

MANCHESTER  
1824

The University of Manchester  
Digital Futures

# INSTITUTE FOR DATA SCIENCE AND ARTIFICIAL INTELLIGENCE

---

AI at the University of  
Manchester



The University of Manchester  
Digital Futures

# Institute for Data Science and AI

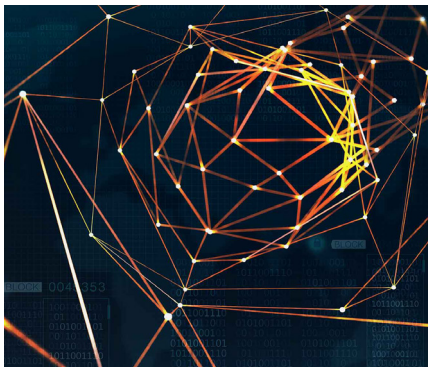
The University of Manchester's Institute for Data Science and Artificial Intelligence (IDSAI) is the access point to the University's expertise in Data Science and Artificial Intelligence, with over 800 affiliated researchers and academic staff.

IDSAI facilitates interactions between researchers and problem holders, owns the University's data science strategy, and delivers sustainable support for the community. Manchester has an engaged data science community, with methodologists embedded in Schools across the University addressing problems in extracting meaning from data, managing data volume, the variety of data used in analyses, the velocity with which it is produced and the veracity of those data.

Data science has a home in all three of the University's faculties (Science and Engineering; Humanities; Biology, Medicine & Health Sciences).

Our expertise covers the complete data science life-cycle: from information management, through analytics, to practical applications. A key feature of our approach is very close coupling between methodologists and translational scientists, drawing on strength-in-depth in real-world applications of data science. This creates a virtuous circle, where challenging real-world problems drive the methodology research agenda, whilst providing a natural route to exploiting new algorithms and methods.

We believe this deeply multidisciplinary approach is one of the distinctive features of data science at Manchester. The programme is built around



Find out more:  
[idsai.manchester.ac.uk](http://idsai.manchester.ac.uk)



# Institute for Data Science and AI Engagement

## INSTITUTE FOR DATA SCIENCE AND ARTIFICIAL INTELLIGENCE

---

IDSAI supports external engagement with the University's research through activities including internal and external funding sandpits, seminar series, annual international Advances in Data Science conference and a data science club.

Hear more about IDSAI from Professor Magnus Rattray, Director of the Institute for Data Science and AI at The University of Manchester.



Hear more from some of our researchers

Read more about the research that takes place at Manchester



### Digital Futures

IDSAI is a key theme within the University's Digital Futures platform. Digital Futures is a highly interdisciplinary network that operates across the whole range of the University's digital research, which aims to present a coherent overview of our digital research activity to external stakeholders and bring together our research communities to explore new research areas and address strategic opportunities.

Find out more:  
[Digitalfutures.manchester.ac.uk](http://Digitalfutures.manchester.ac.uk)



Sign up to the Digital Futures newsletter to join our community.



MANCHESTER  
1824

The University of Manchester  
Digital Futures

# DIGITAL FUTURES

## TRANSFORMING OUR WORLD

Digital Futures is a highly interdisciplinary network  
that operates across the whole range of  
The University of Manchester's digital research.

.....  
MORE THAN 1700 RESEARCHERS ACROSS 30 DISCIPLINES  
.....

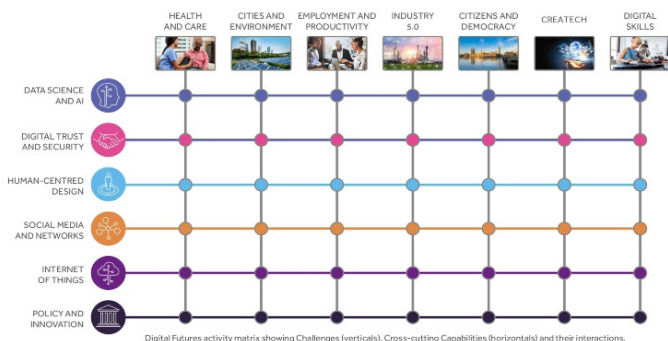
.....  
UNDERSTANDING AND DRIVING DIGITAL TRANSFORMATION  
.....

