

ACADEMIC STRATEGY

2020–2025

V1.0

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1. OUR VISION

Imperial rightly has a reputation for creative research, life-changing education and transformative innovation, and for bold action. The reach and impact of our activities are global and significant. The College Strategy sets out a vision for Imperial as a place for authoritative thinking, world leading teaching and creative research ideas. The Academic Strategy articulates in specific ways how we will fulfil the ambitions of that vision.

The Academic Strategy has been developed to set out some immediate areas which are fruitful for new discovery. These could open doors to new technologies, enable applications that could have major human, physical and economic impact or offer new educational experiences, while at the same time improving the environment for learning, in its broadest sense, for our students.

It will drive our ambition to continue to be a world leading institution in frontier research areas, drawing on ground-breaking fundamental research and innovative technologies to deliver transformative impact. Our discoveries give new insights and build knowledge to enable sustainable change and improve our world, driving Imperial's focus on the impact that our work has on society.

The Strategy identifies and seeks to connect plans developed by departments and faculties to increase our reach, creating greater capacity and capability by working together to deliver outcomes that will make a difference and raise the profile of Imperial. It is based on themes that have emerged as common areas of interest across the College as well as capabilities that frame Imperial's approach. These areas will drive research, education and innovation that respond both to new opportunities to discover more about the natural world and address clear societal challenges. It also sets out an agenda to significantly improve how we deliver a student experience that prepares our students to be leaders, to innovate and drive change in the future.

It will provide a cohesive direction for the College to focus its activity, build partnerships and uncover new opportunities, enabling a bigger reach that can only be attained by working at scale across the College. It will also act as a guide for our attention and effort to seize opportunities and to leverage external resources to support our mission. It will help us prioritise our internal College investment of people, time, space and money.

The Strategy will also be used externally to raise Imperial's profile around the world as a globally leading research-intensive university, which continues to attract the best students and staff, opening new opportunities both nationally and internationally and invite new partnerships.

Professor Ian Walmsley FRS,
Provost, Imperial College London



We seek to understand the world, and to use that understanding to help meet some of the world's challenges. Imperial is well positioned to drive this agenda both by its own community's research and by educating future generations of creative and knowledgeable scientists, engineers and medics.

2. OUR STRATEGIC APPROACH



Our Academic Strategy builds on and furthers the objectives of the College Strategy by identifying specific areas of opportunity to invest in and focus activity and provides a framework to implement the aspirations of the College Strategy. As the College Strategy is refreshed in 2020, it will incorporate the objectives and themes of the Academic Strategy to provide a cohesive direction and vision for the College.

Building on these College Strategy objectives, the Academic Strategy sets out our ambition for supporting and progressing new discoveries and applications in key theme areas to meet significant global challenges. It builds on our excellence in core disciplines and multidisciplinary strengths to drive research and provide a world class education experience. It will engage our student and staff community in a cohesive vision, to focus and collaborate on our efforts and strengthen our ability to seize new opportunities. The Academic Strategy will also provide an opportunity for the College to identify and engage with new – and strengthen existing – partnerships with external stakeholders. This will also enable us to leverage external resources to support our ambitions and strengthen our revenue streams.

The development of the Academic Strategy has also drawn upon the department and faculty strategies, and aligns with other key strategies already in place, such as the Learning and Teaching Strategy and the College's approach to innovation and enterprise.

The Academic Strategy will help us to identify and seize emerging opportunities to drive forward our research, education and innovation, and address pressing societal challenges. It identifies areas of strategic priority for our immediate attention, whilst continuing to deliver and invest in core College activities.

