Department of Informatics
King's College London
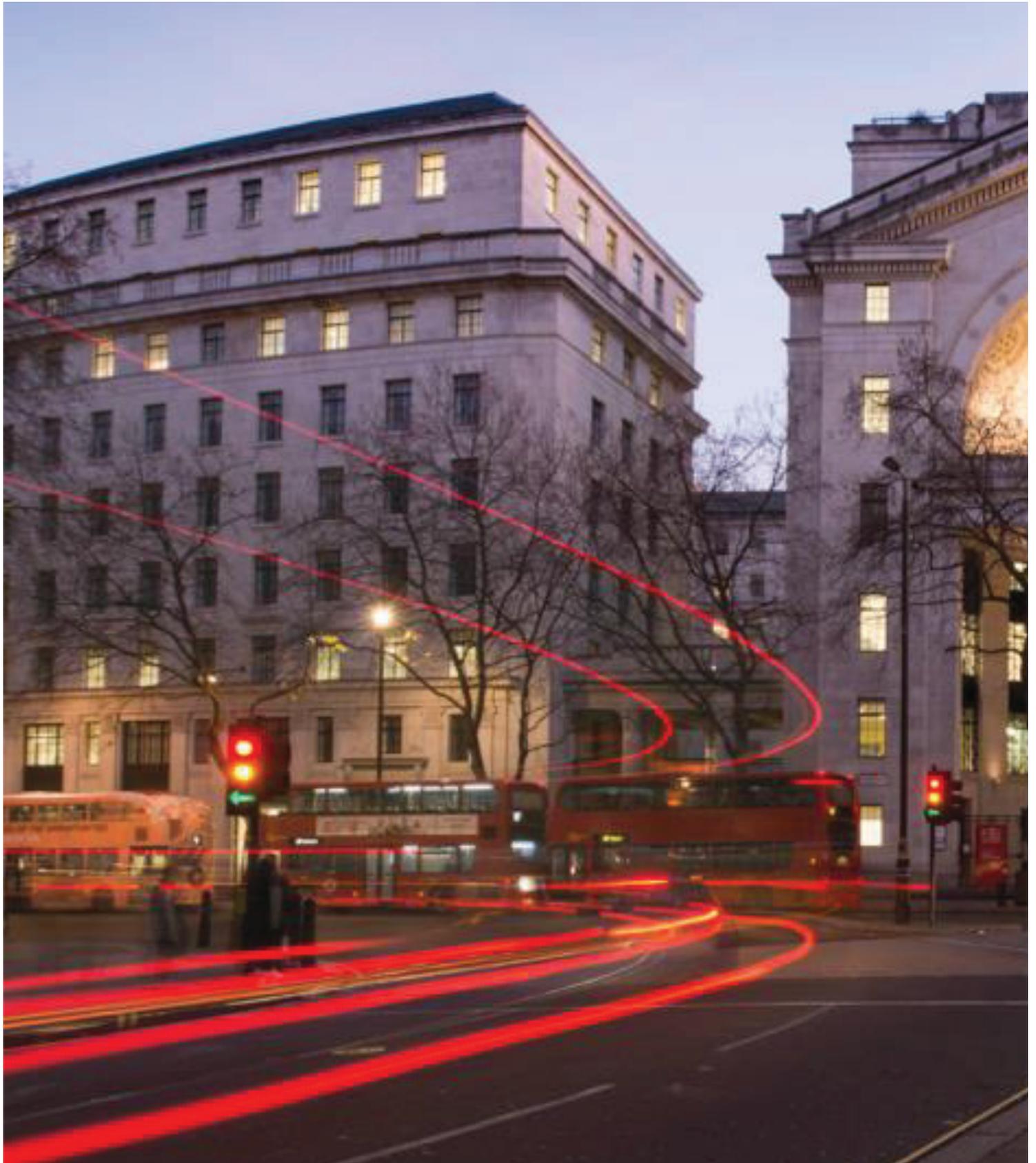
About King's

King's College London offers an intellectually stimulating environment in which to work, where staff are dedicated to the advancement of knowledge and learning in the service of society. We are a multi-Faculty institution, providing high-quality education, research and innovation across the sciences, humanities, medicine, law, dentistry, and social sciences. As a member of the Russell Group, an association of leading UK research-intensive universities, we are committed to maintaining the highest standards in research and education. King's is the largest centre for the education of healthcare professionals in Europe and is home to five Medical Research Council Centres spread across its three teaching hospitals.