.....  
ENGAGING WITH CITIZENS, BUSINESS AND GOVERNMENT  
.....

.....  
PROVIDING THOUGHT LEADERSHIP, SHAPING THE FUTURE  
.....

[www.digitalfutures.manchester.ac.uk](http://www.digitalfutures.manchester.ac.uk)

# Digital Futures



Digital Futures brings together over 1700 researchers from different disciplines across all three of the University's faculties into multidisciplinary communities to tackle important research problems, build critical mass in new and emerging research areas and to work with external stakeholders to support Greater Manchester's ambitions as a leading digital city.

We bring our knowledge to bear on the great issues facing the world in the 21st century, exploring the complex interplay between scientific, engineering, social, wealth creation, and quality of life concerns. We are able to combine disciplines and capabilities to meet both the challenges of leading-edge research and the external demands of government, business and communities.

Digital Futures is built around challenges and cross-cutting capabilities. The matrix demonstrates the interactions between our Societal Challenges, Institutional Challenges and Cross-cutting Capabilities.

## Societal Challenges

Societal Challenges focus on real-world activities that are economically and socially important and have the potential to be transformed by digital technology.



## Cross-Cutting Capabilities

Cross-cutting Capabilities are digital frameworks, technologies, and methods that are important areas of research in their own right and provide the underpinning structures for addressing Societal and Institutional challenges.



Find out more:  
[digitalfutures.manchester.ac.uk](https://digitalfutures.manchester.ac.uk)



# IDSAI Research

## INSTITUTE FOR DATA SCIENCE AND ARTIFICIAL INTELLIGENCE

---

Data science within the University of Manchester Institute for Data Science and AI has a home in all three of the University's faculties: Science and Engineering; Humanities; Biology, Medicine & Health Sciences. Foundational research on Data Science Analytics is focused through our Centre for Fundamentals in AI.

Through our Centre for Robotics and AI our robotics and autonomous systems research has a distinctive profile developing, integrating and applying novel AI approaches in the design of robots and autonomous systems for real world applications.

Our Pankhurst Institute For health technology research and innovation Digital and AI technologies theme explores the potential for digital and AI technologies to revolutionise health and care. Across the University we are addressing data-driven research in Health & Biology, Social & Policy, Environment, Urban, Business & Management and the Physical Sciences.



Find out more:  
[IDSAI.manchester.ac.uk](https://IDSAI.manchester.ac.uk)

To hear about more events like this, use the QR code to access our newsletter sign-up page.

You can also follow us on Twitter at [@DigitalUoM](https://twitter.com/DigitalUoM)





# Natural language Processing and Text Mining

The National Centre for Text Mining (NaCTeM), based in the Department of Computer Science in the School of Engineering at the University of Manchester, is the first publicly-funded text mining centre in the world.

It was established to provide support, advice, and information on text mining (TM) technologies and to disseminate information from the larger TM community, whilst also providing tailored services and tools in response to the requirements of the academic community.



NaCTeM researchers have excelled in community shared tasks and challenges, notably in BioCreAtIvE III, IV and V, in BioNLP 2011 and 2013 (for the most complex task of event extraction) and most recently obtained two first places in tasks of the 5th CL-SciSumm Shared Task 2019.

Moreover, NaCTeM's participation in DARPA's \$45m Big Cancer Mechanism initiative, in a consortium led by the University of Chicago, saw it produce in 2015 the top performing system for extracting information to support cancer pathway modelling.

NaCTeM's academic and industrial research projects range over many domains from biology and biomedicine to biodiversity, toxicology, neuroscience, materials, history, social sciences, insurance, and health and safety in the construction industry, with funding coming from EPSRC, ESRC, MRC, AHRC, Wellcome Trust, NIH, Pacific Life Re, Lloyd's Register Foundation, AstraZeneca, DARPA, EC Horizon 2020, JST and the cosmetics and extracts industry, among others.

Applications arising from such research include Thalia, a semantic search engine over more than 20m biomedical abstracts; Facta+, to find unsuspected associations in the biomedical literature; HoM, allowing semantic search of historical medical and public health archives; and RobotAnalyst, supporting the hitherto laborious screening stage of systematic reviewing through active learning techniques.