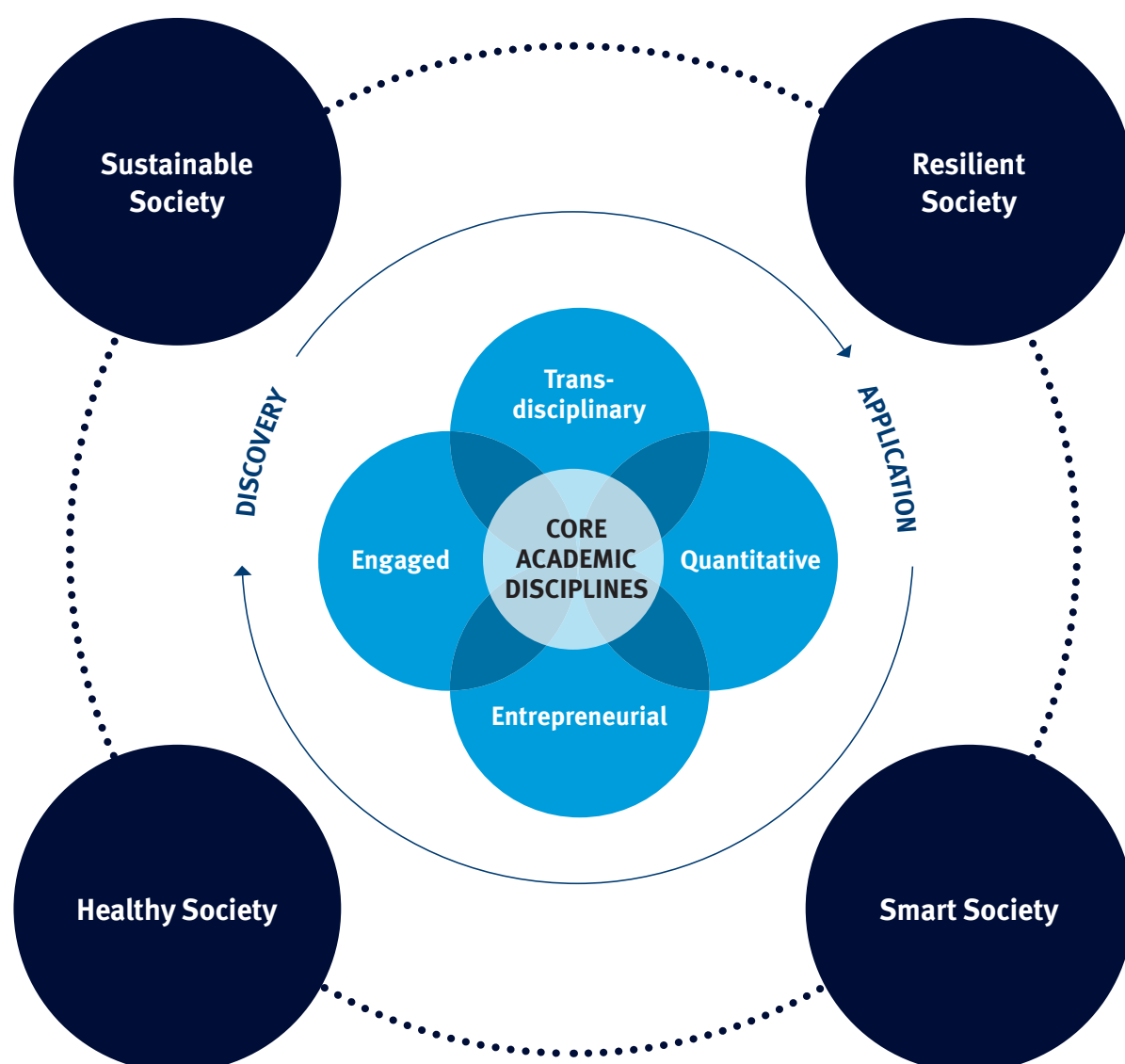
This shared College vision will enable us to work together at scale across disciplines, departments and faculties, providing a cohesive direction for the College to focus its activity, build partnerships and uncover new opportunities, and drive discovery and impact.

College Strategy objectives

The College aims to achieve enduring excellence in research and education in science, engineering, medicine and business for the benefit of society:

- The College will continue to maintain **foundations** in world class core academic disciplines underpinned by fundamental science, enabling multidisciplinary research across disciplines and embedding the educational experience in a vibrant, research-led, entrepreneurial environment.
- Investing in our **people**, the College will build a supportive, inclusive and highly motivated staff community, provide an enriching student experience and build lifelong relationships with our alumni and friends.
- The College will continue to strengthen **partnerships** with business, academia, non-profit, healthcare and government institutions on a global scale, informing decision makers, and engaging with the public and local communities.
- These objectives will be **enabled** by strengthening and diversifying revenues, providing excellent professional support, processes and infrastructure and acting courageously by pursuing new opportunities.

Figure 1: The Academic Strategy framework



We have identified four themes where both our expertise is particularly strong and where there are clear unanswered questions or societal challenges that require attention. Of these, we have looked for topics where Imperial's approach can be distinctive – how we deliver our mission will be different than those of other institutions.

