

RESEARCH STRATEGY

Through **world-leading**
and **outward-looking**
research focused on
meeting societal need
King's will make the
world a better place.



Foreword...

Since my arrival at King's, I have been committed to continuing to develop an ambitious agenda for research. We have many areas of excellence and brilliant colleagues. However, we must increase the areas where we are delivering at the highest level and the whole 'sea level' of our research excellence must continue to rise.

Research is about great people creating new knowledge – blue sky and applied. It is also about providing a major contribution to addressing the great problems of the age, which will increasingly require inputs from multiple disciplines.

The launch of a research strategy for King's is an excellent opportunity to enable and complement the work of our faculties. It enhances the delivery of key research related initiatives underpinning our Strategic Vision 2029. Our research strategy outlines our institutional commitment to delivering world-class research supported by world-class facilities.

King's research strategy sets out our ambition to build on our current strong position. The research strategy has been developed around our people – our researchers, current and future, our professional services and our students. The strategy is designed to provide the support, development, infrastructure and environment they need to succeed.

Committing to the delivery of the strategy will allow us to become more responsive to shifts in our operating environment and increasingly agile in our approach to global research challenges. While our vision is ambitious, I am confident we can achieve this through the effective implementation of the detailed actions set out within the plan. The level of engagement and enthusiasm shown by King's community in developing the research strategy gives me confidence that together we will achieve our ambitions for the future, making the most effective contribution we can in the years ahead.

Professor Ed Byrne President and Principal



I am delighted to launch King's research strategy, the culmination of 12 months work across the university to better understand the needs of our research community and define how we will enable the full potential of our outstanding research staff and students to be realised. I am grateful to the many colleagues who have taken time to contribute to the development of this research strategy and I hope you will soon see the impact of your involvement. I would also like to thank Dr Lorna Thomson, Director of Research Strategy, who has done so much to get us to this point.

The research strategy sets out the broad direction of travel to deliver the environment and support that is critical to our research success. The accompanying action plan details the specific tasks, the measures of success and the accountability for delivery. Our intent throughout has been to support an enabling culture across King's. I encourage you to engage with delivery of the strategy and think about the positive impact you can make within your role. By working in partnership, we can achieve our research ambitions and all benefit from positive changes that will occur.

Professor Reza Razavi
Assistant Principal,
Research & Innovation

Vision...

Research is core to King's,
what we do, what we care
about and how we educate.

It is how we channel our
creativity to further knowledge
and understanding, challenge
convention and deliver impact.

Our vision is to deliver research
to inform and innovate.

Ambition...

King's will focus on growth in research quality, impact and income by:

- Concentrating on excellence in our research, supporting areas of strength and fostering those with the potential to become world-leading.
- Delivering a growth agenda to enhance our academic size and shape.
- Building upon notable success in connecting and collaborating with practitioners and policy makers, to ensure that our research is changing practice and influencing understanding, behaviours, policy and culture.
- Exploiting our pipeline approach in biomedicine from fundamental science, through experimental medicine, to health services research, leading to transformational benefits for patient and population health.
- Better connecting our people and expertise to explore new avenues of research.

CHALLENGE
INNOVATE
CHANGE
INFLUENCE
EXPERIMENT
TRANSFORM
BENEFIT
CONNECT
EXPLORE
COLLABORATE
ENABLE

The Governance of ‘Game Changing’ Technological Innovation

Professor Karen Yeung, Director of the Centre for Technology, Ethics, Law & Society (TELOS), is involved in several projects concerning the governance of emerging technologies, including the use of ‘gene editing’ technologies, and the rise of Big Data and predictive analytics to drive decision-making.

Recent advances in gene editing have transformed research in the biological sciences, potentially changing human expectations and ambitions to control the biological world. Together with the Nuffield Council on Bioethics and experts in the biosciences, law, philosophy, ethics, sociology and industry, she is addressing important ethical and practical questions concerning the possibility of influencing inherited characteristics in humans through the use of genome editing technologies.

