

An initiative of  
**Imperial College**  
London

# Intelligence Applied

# Solving global challenges with AI

I-X is an ambitious new research initiative at Imperial College London, established to bring new focus to interdisciplinary AI research. The goal is to bring together AI experts from across the College to tackle major research challenges in areas such as health, sustainability, and security, and to create new opportunities for deeper collaboration with companies and entrepreneurs.

I-X operates outside conventional university structures, enabling it to better support interdisciplinary teams working on original research with the potential for global impact. Current research includes projects such as new medical imaging for cancer diagnosis, tracking CO<sub>2</sub> emissions and AI-based space debris modelling platforms. I-X also offers interdisciplinary doctoral programmes and master's courses, which combine academic studies with entrepreneurship.

Established with an initial investment of £29 million from Imperial, I-X is located at the College's innovation campus in White City, where it is connected to a vibrant innovation ecosystem with many businesses and research facilities.

Philanthropy will play a crucial role in realising our vision for I-X, supporting academic leadership, creating opportunities for the next generation of AI researchers, and helping to create gold-standard research facilities.

**“I-X brings together Imperial’s strengths in data, AI, computing and maths to drive the smart society of the future. We will embed our research, education, and innovation mission in a multidisciplinary, entrepreneurial environment that engages external partners to help deliver new ideas, new technologies and deeper impact more effectively and rapidly.”**

Professor Ian Walmsley  
Provost, Imperial College London





# Leading the world in interdisciplinary AI research

Imperial College London is one of the world's leading universities for research and training in science, engineering, medicine and business. We have consistently been amongst the top ten in the *Times Higher Education* world rankings, while the UK government's independent Research Excellence Framework (REF 2021) ranked Imperial as top in the UK for research, with a greater proportion of top-scoring 4\* research than any other university in the country.

With a proven record of supporting staff and students to translate their ideas for the market, Imperial was named as the UK's most innovative university by Reuters and the best university in Europe for student entrepreneurs by *Forbes*, with Imperial alumni or students taking 17 places on the *Forbes* '30 under 30' list for 2022.

## A global leader in AI research

Ranked top in the UK for computing and engineering (REF 2021) and with more than 300 academics working on AI and related fields, Imperial is one of the world's leading AI research communities.

In education, we attract some of the best emerging talent. We are home to a number of doctoral training programmes with an AI focus, including AI in healthcare, 'safe and trusted AI', and statistics

and machine learning. We offer a range of master's degree courses in AI, machine learning and data science, and executive education options in AI for professionals wishing to move into the field.

AI research at Imperial is by nature interdisciplinary, with experts in theoretical AI working alongside colleagues from a broad range of disciplines who apply AI in their research.

This interdisciplinary approach enables us to tackle real-world challenges, for example, by bringing together computer scientists, product designers and medical doctors to work on new technology to support people with dementia to live independently, or by partnering with colleagues in the commercial sector to redesign data centre computing – which underpins AI – to improve security.

The creation of I-X provides the strategic vision, academic leadership, and core infrastructure needed to expand this approach, fostering deeper collaboration not only within the academic community, but with companies and startups too.



## CASE STUDY

### Living independently, for longer

Professor Payam Barnaghi is part of the team behind Minder, a remote care platform that uses home sensors and artificial intelligence to build up a picture of how an individual with dementia usually behaves while at home – and then to flag any changes in their behaviour that could be a cause for concern. With colleagues at I-X, Professor Barnaghi is now looking at how wearable sensors that provide real-time data on an individual's vital signs can be used to provide more accurate in-home monitoring for people with dementia or other age-related conditions.



# Lifting barriers to deeper collaboration

I-X combines expertise in AI, machine learning, statistics and data science with core disciplinary strengths in medicine, science and business. We are undoing the institutional barriers that can obstruct deep collaboration across disciplines and limit opportunities to partner with companies and entrepreneurs working on related challenges outside an academic setting.

At the Translation and Innovation Hub at the White City Campus we have created a new 27,000 square-foot facility for co-location, an open workspace where researchers from the academic and commercial sectors can work together outside disciplinary or institutional silos.

Here, as part of White City's established innovation ecosystem and in close proximity companies and startups operating in the tech sector, we are working alongside entrepreneurs and industry researchers on shared problems and projects, through informal exchanges, 'in-residence' arrangements, and joint appointments that bridge the commercial and academic sector in a more formal way.

## WHITE CITY CAMPUS

### A space for discovery and innovation

I-X is based at Imperial's research and innovation campus in White City, a 23-acre site that is home to major multidisciplinary research and laboratory facilities, innovation spaces for startups, and workspace for high-growth businesses and scale-ups. More than 2,000 scientists, clinicians and engineers are based at the White City Campus, working alongside 500 businesses of all sizes, from technology startups to multinational corporations such as Novartis and Airbus Defence and Space. Here, I-X is plugged into a thriving innovation ecosystem and the opportunities for collaboration that it offers.