These themes build on faculty and department strategies to identify areas of current excellence and emerging intellectual focus in research and education, as well as areas of opportunity to build new strengths. These are the themes in which, right now and in the immediate future, the College will seek to accelerate discovery and impact to society through strategic, College-wide investments.

These themes are supported by four capabilities that enable our excellence in all that we do. Together, our four capabilities reflect the strengths that make us unique within the UK, and position us to make a distinctive contribution to the strategic themes which we have chosen to focus on. Whilst our strategic themes may change over time, our capabilities reflect the areas of excellence that are the enduring bedrock of what we do.

Our excellence in fundamental science and core disciplines is central to our academic vision. It underpins all that we do, allowing us to work together across disciplines and address societal and global challenges. We have an outstanding foundation in fundamental science and a great engine of ideas that generates new understanding about the world. These discoveries underpin advances in technology and drive societal impact. We provide an environment and education experience that is curiosity-driven and explorative, led by enquiring minds, where our students develop a deep understanding of and skills in fundamental science.

We will continue to invest in our fundamental science and core disciplines, as without these strengths we cannot hope to capitalise on our immediate opportunities – or on the unknown opportunities of the future. Departments and faculties will continue to have responsibility for maintaining excellence in core disciplinary expertise. The Academic Strategy will build on this by identifying and enabling opportunities that reach across departments and faculties at College level.

3. OUR THEMES



Sustainable Society

We are helping societies to become more sustainable by transforming manufacturing, attitudes to consumption and economic practices.

It is vital that we utilise the world's resources in a way that ensures the planet and societies are sustainable. This requires a deep understanding of the science of how complex ecosystems function and change, and how we can transition society to more sustainable practices, at scale, that create a lasting positive impact. Our **Circular Economy and Sustainable Manufacturing** theme focuses on developing systems approaches to whole life-cycle manufacture, encompassing design, recycling, raw materials sustainability and economics – which transition business towards integrated and sustainable approaches. Our research builds knowledge and capabilities to move **Towards Zero Pollution**, incorporating energy, materials, urban design and human health. Our research underpins the **Energy Transition** from fossil fuels to sustainable energy sources, including strengths in electric vehicles, wind, nuclear, fuel cells, energy storage and the smart grid. **Understanding Complex Ecosystems** will build knowledge and application around food security, climate resilience, managing human dimensions of species extinction and how environments impact health and disease. Our **Clean Water** theme encompasses infrastructure and waste management, urban hydrology and de-pollution, along with mathematical modelling for promoting healthy oceans. We are also developing knowledge of the **Economics of Climate Change**, including identifying investment opportunities in renewable energy, clean technologies and climate-resilient infrastructure that will support our sustainable future.

Our world leading research and teaching in sustainability are exemplified through our cross-faculty initiatives and specialist centres, such as the Grantham Institute for Climate Change, Air Quality Network, Sustainable Gas Institute, Agri-Futures Lab, Energy Futures Lab, Institute for Global Health and Innovation, the Leonardo Centre for Business Sustainability, Centre for Process Systems Engineering, Centre for Environment and Health and Transport and Environment Lab.



Healthy Society

We are innovating new technologies and strategies to improve health services and support the prevention, diagnosis and treatment of disease by converging science disciplines and integrating them with clinical and public health practices.

We aim to improve health in the UK and worldwide. We are **Transforming Healthcare Through Data-driven Research**, advancing our knowledge and capabilities to collect, secure and mine data to develop new interventions, improve the prediction, diagnostics and prevention of disease, and apply AI to medical systems. Using data at scale will lead to greater **Understanding of Population Health**, to assess the effects of exposures on human health and link back to mechanisms, identify high risk groups and model preventative approaches. A better understanding of the patient through clinical data, genetics, phenomics and environmental exposure together with a deeper knowledge of disease allows us to develop **Precision Treatment** approaches to identify new treatments, targeted to the patient, and develop new diagnostics, gene-editing therapies, drug discovery and nano medicine. Through **Advancing Healthcare Management and Innovation** we aim to combat disease, improve patient care and develop more effective and universally accessible healthcare systems, working alongside the NHS, policy makers, industry and patients. We use our world leading research in medical devices, bioengineered materials and systems, imaging, sensing and data analytics to develop effective healthcare solutions and **Affordable Healthcare and Technologies for an Aging Society**. We apply our expertise in health research to create **Education and Behaviour Change**, to implement policy and change behaviour at a population level, working with experts in public and patient engagement.