NaCTeM also collaborates closely with the Artificial Intelligence Research Center, National Institute of Advanced Industrial Science and Technology, Japan.

Find out more:

[nactem.ac.uk](http://nactem.ac.uk)



# Alan Turing

Turing's name is synonymous with Data Science and Artificial Intelligence at The University of Manchester, from his work here in the 1940s and 50s to our current partnership with the Alan Turing Institute.

## The Alan Turing Institute

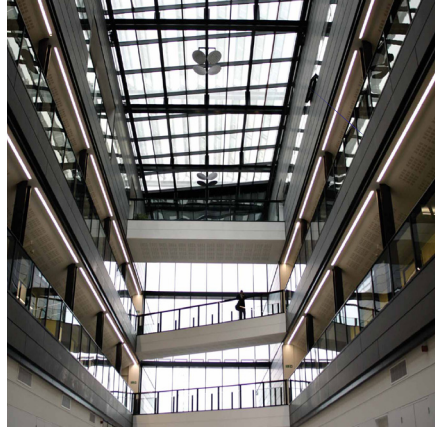
Alan Turing joined The University of Manchester in 1948, as Reader in the Mathematics department. In 1949, he took up the post of Deputy Director of the Computing Laboratory. This coincided with Manchester's work to develop the world's first modern computer: the 'Manchester Baby'.

In 1950 Turing published a seminal paper entitled 'Computing Machinery and Intelligence', in which he first addressed the issue of what was to be labelled artificial intelligence (AI).

In his paper, Turing developed a method to determine whether a machine can be recognised as 'intelligent' by demonstrating human-like thinking - this challenge was called the 'Imitation Game', and is now known as the 'Turing Test'.

Computing Machinery and Intelligence would have a significant influence on AI, a research area that continues exponentially today and where Manchester is still a global centre of excellence.

Turing contributed to the development of the Manchester Mark 1



The University's Alan Turing Building

and the Ferranti Mark 1, the world's first commercially-available digital computer, designed at The University of Manchester by Freddie Williams and Tom Kilburn.

Turing, Kilburn and Williams all now have Manchester buildings bearing their name.



Turing's pioneering work in mathematics, computing and artificial intelligence helped to distinguish and enhance our reputation in these academic areas, something that continues to this day.

Here at The University of Manchester, Turing's legacy lives on as future generations of mathematicians and physicists study in a building that bears his name. This latest recognition is richly deserved and a fitting tribute to one of the greatest scientists of the 20th Century.

Professor Dame Nancy Rothwell





The Manchester Baby

The Alan Turing Institute was created as the national institute for data science in 2015, adding artificial intelligence to their remit in 2017. The institute is a collaborative hub, with roots in universities and centres of research excellence across the UK, and strong links to a growing network of industry, public sector, and third sector partners.

Since 2018 there have been thirteen University partners: Birmingham, Bristol, Cambridge, Edinburgh, Exeter, Leeds, Manchester, Newcastle, Oxford, Queen Mary University of London, Southampton, UCL and Warwick.

The Alan Turing Institute also collaborates with businesses and public and third sector organisations to apply this research to real-world problems, with lasting effects for science, the economy, and the world we live in.

Our researchers collaborate across disciplines to generate impact, both through theoretical development and application to real-world problems. They

are fuelled by the desire to innovate and add value.

The institute has three ambitious goals:

- Advance world-class research
- Train the leaders of the future
- Lead the public conversation

Being a national institute enables the institute to deliver benefits that a single university could not deliver alone. Breaking down disciplinary boundaries, computer scientists, engineers, statisticians, mathematicians, and scientists work together under one shared goal.

Crucially, the Turing Institute is a convening power, bringing together the best talent in the data science and AI community to speak to industry, policy-makers, and the public.

In October 2021, The University of Manchester announced 33 Manchester-based Turing Fellows across all three of our Faculties.

Find out more: [turing.ac.uk](https://turing.ac.uk)

Use the QR code to find out more about Alan Turing Institute





# Turing Innovation Catalyst Manchester

Transform the future, right now. AI is the world's fastest growing deep digital tech sector. Its infinite possibilities are set to transform our collective future, but right now is the moment to write yours.