Karen’s research in critical data studies explores the social power of algorithms in light of the so-called ‘Big Data revolution’, and the turn towards data-driven decision-making. She is a member of the Royal Society-British Academy Working Group on Data Governance which is currently undertaking examining new uses of data and their implications, and reviewing the data governance landscape in order to make recommendations for cross-sectoral governance arrangements to ensure the UK remains a world leader in this area.

Delivery...

King’s must provide the environment, support and networks needed for our community, from postgraduate research students to senior academics, to deliver research excellence.

The five pillars

The five pillars allow us to build on our disciplinary excellence, engage in multi- and inter-disciplinary research and ultimately deliver our vision of transformative research that crosses disciplines and changes paradigms.



Understanding Neurodegeneration

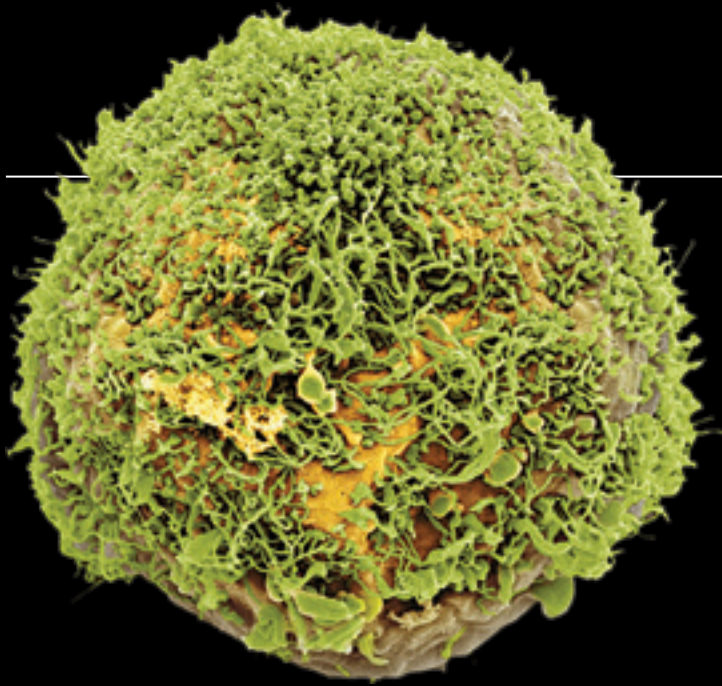
Professors Chris Shaw and Ammar Al-Chalabi have made major contributions to our understanding of motor neuron disease (amyotrophic lateral sclerosis).

In recent years they have identified multiple genes that substantially increase the risk of familial and sporadic forms of this disease, and that affect the prognosis of patients.

This has transformed understanding of the disease, and several gene tests are now offered in diagnostic laboratories around the world.

These discoveries also open opportunities for gene therapy approaches to treat motor neuron disease.

Building on this, their research has identified cellular mechanisms for the action of these genes, with a focus on dysfunctional RNA processing and axonal transport mechanisms.



Advanced therapies for autoimmune diseases and cancer

Researchers at King's College London, in partnership with the Guy's & St Thomas' NIHR Biomedical Research Centre are making major advances in the development of new types of treatments for difficult-to-treat diseases.

These advanced therapies include cell therapy, antibodies and peptide interventions and have the potential to make a major improvement in survival and quality of life for patients.

Professors Graham Lord, Giovanna Lombardi and Alberto Sanchez Fueyo are conducting innovative clinical trials using a patient's own immune cells to treat autoimmune diseases such as inflammatory bowel disease, and to promote tolerance of transplanted organs (avoiding the need for long-term immunosuppression, which has substantial adverse effects).

Their approaches involve harvesting the patient's immune cells through a simple blood donation, before selecting for a particular type of cell, known as a regulatory T cell. These cells regulate the immune response and can therefore reduce the unwanted activity.