## CASE STUDY

### Mapping space debris

Navigating space debris from defunct hardware has become a major challenge for satellite operators, with the problem of collision posing an increasingly significant risk. A cross-disciplinary I-X team – including both academic staff and colleagues seconded from industry partners – is now planning to provide the first direct mapping of space debris. Using a small satellite equipped with ultra-sensitive sensors to detect impacts, they will then use machine learning to develop 3D mapping from the data, with the ultimate goal of mitigating the risk of space debris damage.



# Finding solutions to global challenges

Our research programme focuses on the most exciting and ambitious ideas: work that stands to deliver real benefits to humanity and advance scientific exploration, and that offers potential for clear progress within a five- to ten-year period. Alongside theoretical research on AI, machine learning, statistics and data science, we focus on both foundational AI and AI applications.

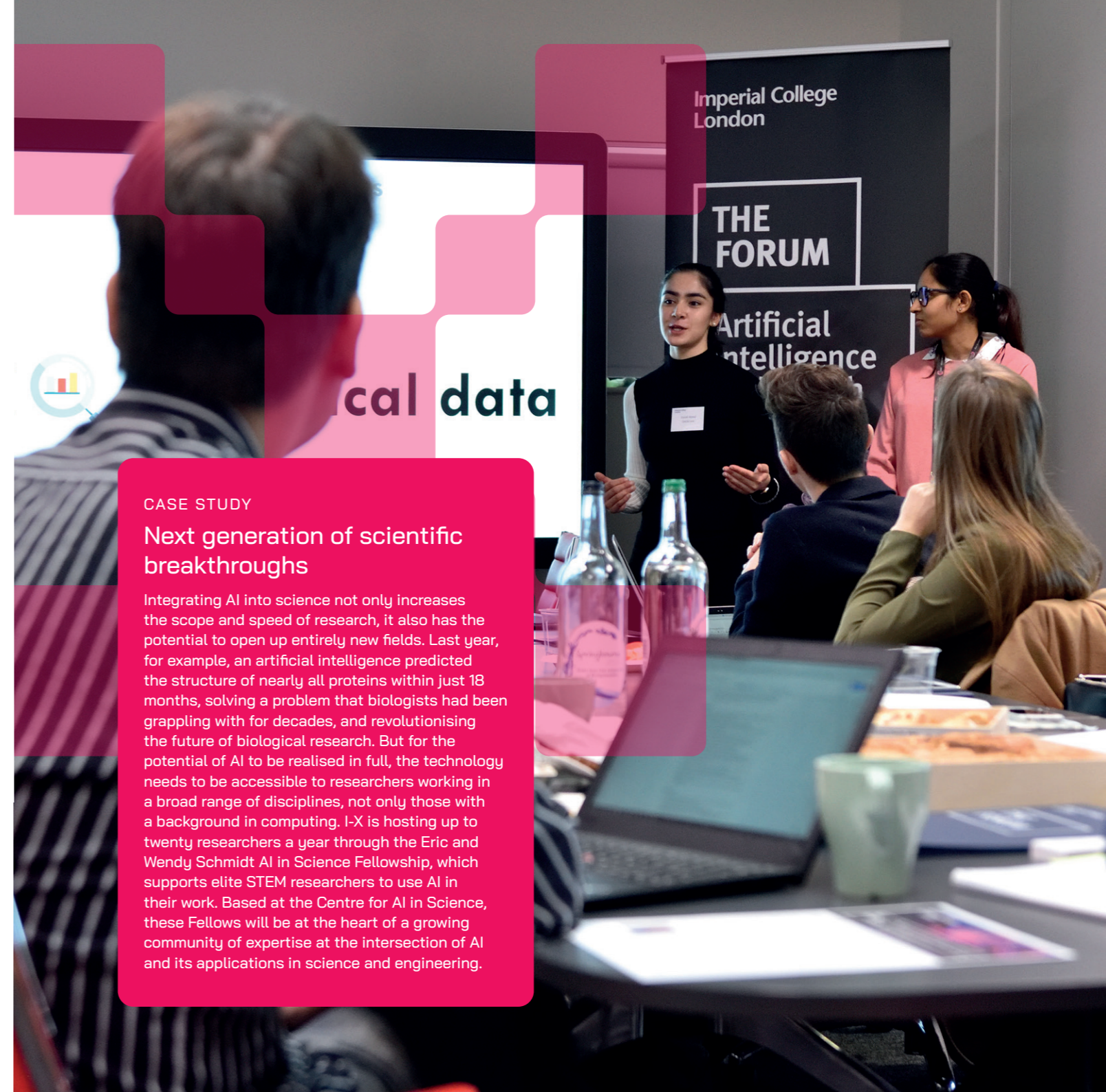
Work on *AI applications* tackles some of the most pressing problems in health, sustainability, economics, and defence. Current projects include 'Card.io' (pictured, right) which combines medical imaging, computer vision and genomics to improve understanding and treatment of cardiovascular disease, and 'Carbon Mark', an ambitious attempt to calculate the carbon emissions of all consumer goods, with the ultimate goal of guiding greener purchasing decisions.