Turing Innovation Catalyst Manchester empowers you to do just that. Set to launch in 2023, our focus will be on commercialising and accelerating AI, deep digital tech, and digital trust technologies.

The Turing Innovation Catalyst Manchester is led by The University of Manchester, working with business, academic and public sector organisations. The project aims to accelerate Greater Manchester's digital economy by supporting existing start-ups and creating new ones, especially in the field of artificial intelligence. It will also help to develop skills in the region, with a particular focus on women and under-represented groups in the industry.

This will bridge the gap between cutting-edge research and business, and will have centres across the region from which to coordinate activity. The project aims to position Greater Manchester at the forefront, which will have a transformative effect on the regional economy and jobs.

TURING  
INNOVATION  
CATALYST  
MANCHESTER

WHERE  
AI POWERS  
GROWTH

AI is the world's fastest growing deep digital tech sector. Its infinite possibilities are set to transform our collective future, and right now you can get involved as part of Turing Innovation Catalyst Manchester. Set to launch in 2023, our focus will be on commercialising and accelerating AI, deep digital tech, and digital trust technologies.

- An ambitious programme of activity
- Human connections in a technology hub.
- A serious boost for businesses
- A diverse community.
- Establishing Manchester's place on the AI map.



# Manchester Centre for AI Fundamentals

The University of Manchester's new Centre for AI Fundamentals is a key component of a number of significant recent investments. The University of Manchester has made into AI education, innovation and industrial collaboration.

We boldly focus on fundamental AI research, which includes probabilistic modelling, deep learning, reinforcement learning, causal modelling, human-in-the-loop ML, explainable AI, ethics, privacy and security.

This centre brings together renowned academic expertise in AI with the latest research taking place across our growing Institutes.

“ We need new kinds of AI assistants which can learn to work well with humans and complement their skills. That requires new fundamental AI research, and Manchester has recognised this opportunity and is considerably strengthening its AI research. Manchester is a top-notch place to build and apply new AI which matters and has impact.

Professor Samuel Kaski

These include; The Institute for Data Science and AI (IDS AI), The Christabel Pankhurst Institute and our partnerships with The Alan Turing Institute and the European Laboratory for Learning and Intelligent Systems (ELLIS).

The University has already recruited a number of key staff to the new centre for AI Fundamentals, including lecturers and researchers, and there are a number of further vacancies currently being advertised. For further information on these, please use the QR code below.

To find out more about the Manchester Centre for AI Fundamentals, visit [manchester.ac.uk/fun-ai](http://manchester.ac.uk/fun-ai)



# The Christabel Pankhurst Institute

For health technology research and innovation

In 2021, a consortium led by The University of Manchester launched the Christabel Pankhurst Institute for Health Technology Research and Innovation. This new multimillion pound institute is building on Manchester's academic strengths in digital health and advanced materials to discover innovative health and care solutions.

This institute is part of an ambitious plan set out in the Greater Manchester (GM) Local Industrial Strategy to boost the city-region's provision in this area.

The initiative will build on investments from the University, Manchester Science Partnerships (MSP), the Engineering and Physical Sciences Research Council (EPSRC), and The Alan Turing Institute, creating a total budget of more than £25m.

The institute has recently moved into a flagship building at the centre of the University's campus. This location and partnership will provide support for business growth by facilitating better collaboration between the NHS, researchers and industry through MSP, MFT, Health Innovation Manchester and the University.

To find out more, visit

[pankhurst.manchester.ac.uk](http://pankhurst.manchester.ac.uk)

“

Health and scientific innovation is needed now more than ever, so it is terrific news that we can support the launch of The Christabel Pankhurst Institute in Greater Manchester.

The launch will see The University of Manchester continue to be a pioneer in digital health. It will come as a boost to the business sector by creating employment opportunities, at the same time as delivering further long-term health benefits to our city-region.

Andy Burnham,  
Mayor of Greater Manchester

”



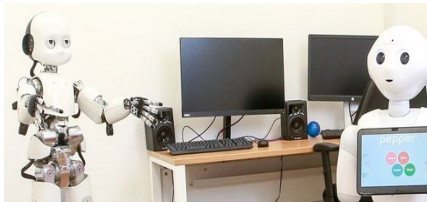
CHRISTABEL PANKHURST INSTITUTE

FOR HEALTH TECHNOLOGY RESEARCH AND INNOVATION



# Robotics and AI

Manchester's new centre dedicated to state-of-the-art AI technologies



The University's Centre for Robotics and AI pulls together experts and projects from across the academic disciplines who share the challenge of working on the front line of applied robotic technologies.

