interaction is a significant impediment to reaching the required rates of genetic gain in plant and animal breeding, especially amid climate change.



Dr Shama Rahman focuses on neuro-enhancement and wellbeing, utilising adaptive AI/human collaboration and co-creative digital technologies to enable optimised mental states. Shama is working on the creation and integration of technology more intuitively via people and planet centred design, simultaneously boosting creativity, well-being and productivity.



Wellcome Institutional Translation Partnership Award (iTPA)

The award-winning Wellcome iTPA has delivered almost seven years of dedicated mentoring and support for early career researchers. During the course

of the iTPA, 211 projects were awarded with a total of £1.98m. The programme delivered 67 upskilling and community-building events to more than 790 collective participants, and managed an information portal with over 1,500 members. Furthermore, the iTPA

team provided tailored support and Entrepreneur-in-Residence mentorship to more than 700 researchers. The team will now be fully embedded at Edinburgh Innovations to continue providing support to early career researchers.

Case Study:

iTPA

Dr Aja Murray, Reader in Psychology at the School of Philosophy, Psychology and Language Sciences, works on developmental aspects of mental health and neurodiversity, especially ADHD.

Her research highlights that young people with ADHD (affecting around 5% of this age group) struggle with emotional regulation, which affects their school experience, work, social relationships and mental health.

As part of her work to address this challenge, Dr Murray joined a first-in-kind iTPA programme to develop a digital health intervention (DHI) app for emotional regulation in ADHD, addressing the lack of evidence-backed interventions in this area. As part of this programme and wider iTPA team support, Dr Murray was able to leverage her significant experience to develop a DHI prototype capable of delivering accessible support.

Dr Murray secured further funding, including a College of Arts, Humanities and Social Sciences KEI award, and engaged stakeholders

Tooled Up Education – an organisation with an established network of thousands of users. This work resulted in securing the first £300k MRC DPGF awarded to CAHSS to further develop and test the DHI.

Following this impactful and significant project, Dr Murray's wider work in the health area was recognised – along with collaborators from Psychology, the Centre for Clinical Brain Sciences and the Schools of Health and Literatures, Languages & Cultures – as one of the winners of the Wellcome Trust Mental Health Data Prize. The Data Prize supported the development of DigICAT, a statistical tool that supports data-driven decisions for identifying potential intervention targets, including policy development.



Impact: Staff and Student Enterprise

We invest in our people, place and facilities by attracting world-class talent, supporting innovative spinouts and startups, and creating spaces for collaboration with industry, government and third sector partners.

The latest figures (HESA 2022/23) show that the University created the most student startups in the Russell Group of 'world-class, research intensive' universities. This year saw a combined 127 staff and student companies launched and £141m invested into University-associated companies. £73m of this investment went into staff spinouts. We celebrated 18 years of student enterprise support at the University by launching a record 116 student startups, placing us top in Scotland.



Our spinouts and startups are tackling some of our world's biggest challenges, as well as issues that have previously been underserved. By commercialising their research, our staff, students and alumni are making their ideas work for a better world.

MiAlgae

Biotechnology startup MiAlgae is working to end our reliance on wild-caught fish as a primary source of Omega-3 with a patented fermentation process to grow Omega-3-rich algae. MiAlgae's sustainable alternative takes this essential nutrient source from whisky distillation by-products, providing a very Scottish solution to a global problem. By supplying a sustainable source of Omega-3, the company aims to reduce the untenable rates of fish harvesting and preserve wild fish populations worldwide. MiAlgae was selected as a finalist for the prestigious Earthshot Prize 2024.

EPIC

Researchers at the Centre for Clinical Brain Sciences have collaborated with colleagues from across the disciplinary spectrum to create a unique programme of practical support for neurodivergent children and young people - the first of its kind to be based on research. Edinburgh Psychoeducation Intervention for Children and Young People (EPIC) began as a research collaboration and in 2024 spun out into a Community Interest Company EPIC Think Learn, which launched with an online membership platform of written, video and audio materials for the parents, teachers and clinicians of children with a range of neurodevelopmental conditions.

ATTA Breastmilk Community

ATTA Breastmilk Community aims to end preventable newborn deaths through breastmilk donation while prioritising maternal health and mental well-being. A startup from the Business School, ATTA is changing lives by providing vital training, resources, and support to mothers, infants and communities in need across Uganda. ATTA has already supported over 500 vulnerable babies with more than 800 litres of breast milk. The WHO recommends that when a mother's milk is not available the best possible alternative is donated breast milk from another mother, and ATTA is facilitating access to safely donated breastmilk for newborn babies who need it to survive and thrive.