Professor Mark Peakman has developed a peptide vaccine for the treatment of type 1 diabetes. This works by inducing tolerance (turning off the immune response), preventing the inappropriate attack of the patient's own pancreas that occurs in this disease.

By intervening early, the approach hopes to preserve remaining pancreatic function, which could be transformative for people suffering from this disease.

Professors John Maher and Adrian Hayday are using different types of T cells – in some cases including a genetic insert to create a targeting mechanism known as a chimaeric antigen receptor – to develop new treatments for a variety of cancers, particularly several that are poorly treated, such as head and neck cancer.

In particular, Professor Hayday's approach is the first in the world to utilise T cells drawn from normal human tissues, as opposed to the blood or tumours. These developments in T cell cancer immunotherapy have been used to create two spinout companies this year.

Professor John McGrath and colleagues have also successfully used cell therapy to treat severe, rare skin diseases.

The Many Electron Problem

Professor Mark van Schilfgaarde and Dr Evgeny Kozik are part of the Many-Electron Problem – research that is furthering our understanding of the properties of materials by examining the theory of electronic structure.

Whilst the fundamental equations describing the electronic structure of materials have been known for a long time, solving these equations can be notoriously difficult.

Their research aims to address perhaps the main outstanding problem in condensed matter physics today – the problem of electron correlations and how the movement of one electron strongly affects the other.

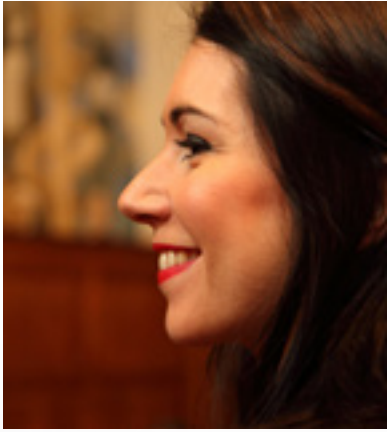
By solving these equations for electronic structure, we can begin to understand the rich variety of physical phenomena.

They have recently published a new approach that seeks to merge two completely different, but state-of-the-art methodologies to understand the electronic structure: GW theory and Dynamical Mean Field Theory. The former handles correlations well, provided they are not too strong and the latter handles strong correlations provided they are very localised.

A combined methodology should provide a path to realising an accurate, widely applicable approach to the study of correlated electrons for almost any kind of material.

Applying the new methodology to nickel (a simple elemental material that neither GW nor DMFT alone describes well) shows strong correlation of electrons, in perfect agreement with the experimental results.

If these results can be applied widely, this may begin to revolutionise our ability to calculate and understand the properties of molecules and solids important in everyday life.



Investing in talent

Gemma Modinos, King's Prize Fellow

My King's Prize Fellowship signified a clear step forward in my career: Firstly, the reassurance of the university supporting my research vision but importantly, it has enabled me to secure a Wellcome Trust & Royal Society Sir Henry Dale Fellowship, which also led to conferment of a Senior Lecturer title.

This was undoubtedly facilitated by the King's Prize; providing me with protected time to focus on my research in social neuroscience related