King's is one of the top 10 UK universities in the world (QS World University Rankings 2020) and the fourth oldest university in England, based in the heart of London. King's has over **31,000 students** (including more than 12,800 postgraduates) from some 150 countries, and over **8,500 employees**. King's provides world-class education and cutting-edge research. King's is in the top seven UK universities for research earnings and has an overall annual income of over **£840 million** (2018).

Leadership and structure
King's is led by **Professor Ed Byrne** President & Principal supported by senior officers. King's is located across five central London campuses and comprises nine academic faculties:

- Faculty of Arts & Humanities
- Faculty of Dentistry, Oral & Craniofacial Sciences
- Faculty of Life Sciences & Medicine
- Faculty of Natural & Mathematical Sciences
- Faculty of Social Science & Public Policy
- Florence Nightingale Faculty of Nursing, Midwifery & Palliative Care
- Institute of Psychiatry, Psychology & Neuroscience
- King's Business School
- The Dickson Poon School of Law

King's Strategic Vision 2029
King's Strategic Vision looks forward to our 200th anniversary in 2029. It shows how King's will make the world a better place by focusing on five key strategic priorities: educate to inspire and improve; research to inform and innovate; serve to shape and transform; a civic university at the heart of London; an international community that serves the world. Further information on our strategy can be found here.

Department of Informatics

To better tackle real-world challenges, the Department of Informatics has strategically organised its activities according to six research groups and five cross-cutting hubs.

Algorithms and Data Analysis (ADA) is concerned with theoretical and practical considerations of machine learning techniques and algorithm design applied to very large data sets. **Cybersecurity** (CYS) investigates design, modelling, analysis, verification and testing of networks and systems in order to tackle cybersecurity and privacy problems that are important to industry, society and individuals in this technologically dependent world.

Distributed Artificial Intelligence (DAI) explores the use of AI in social and economic contexts where an intelligent entity may be interacting with other entities. **Human Centred Computing** (HCC) is concerned with the design, development and evaluation of systems with which humans interact and engage in complex and varied ways. **Reasoning and Planning** (RAP) focuses on the fundamental Artificial Intelligence challenge of creating, representing and reasoning with expressive models of the world, with particular strengths in dealing with complex systems, reasoning with information that is uncertain, incomplete or subjective, and planning. **Software Systems** (SSY) investigates design, modelling and engineering of software systems, reasoning about systems, and algorithms and tools for verification of software.
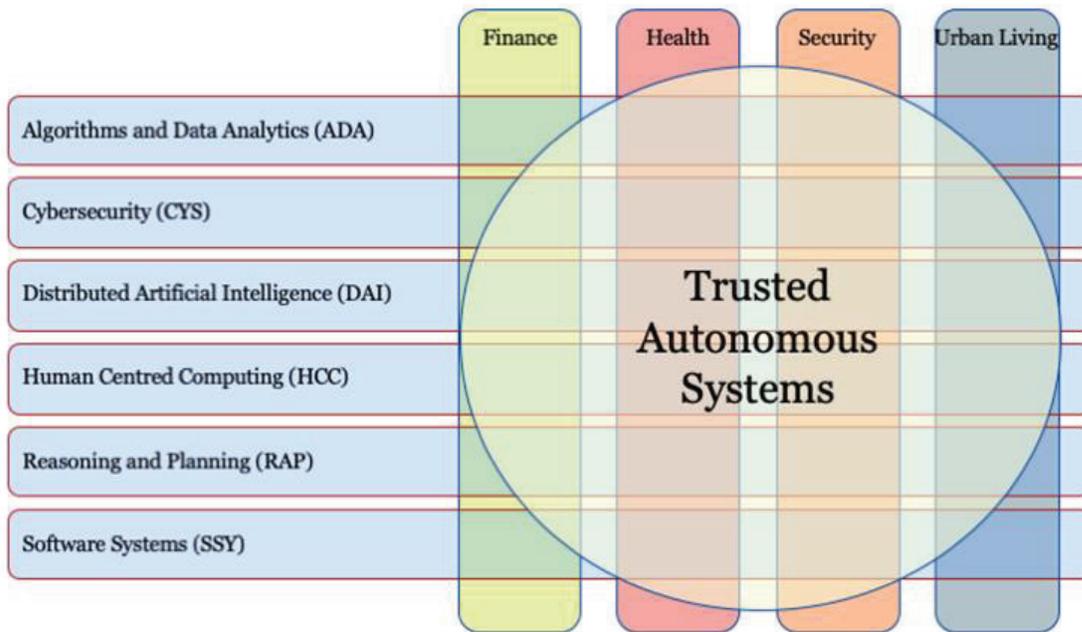
Hubs provide a virtual clustering of researchers from all parts of the Department around a specific theme. Five hubs have been identified: four focus on sectors of economic activity (health, security, urban living and finance), whereas the fifth hub (trusted autonomous systems) provides a technology focus for the whole Department.