For example, Manchester researchers are looking to develop robotic systems that are able to explore in the most extreme environments, such as those found in the nuclear industry, power generation or agriculture. Other expertise includes designing robots to support digital manufacture or work in the field of medicine and health.

Robotics is now an important field that can be found in research areas across the University's academic portfolio – which is not surprising, as robotic and autonomous systems are being applied in all parts of our lives.

With the launch of this Manchester centre of excellence in robotics and AI we are providing a new focus to our multidisciplinary, world-class work in this field.

Professor Richard Curry

The centre maintains a portfolio of around 30 research projects with a value totalling over £35m, funded by EPSRC, InnovateUK, European Commission, RAEng and industry.

With a distinctive focus on integrating robotics and AI research, and a breadth of application domains ranging from nuclear robotics to trustworthy and verifiable autonomous systems to human-robot interaction for social and healthcare, the research we undertake puts our Centre at the forefront of UK and international investment priority areas.

Key Research Themes Include:

- Platform design, mechatronics and control
- Verification, security and trust
- Human-robot interaction and cognitive robotics
- AI, machine learning and data
- Ethics and society

To find out more, visit:  
[robotics.manchester.ac.uk](http://robotics.manchester.ac.uk)



# European Laboratory for Learning and Intelligent Systems

The European Laboratory for Learning and Intelligent Systems (ELLIS) has added The University of Manchester as a partner of its global members who strive towards a meaningful contribution to securing Europe's sovereignty and leadership in the research field of modern artificial intelligence (AI).

Four new international units have been announced including; Manchester, Jena and Stuttgart in Germany and Milan in Italy. The new units join a network of world-class institutions across 14 European countries and Israel.

The University of Manchester has recently strengthened its position as a centre for research into AI fundamentals and impactful applications of AI to improve health, security and sustainability. Last year the University appointed AI Chairs in each of its faculties followed by several excellent machine learning faculty appointments in the department of Computer Science.

The University of Manchester has been a partner of the Alan Turing Institute since 2018 and is home to 33 Turing Fellows.

It has a thriving community of data science and AI researchers, with over 900 researchers affiliated to its Institute for Data Science and AI (IDSaI). Manchester's ELLIS unit brings together experts in AI fundamentals

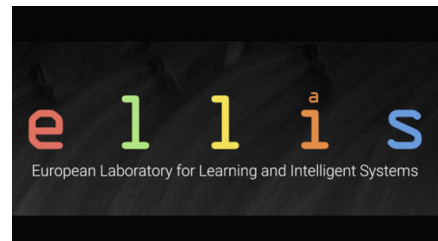
“ The University of Manchester continues to grow as a centre of excellence for AI research and the new ELLIS unit will further strengthen this activity. Through the new ELLIS unit Manchester will be able to better link machine learning researchers across Europe with impactful applications across many disciplines. ”

Professor Magnus Rattray

with experts in the application of AI in other fields, with particular strengths in health, and will connect with other leading experts in the ELLIS network across Europe.

The University of Manchester has established a strategic partnership in a shared professorship with the director of the ELLIS unit Helsinki, Samuel Kaski from Aalto University, Finland. This Northern link will be used in the future to set up the ELLIS units in Manchester and Helsinki as a twin unit, with tight collaboration already under way through research collaboration and exchange.

Find out more: [idsai.manchester.ac.uk/connect/partnerships/ellis](https://idsai.manchester.ac.uk/connect/partnerships/ellis)





The University of Manchester  
Digital Futures





Digital Futures  
@DigitalUoM  
[Digitalfutures@manchester.ac.uk](mailto:Digitalfutures@manchester.ac.uk)

Follow the Institute for Data Science  
and AI @idsai\_uom

[idsai.manchester.ac.uk](http://idsai.manchester.ac.uk)  
[idsai@manchester.ac.uk](mailto:idsai@manchester.ac.uk)