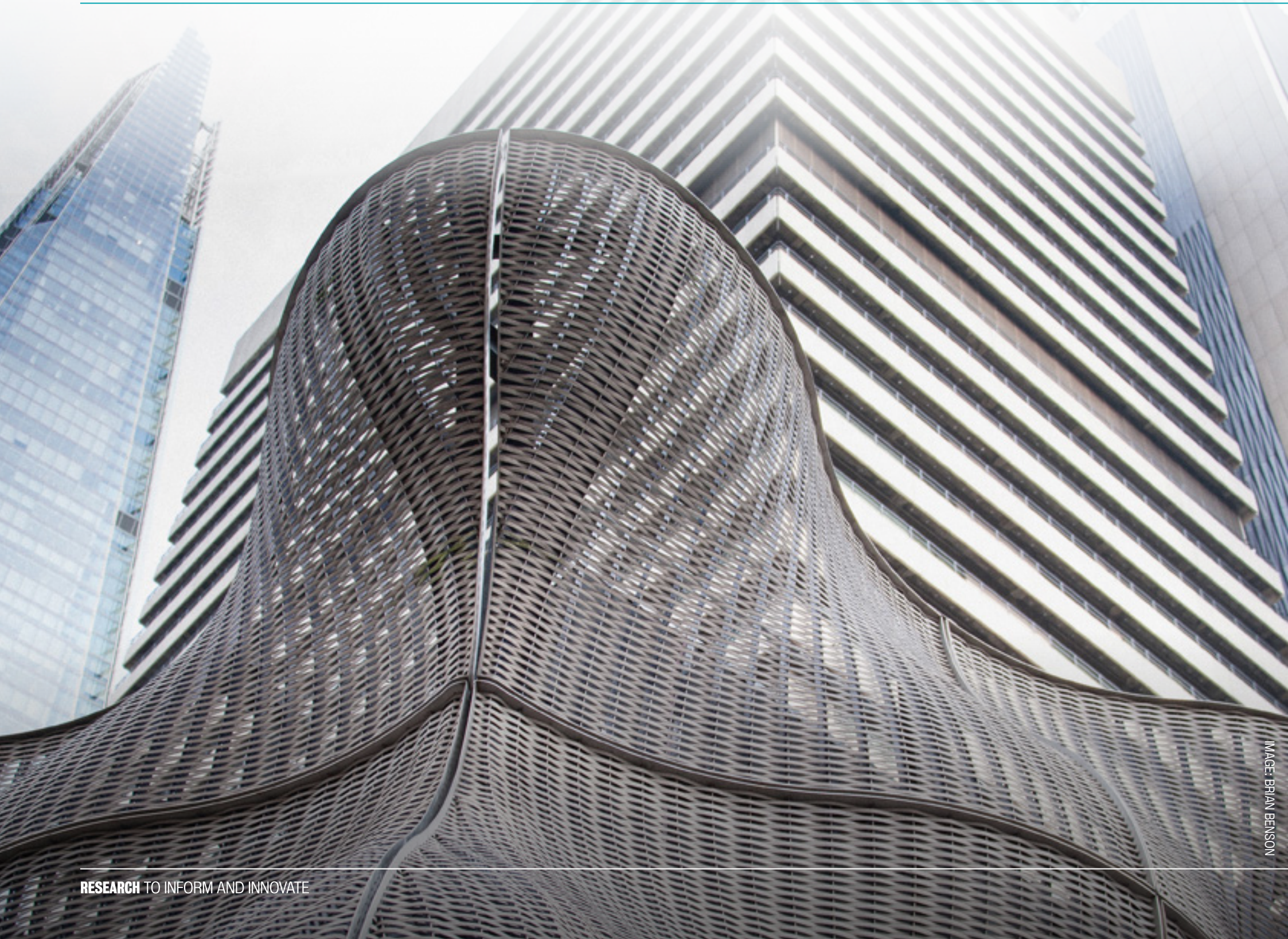
to psychosis and to apply for independent research funding.

King's has provided the ideal environment for the development of my career. Here it is possible for me to carry out truly interdisciplinary research bridging the expertise of several world-class departments.

I can work at the interface between animal and human research; I have unique access to the patient groups at the Institute of Psychiatry, Psychology & Neuroscience; and the work can

be hosted at the King's & Guys and St Thomas' PET Centre, one of the few places in the world with the capability and the expertise in the advanced imaging technologies that I use.

In addition, King's international reputation helps establish and strengthen collaborations with other prestigious institutions. I am very grateful to King's for the opportunity, and I commend its commitment to support the professional development of early career researchers.



Talent...

Our research success is dependent on our staff

- We will support our staff to deliver world-leading research at all stages of their career.
- We will recruit the best talent to King's, and strongly encourage talented researchers with personal fellowships to come to King's.
- We will improve the way research services are delivered and focus resources on services that deliver real value to the academic ambition.