Work on *Foundational AI* focuses on advances in AI technologies, including themes such as human–AI interaction, quantum computing, systems and infrastructure, and explainable AI. Examples of foundational research include a partnership of academic and industry researchers working on non-invasive interfacing with the human nervous system, and a major systems research project that aims to ensure



that computing infrastructure and software systems keep pace with the data and compute requirements made by an increasingly data driven society.

Since the launch of I-X, we have established a growing research community, with 100 academics now participating in over 30 I-X research initiatives, and a series of new hires bringing fresh ideas and experience to priority areas.



## CASE STUDY

### Next generation of scientific breakthroughs

Integrating AI into science not only increases the scope and speed of research, it also has the potential to open up entirely new fields. Last year, for example, an artificial intelligence predicted the structure of nearly all proteins within just 18 months, solving a problem that biologists had been grappling with for decades, and revolutionising the future of biological research. But for the potential of AI to be realised in full, the technology needs to be accessible to researchers working in a broad range of disciplines, not only those with a background in computing. I-X is hosting up to twenty researchers a year through the Eric and Wendy Schmidt AI in Science Fellowship, which supports elite STEM researchers to use AI in their work. Based at the Centre for AI in Science, these Fellows will be at the heart of a growing community of expertise at the intersection of AI and its applications in science and engineering.



## Building a pipeline of talent

The demand for AI skills in the workforce exceeds the available supply, creating a skills gap that risks impeding innovation and slowing technological advancement.

Working with founding partners, I-X will develop interdisciplinary curricula that equip students to work with, and on, next-generation technologies. New master's programmes will combine AI, machine learning and data science with areas of application in health, life sciences, engineering and business. New PhD programmes will combine doctoral study with entrepreneurial activity, empowering students to progress their business plans while building new technologies.

Imperial's reputation as one of the world's best places to study computing at postgraduate level means that we already attract excellent students from around the world. As I-X expands its educational offering, we will be able to welcome a growing number of bright young people and to build a diverse pipeline of talent, equipped with the technical skills, interdisciplinary outlook and enterprising spirit to make a serious contribution in research, industry, and entrepreneurship.

### CASE STUDY

#### Changing the face of tech

Philanthropy is helping to realise our vision for diversity in AI. Thanks to support from DeepMind, we are able to offer scholarships that give people from groups underrepresented in our student community the opportunity to study for a master's or PhD in AI and computing. As well as financial support for the duration of their studies, Scholars are matched with a DeepMind mentor to support them in their studies and career plan. Hannah Kay's DeepMind Scholarship allowed her to move into AI from a background in psychology, where she gained coding skills and worked on new methods for measuring trust amongst users of AI tools.



## Philanthropic opportunities at I-X

While public money tends to be awarded for discipline-specific research and industry funding focuses on work with clear commercial potential, philanthropic support offers the freedom to pursue our vision for I-X without compromise.

**By supporting academic posts, you bring new talent to an area of research that interests you, from machine learning for software security to climate modelling or AI ethics and safety.** Philanthropic support for academic chairs enables us to appoint senior researchers to lead priority research, while support for lectureships and fellowships provides opportunities for the next generation of researchers. Academic posts can be funded over a fixed duration or in perpetuity through an endowment gift.

**Supporting PhD studentships or master's scholarships at I-X helps to build a diverse pipeline of talent into the sector – and connects you with our growing postgraduate student community.** Philanthropic support for students helps to lift the financial barriers that deter graduates from going on to advanced study in AI and related fields. Giving to support scholarships at I-X enables us to attract the best students – including those from groups underrepresented in our student community – and to equip them with the skills needed to thrive in an academic, commercial or entrepreneurial context.

Philanthropy can also support 'PhD startupships', which allow students to combine doctoral research with launching and growing their own AI startup.

**Philanthropic investment will create new facilities for cross-disciplinary working.** We are equipping our workspace at the Translation and Innovation Hub with specialist research facilities, including a digital living lab – a home-style environment for studying how people interact with tech – and a suite for human-robotics research. Philanthropy will help us go beyond what is possible with core funding alone – and to realise our plans in full. We would be delighted to celebrate your support through physical recognition on site.

**Supporting blue-sky research unlocks innovation.** Many of the most exciting advances in science come from 'blue sky' research – work that has great potential but is at too early a stage to have immediate commercial application. With your support, we will create the I-X Discoveries Fund to offer seed funding to research teams working on approaches that have potential for major impact, but which are too early stage for conventional funders.

## Where your gift can make a difference

There are many areas where philanthropic support can have transformational impact on I-X and our research and teaching mission, and we look forward to speaking with potential supporters about how our priorities may align.

To learn more about making a gift to I-X, please get in touch.

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