Financial markets are increasingly being underpinned by information technology to the extent that financial markets can be seen as instances of distributed systems technology, and in turn economic and financial incentives are increasingly understood to play an important role in conventional distributed systems technology such as internet protocols. The **Finance Hub** conducts fundamental and applied research at the intersection of finance and computation, a sector which is colloquially known as FinTech. We apply techniques such as network analysis, scientific and high-performance computing, time-series analysis, bigdata analytics and agent-based modelling to problems in market micro-structure, risk management, portfolio construction, and the design of crypto-finance and distributed-ledger protocols. The Hub has established collaborations with other departments at King's, such as the Department of Mathematics and the King's Business School, as well as key financial institutions, including the Financial Conduct Authority. These collaborations are key to enabling access to data conducive to original research.

The **Health Hub** centres on computational characterisation of medically relevant study cases and data. Comprising bioinformatics, systems biology, medical and health informatics, well-being, sensors and remotely controlled robotic devices, this multidisciplinary activity not only connects academic groups within the Department of Informatics, but also links Informatics to multiple other disciplines and organisational units across King's and to the Francis Crick Institute. The overall objective is advancement in understanding fundamental mechanisms in health and disease, enabling remote diagnosis and operations, monitoring the delivery of medical practice and designing effective interventions for therapy or treatment. Through these collaborations, there are opportunities to access unique data sets, which enable the development and evaluation of original computer science research, with the potential to have strong impact in the broad area of health.

The **Security Hub** consolidates the research conducted in Informatics related to security, covering the whole socio-technical and cyber-physical spectrum of modern systems with a strong focus on information security and cybersecurity. This includes topics such as formal and intelligent methods for security and privacy; security design, verification and testing; secure and privacy-preserving telecommunications; human factors and usable security and privacy; data privacy, data anonymization, and personal data protection; data and system transparency; digital forensics and cybercrime; and blockchain and distributed ledger technologies. The Hub also collaborates with other organisational units at King's, in particular the School of Security Studies (including the Department of War Studies and the Department of Defence Studies) and the Department of Digital Humanities, which provide additional security scenarios and access to unique data sets.

The **Urban Living Hub** acts as an umbrella activity for all research in the Department of Informatics addressing urban-related issues. Topics of interest include buildings, energy, culture, entertainment, logistics, town planning, pollution, population, transport and smart cities. The hub is directly aligned with King's 2029 strategic vision of a civic university at the heart of London, with a view to develop research collaborations that address London's challenges. The Hub operates in close cooperation with the Centre for Urban Science and Progress (CUSP) London, a national and international collaborative network of researchers, companies and local governments. Through CUSP London's ambitious program, the Hub offers opportunities to access unique data sets and challenges.

The **Trusted Autonomous Systems** Hub pulls researchers from computer science and engineering together to develop the trustable autonomous systems of tomorrow. Our vision for such autonomous systems is that they are capable of reasoning and planning, they are safe and secure, they efficiently integrate in human-autonomous systems teams, they rely on wireless communications and they might have physical embodiment as robots or intelligent sensors, they interact with humans, they are accountable for their behaviour, thereby allowing users to place their trust is them.