The Centre for Research Staff Development

The Centre for Research Staff Development provides support for research staff to achieve their potential, before, during and after their time at King's, with active engagement from the most senior staff in the university.

Research staff are post-doctoral staff, research assistants and technicians – in fact all those other than PhD students who are engaged in research and who do not yet have an independent, permanent academic or managerial position.

The centre provides professional and career development advice and opportunities, supports research staff networks, builds a university-wide research staff community and advocates for research staff within and beyond King's.

World-leading facilities

The Maurice Wohl Clinical Neuroscience Institute, located at the heart of King's Denmark Hill Campus, brings together 250 clinicians and scientists from many disciplines including neuroimaging, neurology, psychiatry, genetics, molecular, cellular biology and drug discovery.

The institute's objective is to advance our understanding of disease mechanisms and develop new therapies for neurological and psychiatric disorders through innovative research.

The institute fosters collaboration between researchers across multiple disciplines, academic institutions and healthcare organisations to dramatically accelerate the translation of basic research into clinical practice.



IMAGE: STALE ERIKSEN

Environment...

We will deliver valuable insight and ground-breaking discovery using state of the art infrastructure.

- We will have cutting edge core facilities, supported by expert staff, available to all researchers and a coordinated approach to investment in key technologies.
- We will deliver an eResearch function which provides dedicated infrastructure, expertise and support across King's.
- We will enhance research management systems, increasing functionality and providing comprehensive institutional research data.
- We will transform the provision of research information through our website.



IMAGE: DAVID TETT

Developing new eResearch capability

King's has committed to investment in a new eResearch capability to better facilitate computationally intensive research and to utilise technology to enhance many other areas.

In five years, King's will be recognised as a world-leading centre of eResearch, defined by high performance computing and engaged in a wide-range of capability-building activities across all faculties.

It will provide a platform that allows researchers to engage in advanced research without unnecessary technological friction.

21ST CENTURY SCIENCE & TECHNOLOGY MANAGEMENT & BUSINESS HUMAN DEVELOPMENT & HEALTH POPULATION HEALTH & IMPLEMENTATION SCIENCE

There will be substantial growth in Physics, Mathematics and Chemistry. By extending, or accessing through partnerships, expertise in new areas and leveraging strengths across the university, we will increase the impact of our basic science strengths. In Technology, we will build on our strengths within Biomedical Engineering, Computer Science, Robotics and Telecommunications as we expand.

King's will establish a new faculty of Management & Business, in 2018/19. There are significant opportunities to grow the research portfolio as the faculty expands to improve understanding of the changing world of business, and provide theoretical, empirical and practical insights into ways of managing for business success.

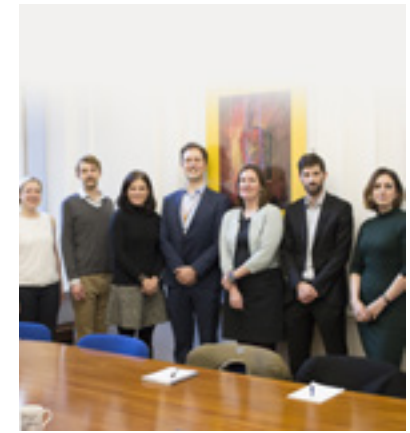
We will consolidate and grow expertise to create an academic grouping focused on child and maternal health with a unique and unifying life course approach combining mental and physical health research. This will include a new digital and informatics offer and will be delivered via a combination of physical and virtual infrastructure with a specialist hub at the Evelina Children's Hospital.

We will establish a critical mass of researchers which crosses faculties and links across health and social science to address important societal needs around population health. This will build on research strengths in, amongst others, Health and Social Care Research, Analytical and Environmental Sciences, Geography, Nursing, Global Health and Public Policy.

Breadth and quality...

We must continue to improve our research quality as we grow, in disciplinary and interdisciplinary research.

