

# Creative Machine Learning



Research, Skills, Innovation

## Shaping the Future of AI

The UCL Centre for Artificial Intelligence (AI Centre) sits at the heart of UCL's AI Strategy "For People and Planet". Whilst there has been dramatic progress in AI, these systems are still far from being universally useful. Current AI systems have only a limited ability to comprehend the world around them and interact with us in meaningful ways.

For example, machines can now accurately transcribe human speech into a textual representation; however, the machine doesn't really know how to interpret the meaning of that representation. Similarly, machines can visually see objects, but the significance and utility of those objects is largely unknown to the machine. Computers can now easily beat humans at chess, but robots still struggle to pick up a chess piece and move it gracefully on the chess board. Loosely speaking, AI systems can perceive, but they struggle to reason about and interact with their environment.

Making advances in AI would enable machines to carry out a variety of repetitive tasks, thereby freeing humanity to spend more time on activities such as supporting empathy, morality, creativity, humour, entertainment, pleasure, family, exercise, culture, education, health, science and environment and ecosystem protection. Used responsibly, AI has the capability to improve the quality of life for all and support, not harm, life on the planet.



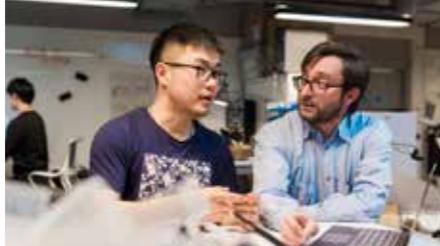
As we transition to a more automated society, the core aim of the Centre is to create new AI technologies and advise on the use of AI in science, industry and society. The Centre brings together researchers with a shared interest in fundamental challenges in Machine Vision, Machine Learning, Machine Reading, Machine Action, Interpretation and Knowledge Representation. The Centre takes inspiration from the vast array of applications across UCL and acts as the engine of methodological progress.

AI has profound ethical and societal implications. UCL is continually aware of its responsibilities and leads on the sustainable development and fair usage of AI. At an institutional level, UCL is a member of the Partnership On AI, a multi-stakeholder organisation that brings together academics, researchers, civil societies and companies building and utilising AI technology to better understand AI's impacts.

## Research

**UCL is one of the leading AI research institutions in the world, with the AI Centre being at the heart of UCL's efforts. Making next generation AI machines is an exciting grand challenge that will require a range of collaborative advances.**

Bringing leading research talent together, we work on joint projects to drive progress. Beyond a purely implementation view, we take a principled approach to try to understand how to efficiently train machines and interpret their capabilities and performance. The Centre's approach to creating efficient and effective AI is inclusive, encompassing a variety of mathematical, computational, statistical and engineering approaches.



Inspiration may come from different areas including neuroscience and psychology. As these systems are deployed in the everyday world, input from the social sciences is vital to make fair and transparent AI systems. To achieve this the Centre leads national and international AI research projects, organises seminar series and hosts research visitors.

## Skills

**UCL has a proud history in AI education. More Masters students have been trained in AI at UCL in the last 10 years than any other university in the country.**

The Centre runs PhD and Masters programmes in Machine Learning and related topics in AI, with over 150 students from around the world graduating each year. Our view is that understanding the scientific and mathematical principles behind AI is important. Rather than just demonstrating how to use existing AI tools we train all students to have the capability to create new AI algorithms. This enables students to have a depth of understanding to lead others and make bespoke solutions to complex challenges.

The UK recognises UCL's expertise in AI training and recently awarded us the UKRI Centre for Doctoral Training (CDT) in Foundational Artificial Intelligence.

This award of £6.7 million has been doubled by the generous support of our industry partners who share our vision to train a new generation of students driven by a passion to make progress in AI and turn this into a positive impact for People and Planet. The CDT is hosted at the AI Centre and will train over 70 PhD students in Foundational AI over the next 8 years.

We will take mathematically gifted students and train them to be leading AI researchers. A unique aspect of the CDT is its remit to also equip PhD students with the skills to form AI startup companies based on their deep technical expertise. The CDT will thus address the national need for AI workers by training researchers capable of advancing core AI algorithms. These graduates will help shape the social, scientific and economic landscape through scientific breakthroughs and the creation of companies on the basis of novel AI technology.

## Innovation

**The AI Centre both feeds in to and is supported by one of Europe's most vibrant tech sectors. Members of the AI Centre have made some of the most successful AI startups in recent times and the Centre aims to help create more by supporting Centre staff and students through entrepreneurship training and hosting industry events at the Centre.**

Of particular interest to us is the creation and support of companies that introduce new AI algorithms exceeding previous capabilities. Such companies will benefit from our deep technical expertise and we believe are most likely to shape the future economic and societal landscape.



## Partnerships

The AI Centre has a clear vision for research, skills and innovation which is continually informed through discussion with academics, students, government and industry. Ultimately the Centre is not for us, it is for you – the public and society that we serve.

We are delighted by the support received for our vision of open, collaborative research and training, partnering with some of the most forward thinking organisations in the world. Our founding partners Cisco, Google DeepMind and Adobe have been instrumental in creating the Centre, helping shape our vision of progressive research and training from Masters students through to PhDs and established researchers. We are grateful to many other generous supporters, including Facebook, Microsoft, Nvidia, Accenture, Vodafone, Huawei, Niantic, Faculty, BenevolentAI, Digital Surgery, Dynium, OSIC, Intuitive and Julia Computing. With all these contributions, we are able to offer much more, from increased support for diversity and training to understanding how and where our research efforts can have the most impact.



Innovation training is kindly supported by Albion Capital, Capital Enterprise, SCM Advisors, CognitionX and Entrepreneur First. The Centre is also supported by Digital Catapult in interfacing with industry and has received generous computing support from local companies including Novatech.



**UCL is a world leading AI institution across research, skills and innovation. We've created an environment that fosters students and researchers to think about the bigger picture with confidence and respect, with a vision for a better future and the tools to make it happen. However, this is just the beginning and we need your support to expand on our success and help make AI a positive reality for all.**



We are delighted to invite you to engage with the AI Centre, through academic or industry partnerships, training, research and education. Please contact us at: [aicentre@cs.ucl.ac.uk](mailto:aicentre@cs.ucl.ac.uk)



**UCL Centre for Artificial Intelligence**

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