The [UKRI Centre for Doctoral Training (CDT) in Safe and Trusted Artificial Intelligence (STAI)](.) brings together world leading experts from King's College London and Imperial College London to train a new generation of researchers in safe and trusted artificial intelligence (AI). The STAI CDT offers a unique four-year programme, focused on the use of model-based AI techniques for ensuring the safety and trustworthiness of AI systems. Students will engage in various training activities, alongside their individual PhD project, ensuring that not only are they trained in state-of-the-art AI techniques, but also that they acquire a deep understanding of ethical, societal, and legal implications of AI in a research and industrial setting. Through engagement with the CDT's diverse range of industrial partners, students will be exposed to the different experiences, challenges, and technical problems involved in both start-ups and large corporations. Staff in the department of Informatics are invited to offer topics and potentially supervise PhD students in the STAI CDT.

Research undertaken in the Department of Informatics as well as in the Department of War Studies has contributed to King's College London being recognised as an **Academic Centre of Excellence in Cyber Security Research** (ACE-CSR) by the National Cyber Security Centre (NCSC) and the Engineering and Physical Sciences Research Council (EPSRC). The ACE-CSR is a crucial mechanism to facilitate engagement with external stakeholders including government organisations, research funding agencies, and the broader industrial sector.

As well as developing research collaborations between the six research groups, our aim is to further develop interdisciplinary research and teaching initiatives with other departments in the Faculty of Natural & Mathematical Sciences, and across the university. In the 2014 Research Excellence Framework (REF), Informatics at King's was rated as having 92% of its research outputs as world leading or internationally excellent. The 2014 REF results placed the Department in the top 10 of Computer Science and Informatics departments in the UK, when measured by the Power Ranking. There are currently 56 full-time academic staff, supported by teams of professional services and technical staff.

We offer several undergraduate programmes, including the **BSc Computer Science, BSc Computer Science with Management, BSc Computer Science with Artificial Intelligence, BSc Computer Science with Robotics, and associated MSci degrees**. There are currently approximately **850** full-time undergraduate students.

We also run a portfolio of successful **MSc programmes in Advanced Computing, Advanced Software Engineering, Artificial Intelligence, Computational Finance, Cybersecurity, and Data Scien**ce. There are currently approximately **220** MSc students. We are keen to continue to expand our postgraduate research programme, in which there are currently approximately **100** PhD students.

For several years, Informatics has hosted research groups in robotics and telecommunications, and associated educational programmes, in effect, incubating a new department of Engineering. Engineering research at King's currently focusses on robotics, telecommunications and biomedical engineering, and our aim is to strengthen our existing research activities but also to establish new research themes, building on the strength and complementarity in the Department of Informatics and across King's more generally. Strong links have been forged between the Department of Informatics and Engineering, and we anticipate the departments to retain strong links in the future.

The Department was awarded a department level Athena SWAN Bronze Award in recognition of the work we are doing towards gender equality. This is part of a broader programme of activities the Department is engaged in around diversity and inclusion and ensuring an inclusive and supportive working and learning environment is a key part of the Department of Informatics' strategy. Although the Department is fairly large in size, there is a friendly and inclusive culture, with regular social and celebratory events to bring staff and students together. Diversity is positively encouraged with a number of family-friendly policies, including the operation of a core hours policy, the right to apply for flexible working and support for staff returning from periods of extended absence, for example maternity leave. All new members of staff are allocated a mentor to support them in their career development and staff are encouraged to participate in the wide range of training opportunities available at King's.

Faculty of Natural & Mathematical Sciences

The Faculty of Natural and Mathematical Sciences (NMS) comprises the Departments of Chemistry, Informatics, Mathematics and Physics. A new Department of Engineering opened in August 2019.

King's is making significant investment in the Faculty and both student and staff numbers are growing. We currently have around **3,700** undergraduate, postgraduate taught and research students and around **300** academic and research staff, supported by **100** professional services staff. We are international in our outlook; our staff come from over 45 countries, with around two-thirds coming from outside the UK, and around 56% of our students are from the EU and the rest of the world.