- We will invest in key growth areas, illustrated on the left hand page, to enhance the breadth of our research.
- We will diversify our sources of funding, developing and broadening research income streams from industry, international funders and contract research.
- We will create research centres of excellence in key areas to bring together a critical mass of leading researchers.



Enabling research

We have invested in a team of research development managers to enhance the support we provide during the grant application process.

The team, led by Dr Tom Foulkes, is based across our campuses and they work closely with academics to provide advice and support.

The team can assist in developing large funding bids, strengthening relationships with funding bodies and improving research performance.

They work together on cross-institution initiatives such as King's Together – identifying synergies, potential partnerships and facilitating new networks.

Over the past year, the team has been involved in several successful applications including the £10m UKRPIF award for neuroscience, a £4m Wellcome Trust collaborative award for ultra-high field imaging, a £5m Wellcome Trust Institutional Strategic Support fund and a £3m AHRC 'Language and Worldmaking' Open World Research Initiative award.



P359P1 SLICE

Impact via key partnerships

Professor Sally Barrington led on ground-breaking clinical trials where Positron Emission Tomography (PET) scans in patients with Hodgkin’s Lymphoma identified patients responding well or poorly to treatment early in the treatment cycle. This helped to prevent many patients suffering the adverse effects of radiotherapy and allowed shorter course chemotherapy.

The partnership between King’s and Guy’s and St Thomas’ NHS Trust via King’s Health Partners was vital for this work.

The PET centre at St Thomas’s where the research was led is the only UK centre to have PET/CT, PET/MR and on-site cyclotron and radiochemistry lab.

The Imaging Core Lab based here co-ordinates a network of up to 40 accredited PET centres to deliver high quality data for multicentre cancer clinical trials.

Impact and partnerships...

The breadth of our research will deliver impact across the spectrum; it will influence policy and practice, enrich cultural life, support cultural cohesion and add value to the UK economy.

- We will become a more porous organisation, encouraging two way dialogue with external stakeholders, improving our online presence to allow greater interaction.
- We will promote multi- and inter-disciplinary research via King's Together.
- We will better support researchers in understanding the process of turning ideas into impact delivering societal benefit.



International partners

Linking closely with our international strategy, we aim to create partnerships which allow us to deliver international impact from our research.

King's and Peking University Health Sciences Centre are collaborating within a joint institute for medical research to address major health issues related to cancer and cardiovascular care, dentistry and mental health.

Additionally, our 10-year relationship with the University of North Carolina Chapel Hill has brought about a range of collaborations, including regular workshops and conferences in the fields of History, Philosophy, Literature and Music, and recently the publication of several joint King's-UNC collections of essays.

Finally, launched in 2016, the PLuS Alliance between King's, Arizona State University and the University of New South Wales has created a network of 120 fellows working together to find solutions to issues of sustainability, global health and social justice.



Mental Health and Justice

Mental Health and Justice is a unique collaboration between the Institute of Psychiatry, Psychology & Neuroscience, The Dickson Poon School of Law, Global Health and Social Medicine, The Policy Institute at King's, The Essex Autonomy Project and the Bethlem Gallery and Museum.

Led by Dr Gareth Owen, the research will address the central dilemma in mental health, ethics and law: the tension between protecting and respecting a person's decision making.

As law in this area commits to human rights and as the international dimension presses, sharp new challenges are arising.

The project focuses on two fundamental concepts – support in decision-making and decision-making ability.

The collaboration involves leading clinical experts, lawyers, philosophers, neuroscientists and social scientists in a King's-based research network that will be delivering practical guidelines, enhancing policy engagement, advancing interdisciplinary working and developing innovation in service-user involvement and public engagement.



Language Acts and Worldmaking

Professor Catherine Boyle is leading a major research initiative which seeks to inform the future of the study and teaching of modern languages.