Kynos Therapeutics

A spinout from the University's Centre for Inflammation Research and the Centre for Cardiovascular Research, biotech Kynos Therapeutics is poised to develop an innovative portfolio of first-in-class kynurenine 3-monooxygenase (KMO) inhibitors. KMO plays a major role in the regulation of inflammation, acting at the interface between inflammation, immunity and metabolism. Inhibition of KMO has therapeutic potential in both acute inflammatory conditions, such as acute kidney injury and acute pancreatitis, and in chronic immuno-inflammatory disorders - all critical areas of unmet clinical need. Positive results from the company's first in-human phase one trial have since led to the company being acquired by global biopharmaceutical company Dr Falk Pharma GmbH.



Gradatim

A startup from the School of Philosophy, Psychology and Language Sciences, Gradatim creates innovative picture books that support compassionate, age-appropriate communication between young children, their carers and health professionals as they navigate significant health challenges. Aimed at children aged 5 and under, the books are designed to facilitate gentle discussions about complex health conditions and disabilities, treatment and management, which bridges a vital gap in early childhood health education. Gradatim stands out for its wellbeing-led approach, rooted in a commitment to disability awareness and adaptive education.

AlveoGene

Launched out of the Universities of Oxford and Edinburgh and Imperial College London in 2023/24, AlveoGene is focused on transforming rare respiratory disease outcomes using inhaled gene therapy. AlveoGene was founded on research by six leading scientists from the world-renowned UK Respiratory Gene Therapy Consortium (GTC), established in 2001 by the three universities to catalyse the application of pioneering research to gene therapy development and manufacturing, related to cystic fibrosis and other respiratory diseases. AlveoGene has secured an exclusive licence to a proprietary and validated next-generation lentiviral delivery platform, "InGenuiTy™", developed over the course of more than a decade by the GTC for the treatment of respiratory diseases with high unmet need.

Startup Summer Accelerator

The Startup Summer Accelerator, delivered by the Student Enterprise team at Edinburgh Innovations, is a 12-week programme designed to fast-track the growth of promising student business founders from the University of Edinburgh. Throughout the programme, participants receive funding, expert-led workshops and industry connections to help refine their ventures. This culminates in a showcase where the founders pitch their transformative ideas to a panel of industry experts. Supported by the Edinburgh Earth Initiative (EEI), Santander and the Mastercard Foundation, the 2023/24 cohort spanned a diverse range of industries, from agritech and digital security to carbon capture and machine learning. This year's cohort was selected for their alignment with the United Nations' Sustainable Development Goals, with Edinburgh Innovations partnering with EEI to deliver a programme dedicated to fostering sustainability and impact.

Impact: Awards success

We champion and celebrate our entrepreneurial staff and students who challenge themselves and put their innovations in the spotlight at competitions, whether it be on a university, national, or international stage. Below are some of our talented pioneers and partners who have received recognition for their drive, vision and innovations in 2023/24.

Scottish EDGE Awards

Seven student startups and one staff spinout from the University won a total of £195k for their innovative initiatives at the Scottish EDGE Awards, the UK's biggest funding competition for potential high-growth businesses:

- Main Edge Award: Konpanion - Assistive robotics startup
- IBioIC Award: Prozymi Labs - Biotech startup using novel gluten-degrading enzymes to improve the texture and flavour of gluten-free bread
- Wild Card Award: Gradatim - Creating picture books to aid the delivery of complex disability/illness information to children under five.

Converge Awards

Five University founders took home prizes in the annual Converge Awards, Scotland's largest company creation programme for the university sector:

- Kickstart Challenge: GenProtex - Drug discovery student startup
- IBioIC Award: Concinnity - AI-assisted work on reducing the side effects of gene therapies
- CENSIS121 Award: CEXAL - using novel biosensors to develop cartridge tests to detect pathogens in drinking water
- Runners up: Whimsylabs and Excellio Labs.



Chancellor's Awards

Among the winners of the 2023 Chancellor's Awards was Edinburgh Innovations' Dr Lorraine Kerr, who was awarded the Chancellor's Award for Outstanding Contribution. Dr Kerr, who is Director of Strategic Partnerships for North America, was given the prestigious award in recognition of her proactive approach to supporting staff and her stewardship of some of the University's important partnerships. Professor Guy Lloyd-Jones, Dr. Deval Desai, and Dr. Jeni Harden, were awarded the Research, Rising Star and Teaching awards, respectively.

Scottish Financial Technology Awards

Smart Data Foundry received the Social Impact award at the 2023 Scottish Financial Technology Awards for its collaboration with East Renfrewshire Council on the pioneering Cost-of-Living Dashboard. Utilising near-real-time de-identified banking data from NatWest Group, the dashboard integrates financial well-being indicators with contextual information, aiding the Council in understanding the challenges citizens face during the ongoing cost-of-living crisis.