All our academic departments have highly rated research activities and the Faculty offers a wide-ranging portfolio of undergraduate, postgraduate taught and PhD programmes. Our work crosses traditional subject boundaries, creating cutting-edge research that provides opportunities to engage in multidisciplinary activities across the university, and to develop partnerships with external groups and industry. Each department has a vibrant research environment, where students work with, and learn from, world-leading academics whilst benefitting from an open-door policy and a wealth of high-quality support. Our vision is to establish King's as an outstanding institution in science and technology, competitive with the world's best. We aim to be distinctive and bold, by strengthening our individual departments in their disciplinary identities and their participation in broader cross-King's interactions.

The growth of our engineering activity at King's is a major strategic initiative for the university, with a new undergraduate General Engineering programme (launched in September 2020), to complement our existing Biomedical Engineering and Electronic Engineering programmes. We are also establishing new engineering research themes, building on the strength and complementarity across King's more generally, including the obvious opportunities in science and health, but also in relation to management and business, security and digital humanities. Externally, our ambition is to develop synergistic research opportunities with key external partners including King's Health Partners, The Francis Crick Institute, The London Centre for Nanotechnology, Thomas Young Centre, and others both nationally and internationally, including exploring the opportunities for joint activities with our PLuS Alliance partners, the University of New South Wales and Arizona State University.

Our unrivalled central London location offers easy access to major research libraries and leading scientific societies such as the Royal Society, Royal Society of Chemistry, BCS, Institute of Physics, IET, IMechE and the London Mathematical Society. We are committing significant investment to the development of our estate, with major capital projects on many of our campuses. In 2019 Her Majesty the Queen opened the Bush House complex on the Strand campus, which provides new teaching facilities, social areas, office space and student space for the Department of Informatics. We are investing £50 million in new education and research laboratories including building new engineering laboratories under the Quad Building at the historic centre of the Strand campus, to provide our students and staff with facilities fit for a world-leading university.

We are very proud of the tradition of excellence within the Faculty, which includes a history of high levels of research funding and a number of Nobel Laureates from among our distinguished former staff and students, and we are working hard to promote the careers of women working in science, engineering and technology. The Department of Informatics was awarded a Bronze Athena SWAN award in April 2018 and the Department of Physics was awarded Juno Champion status by the Institute of Physics in January 2019 and the Athena SWAN Silver award in October 2019. Other departments are working on their own applications. Our work in this area is helping us to identify best practice for the working environment of all staff working in our Faculty.

Supporting our staff is important to us. We offer a Parenting and Carers Fund of up to £10k for academic and research staff working in all disciplines as well as a locally managed fund which provides additional support for those with caring responsibilities. The Carers Career Development Fund also supports academic, research and professional services staff with the additional care costs associated with attending conferences and events outside normal working hours. Staff are able to apply for flexible working to help them to balance the demands of their professional and personal commitments and we offer comprehensive leave policies for maternity, paternity, adoption, surrogacy, dependant and shared leave.

We have a variety of diversity and inclusion networks at King's including an active LGBT+ Staff Network and another for Parents and Carers who run events throughout the year. We host a series of social events for all staff and PhD students in the Faculty to provide an informal setting for colleagues to socialise and connect with one other, including themed coffee mornings, occasional evening events and an annual summer picnic for staff and their families. We also organise lunches for new staff, to help them to meet new colleagues from across NMS.

We are also keen to help our staff to develop their careers. We offer a clear and transparent academic promotion process, including briefing sessions for staff and feedback from our Faculty Academic Staffing Committee on draft applications, as well as support for academic supervision and research grant applications. For professional services staff, we offer a variety of training opportunities including an Information and Skills programme, which offers bite-sized sessions on a range of topical issues and provides the opportunity for staff across NMS and the wider university to share their expertise. Staff can also join one of professional services networks that bring together colleagues in similar roles to share good practice, provide peer support and contribute to King's overarching ambitions.

King's is committed to serving its local community in London. Examples include the King's Maths School, which provides high quality mathematics education for gifted mathematicians aged 16-19 in the heart of London, and CUSP London (the Centre for Urban Science and Progress), a joint initiative with the University of Warwick, that brings together researchers, businesses, local authorities and government agencies, to apply urban science to improving public health and wellbeing.