The Language Acts and Worldmaking project will explore how learning a language affords greater cultural understanding of the world through the multilingual and multicultural lens of Iberian languages, empires and contact zones. The group is studying the ways in which Spanish and Portuguese have forged historic and ever-changing processes of cultural exchange, movements of people and migration of ideas, constantly in contact with many other languages and cultures. This is at the heart of the way 'world-making' is understood.

The researchers will seek to inform new thinking about modern languages teaching and will carry out extensive public engagement through artistic performances, policy white papers, workshops, lectures and summer schools.

The research project brings together academics from King's Faculty of Arts & Humanities in the areas of Spanish, Portuguese & Latin American Studies, Digital Humanities and its Modern Language Centre.



M3: Mental Health, Migration and the Megacity

Research has identified key phenomena that tie mental illness and the social lives of cities together: migration, density and stress. To intervene effectively, there are a number of interdisciplinary questions which need to be addressed.

Led by Professor Nik Rose, researchers at King's are exploring how the relationship between the urban city and mental illness relates to biological, psychological and sociological factors.

They are working across qualitative social sciences and psychiatric and epidemiological sciences to develop a sociological deep surveying instrument for mapping migrant mental health using biological and mobile technologies.

Additionally, they will expand the research from industrial cities of North America and Europe, to account for global diversity of urban experience.

They will investigate the relations between migration, poverty and intergenerational cycles of poor mental health focusing on the consequences of the specific sociology of Shanghai.



Global Health

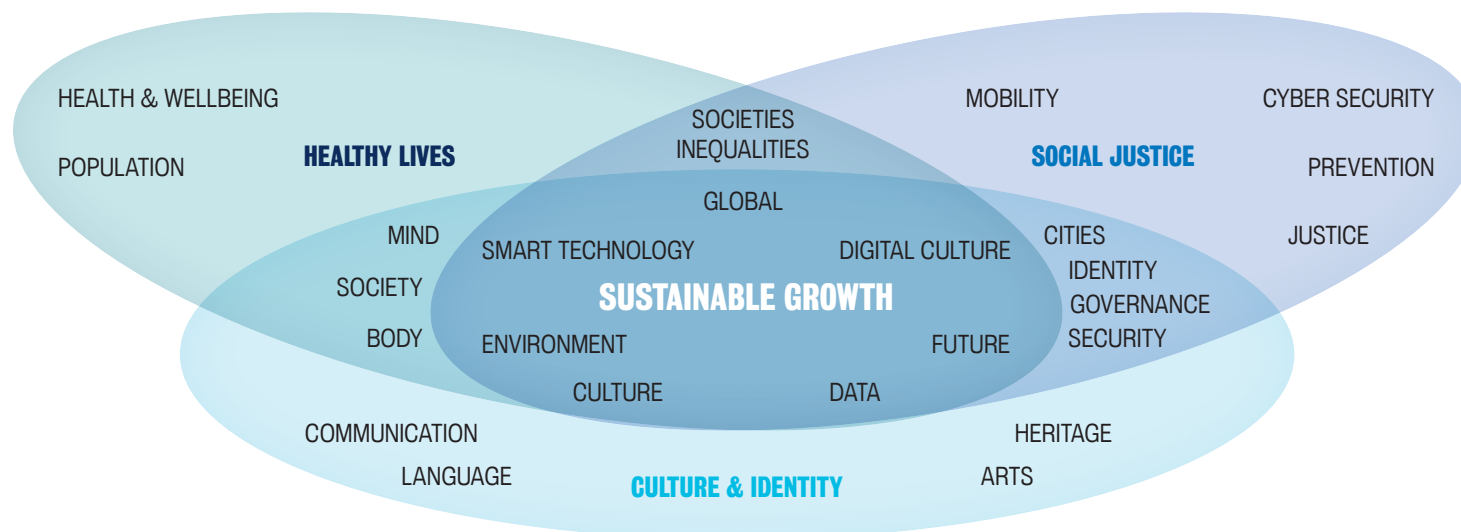
The King's Centre for Global Health, led by Dr Andy Leather, brings together healthcare professionals, sociologists, philosophers, and experts in conflict, policy analysis, governance and humanitarian law.