Scottish Knowledge Exchange Awards

The Wellcome iTPA team, part of Edinburgh Innovations, were crowned Knowledge Exchange Heroes for their work supporting early career researchers to commercialise at the Scottish Knowledge Exchange Awards 2024. They were in good company with Prozymi Biolabs, who took home the Innovation of the Year award, and Roslin Institute student startup BetaBugs, which won the Innovator of the Future award. BetaBugs breeds black soldier flies as an alternative, sustainable protein source that can be used in aquaculture, pork, and poultry feed.



Scotland's Life Sciences Awards

School of GeoSciences spinout Carbogenics won the Sustainability award at Scotland's Life Sciences Awards, which celebrate the leading players in Scotland's life sciences industry. Professor Craig Ritchie, CEO and founder of research organisation Scottish Brain Sciences (SBS), won the Rising Star: Extraordinary Talent award. Professor Ritchie founded SBS in 2023 to provide better access to life-changing Alzheimer's medicines through clinical trials.

Inspire, Launch, Grow - 2023/24 Annual Awards

The University's annual Inspire, Launch, Grow pitching competition champions entrepreneurship at all stages. Winners at the 2023/24 awards included:

- Emerging Innovation Award: SeaSat - Student startup using satellite images to monitor ocean health
- Launch - Impact Award: VetSustain - Not-for-profit enabling vets to drive change for a sustainable future
- Grow - Growth Innovation Award: RoadGauge - Leveraging road inspection technologies to sustainably and efficiently manage issues like potholes
- Emerging Female Entrepreneur: Kamila Malysz of Excellio Labs, using stem cell-derived exosomes for drug delivery
- Moving Mountains Creative Enterprise Award: James Grossman Studio - Social enterprise tackling loneliness through artistic community interventions.



Innovation Drivers

We break boundaries by taking a one-university approach and focusing on our innovation drivers.



Smart Data Foundry is a data innovation organisation, serving the public, private and third sector. Our purpose is to inspire financial innovation and improve people's lives by unlocking the power of financial data. We aim to be the leading provider of data for research and innovation - supplying real data for research and synthetic data for innovation.

Smart Data Foundry provides synthetic data for innovation, enabling financial services organisations, FinTech's and regulators to develop innovative solutions to industry and customer challenges.



THE UNIVERSITY of EDINBURGH
Edinburgh Futures Institute

Edinburgh Futures Institute is focused on tackling today's increasingly complex issues by bringing people and disciplines together to spark the unexpected and make better futures possible. Recognising that the biggest challenges facing societies are complex, global, and interconnected, and that insight, innovation and impact come from bringing people and knowledge together.

The Futures Institute connects and collaborates across disciplines to make a positive impact. By creating new environments for data-rich learning, teaching, research and innovation - side-by-side with communities, organisations, businesses and industry. From start-ups to commercial enterprises, from charities and community groups to government bodies, their challenge-led, interdisciplinary, data-driven, co-creative approach lies at the heart of everything they do.



THE UNIVERSITY of EDINBURGH
Edinburgh Earth Initiative

The Edinburgh Earth Initiative is accelerating the University of Edinburgh's response to the climate crisis. Working with our academics, students, staff, and partners, we help ensure the University of Edinburgh is at the leading edge of climate research, teaching, innovation and action.



The Bayes Centre is the University of Edinburgh's Innovation Hub for Data Science and Artificial Intelligence. The technical strengths brought together in the Bayes Centre build on world-leading academic excellence in the mathematical, computational, engineering, and natural sciences in the University of Edinburgh's College of Science and Engineering. We have a community of over four hundred internationally recognised scientists, outstanding PhD students, leading industry experts and innovation support professionals, working together across disciplines and sectors to advance data technology and apply it to real-world problems.



THE UNIVERSITY of EDINBURGH
The Royal (Dick) School of Veterinary Studies

Nucleated at the Royal (Dick) School of Veterinary Studies' Easter Bush Campus, the Agritech Hub is a dynamic and vibrant innovation environment. World-class facilities equipped with the latest technologies support Europe's largest concentration of animal science research experts and clinicians, as well as co-located industrial partners in our custom-built Innovation Centre.



The ACRC is a multi-disciplinary research programme combining research across fields including medicine, engineering, informatics, data and social sciences. Our vision is to improve the quality and sustainability of care provision in order to enhance the quality of life, dignity and the desired level of independence of people living with multiple conditions in later life. The ACRC is a collaboration between the University of Edinburgh, Newcastle University and University College, London, and was established in 2020 with £20m funding from Legal and General.



The National Robotarium is a world-leading centre for robotics and AI. A partnership between Heriot-Watt University and The University of Edinburgh, as part of the Data-Driven Innovation initiative, the centre creates innovative solutions to global challenges, working directly with industry to test and develop robotic, AI and automated technologies and rapidly move pioneering research from lab to market.