This expertise is directed toward our three country partnerships in Democratic Republic of Congo, Sierra Leone and Somaliland. Long-term co-development of health partnerships with individual countries supports the strengthening of national health systems by building the capacity of health workers and key institutions.

The centre's vision is to bring the development and academic communities together; to support the development of autonomous and resilient health systems in the most challenging environments in post-conflict low-income countries; to develop future global health leaders as early career clinicians and academics engage in our health partnerships; to provide experiential learning opportunities for our own global health students; but above all to engage with health professionals and health institutions in a spirit of co-development as we seek to improve health and wellbeing for individuals in LMICs.

King's Together...

King's Together is an initiative to support multi- and inter-disciplinary research.



The breadth of expertise across King's puts us in a strong position to utilise multi-disciplinary and inter-disciplinary research both to enable transformative advances in fundamental research and to produce novel and even revolutionary insights. This understanding can be applied rapidly to deliver impact across the world.

By considering our current strengths, we have outlined four overlapping themes which are a guide as to where we may be able to engage in innovative research.

We want to enable our staff to work together in these areas but also to continue with curiosity-driven research that can unearth new and emerging problems. We aim to be an institution which is agile and responsive to emerging challenges.

We have appointed champions from a range of different disciplines to promote multi- and inter-disciplinary working across King's. The champions will shape the thinking for the research themes and facilitate engagement with researchers to encourage ideas from all levels.

We have launched an internal seed funding scheme to bring together people and ideas. We expect the seed funding to generate new research grant applications. The scheme is flexible (the award based on the needs of the proposal) intended to encourage porosity and is available to staff of all levels and disciplines.

We are removing institutional barriers to working across disciplines, ensuring inter-disciplinary projects and ways of working are embedded within our research policies.



Professor Peter McNaughton FMedSci

Student groups are among the most rewarding audiences to talk to.

Science is their future and they are super-keen to hear about modern research.

Recently I spoke about 'New ideas in pain: taking novel analgesics from basic science to the clinic'. We are all familiar with common pain, which may not be much fun but is beneficial because it helps protect us from harm. However, some people suffer from truly awful, unrelenting, pain and are very poorly served by currently available pharmaceuticals.

We have discovered an unexpected mechanism which may explain this excruciating pain, and we are trying to develop new drugs which can tackle it.

I can't say yet for sure whether we will be successful, but the audience was fascinated and came up with a number of novel ideas that I'd not thought of.

All in all, a rewarding experience both for me and for them.

Education...

Our students will learn through participating in research and enquiry at all levels of their study.

- We will create new opportunities for undergraduates to engage with research.
- Doctoral Training Centres will be rolled out as the King's model for Postgraduate Research student training, offering all students comprehensive training in addition to their research project.
- Our leading researchers will take part in a flagship lecture series aimed at engaging and enthusing undergraduates about cutting-edge research.



Professor Edith Hall

In encouraging students to consider research careers, there's no substitute for the excitement when they feel included in cutting-edge investigations and know they are the first audience of new discoveries.

My module 'An Introduction to Classical Reception' has run in tandem with a major research project investigating the roles of ancient Greece and Rome in social and political discourse across the class spectrum.

Students have attended lectures at King's and further disseminated the findings through public lectures held by the Arts & Humanities Research Institute.

They have helped chart the history since the late Georgian era of King's teachers and students from under-privileged backgrounds.

I also always ensure there are free-of-charge places for undergraduates at the other London venues where I speak, including the National Theatre, British Museum, British Library, King's Place for Poet in the City, the Hellenic Centre, the Historical Association and live recorded discussion shows at the BBC.



Success...

Successful implementation of the research strategy will ensure that across a broad range of disciplines King's will be delivering outstanding research and in a number of key areas will be recognised as the world-leader.

Our research will be widely known for its impact and will attract the best research talent and students to King's.