THE UNIVERSITY of EDINBURGH
informatics

The School of Informatics is number 1 in the UK for Computer Sciences research power since 2014, a world-leader in AI research and teaching, with a dedicated commercialisation and industry engagement team to amplify the significant impact and reach of its academic research. Informatics leads on emerging technologies: Autonomous Vehicles, Biomedical AI, Blockchain & DLT, Cyber Security, Privacy & Trust, Generative AI, Machine Learning, Quantum Computing, and Robotics.



Built and operated by supercomputing and data science centre EPCC at the University of Edinburgh, The Edinburgh International Data Facility (EIDF) is a set of compute, data and customer services optimised for data analytics and science. EIDF employs a "building block" approach to give it the flexibility required to evolve and meet its users' needs. Businesses, universities, and public sector organisations make use of EIDF to undertake data-driven research and development. Core services include on-premises compute through virtual machines, GPUs, Cerebras AI, Jupyter Notebooks; large data storage and management, and Safe Haven facilities to process privacy-sensitive data.



THE UNIVERSITY of EDINBURGH



The Usher Institute works with people, populations and data to understand and advance the health of individuals and populations through innovative collaborations in a global community. As an Innovation Hub, we support the use of data and digital technologies to improve outcomes for patients and encourage the adoption of those with the greatest potential to transform health and social care.



THE UNIVERSITY of EDINBURGH
Generative AI Laboratory

The Generative AI Laboratory (GAIL) harnesses the University of Edinburgh's world-leading research and innovation in artificial intelligence to develop safe solutions for both industry and government to benefit society.



Edinburgh BioQuarter is a leading location for healthcare delivery, groundbreaking medical research and health innovation. Our vision is to unlock BioQuarter's full innovation potential, accelerate its growth and become a global destination for pioneering health innovation and enterprise.

Over the next decade BioQuarter will transition into Edinburgh's Health Innovation District - a new mixed use, urban neighbourhood of Edinburgh, centred around a world leading community of health innovators and companies.



The Arrol Gibb Innovation Campus (AGIC) is a global centre of excellence which is transforming large-scale manufacturing through innovation and learning. It will become the first large-scale digitally enabled advanced manufacturing facility for the marine and energy transition sectors in the UK. In a unique collaboration, AGIC brings together Babcock International, the Royal Navy, two universities, the regional college and the government. It offers core capabilities in advanced and large-scale manufacturing, composites, robotics and digital manufacturing, which are all supported by cross-campus skills development and an innovation hub.



THE UNIVERSITY of EDINBURGH
Baillie Gifford Pandemic Science Hub

We use human genomics and experimental medicine to rapidly find and test effective drugs. We are bold in ambition to transform the speed of therapeutic innovation. We bring disciplines together to solve the hardest challenges: we will use functional genomics to identify effective therapeutic targets, evaluate therapies with high precision using miniturized technologies that will go further and deeper into human lung to find, deliver, sense and see the effects of therapies at the bedside.



The Anne Rowling Regenerative Neurology Clinic is a charitable University of Edinburgh clinical research facility. We seamlessly integrate the best health care with the best health research as key to discovering and testing new treatments in clinical trials. We're delivering drug trials, making discoveries and improving quality of life for people living with neurological conditions including MS, MND, Parkinson's and early onset dementias.

Driving Success

EDINBURGH INNOVATIONS

Edinburgh Innovations is the University of Edinburgh's commercialisation service.

We bring University of Edinburgh research to industry, working to identify ideas with value, and facilitating the process of bringing them to life in real-world applications.

**WE MAKE IDEAS WORK
FOR A BETTER WORLD**

www.edinburgh-innovations.ed.ac.uk

OLD COLLEGE CAPITAL

Old College Capital (OCC) is the University of Edinburgh's venture investment fund. OCC manages Edinburgh's early-stage investment activities and shareholdings; supporting exciting ideas and technologies emerging from the University. OCC is part of Edinburgh Innovations, the University of Edinburgh's commercialisation service.

www.oldcapitalcollege.com

DATA-DRIVEN INNOVATION

An innovation network helping organisations tackle challenges for industry and society by doing data right to support Edinburgh in its ambition to become the data capital of Europe.

The DDI programme has helped establish six hubs at the University of Edinburgh and Heriot-Watt University – creating a regional power-house for collaboration with industry partners, as part of the City Region Deal.

To support the Entrepreneurship strand of the DDI programme on behalf of the DDI hubs, the University of Edinburgh encourages students and staff to take entrepreneurial pathways, encourages the creation of DDI-related companies, supports growth in existing companies and attracts match funding and investment. This is part of a wider range of activities aiming to create and grow over 400 data-driven companies over 15 years, securing significant investment in those companies, and the creation of high value jobs in the city and region, contributing to the vision of Edinburgh as the data capital of Europe.

www.ddi.ac.uk



THE UNIVERSITY
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EDINBURGH
INNOVATIONS

DDI Data-Driven
Innovation



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CITY
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DEAL
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