Our world leading research and teaching in health are exemplified through our cross-faculty initiatives and specialist centres, such as the Cancer Technology Network, Centre for Mathematics of Precision Healthcare, Hamlyn Medical Robotics Centre, Centre for Drug Discovery Science, Antimicrobial Resistance Network of Excellence, Institute for Molecular Science and Engineering, Centre for Health Economics and Policy Innovation, International Health Management, Institute of Global Health and Innovation, and Big Data Analytics Unit.



Smart Society

We are enabling discoveries and developing new technologies in artificial intelligence, machine learning, statistics, data sciences and robotics, and helping to better understand how they will transform lives, environments and present new challenges to the world of work.

Information is the key to the future. New modes of acquiring, processing, disseminating and reacting to information will be the critical technologies that shape society. We are developing new approaches to the acquisition and manipulation of information in **Future Information Technologies and Robotics**, from Human Centred Robotics and artificial intelligence (AI) to quantum information science and technology. These technologies and their application to interrogating data within a scientific framework will open the door to **Data Enabled Discovery and Science**, leading to new understanding and prediction. The impact of smart technologies will drive a step change in business and society more generally, and the **Digital Transformation and Impact on Society** theme will develop research on how business analytics, data, cyber-security and AI will shape this. Similarly, our ability to develop and manage financial resources in an effective and equitable way will be enhanced by technology. The **Future of Finance and Fintech Revolution** theme will consider how emerging areas such as digital money and cryptocurrency will change finance for entrepreneurship and for greater inclusion.

Our cross-faculty initiatives and specialist centres in this theme include the Centre for Systems Engineering and Innovation, Centre for Smart Connected Futures, Manufacturing Futures Lab, Controlled Quantum Dynamics Centre for Doctoral Training, Digital Transformation Academic Network, Gandhi Centre for Inclusive Innovation, AI health imaging, and Centre for Global Finance and Technology.



Resilient Society

We are developing understanding and technologies to enable stable and robust infrastructures that underpin the delivery of services – from water, fuel and power, to data, communications and the banking system – to make societies resilient.

A sustainable society plans for long term success, and a resilient society plans to accommodate rapid and possibly sudden changes. These bring different, if overlapping challenges. The digital revolution will transform all aspects of society. Our **Cyber Security and Digital Ethics** theme will develop research to build a digital world that is secure, inclusive and accessible by all, protecting individuals and creating social good. Advances in AI, data and social media will impact human health and our **Health and Wellbeing Infrastructure** theme will use technology-driven approaches to enable better, longer lives, both at home and in improved hospital care. The behaviour of financial markets and the ability to improve risk management, promote investment and generate productivity explored in our **Financial Resilience and Infrastructure Security** theme will address the resources needed to effect change, ensuring that we are able to control and to cope with the future environment. We will seek to reduce society's carbon footprint by building **Low Carbon Energy Networks** that will take a systemic approach to analysis and integration, information policy and regulation for low-carbon energy, including renewables, storage and metabolic engineering. Our strengths in these areas, as well as in pollution, energy transition, ecology and diversity will help us develop **Climate Change Mitigation** and resilience in critical areas.

Our world leading research and teaching in this area are exemplified through our cross-faculty initiatives and specialist centres, such as Centre for Systems Engineering and Innovation, Institute for Security Science and Technology, Centre for Environmental Policy, Energy Futures Lab, Brevan Howard Centre for Financial Resilience, Vaccine Centre and Network, Centre for Global Infectious Disease Analysis, and the Data Science Institute.



Cross-cutting sub-themes

There are numerous strengths in the College's portfolio that engage with more than one of the themes and overlap with many sub-themes.

Our outstanding fundamental research in **Discovery and Application** generates new understanding about the world, providing discoveries that underpin advances in technology and drive societal impact. Our approach to science and innovation based on the integrity of our research that provides value for society in an ethical, inclusive and responsible way is at the heart of the **Responsible and Inclusive Innovation** theme. Strengths in several cross-cutting areas add capability to several themes. **Smart Systems** include building responsive and adaptive networks based on data-driven optimisation to better enable technologies, processes and infrastructure. **AI and Machine Learning** is applied to prevent and diagnose diseases, to accelerate new treatments, to develop new innovations, and to shape the future of companies. **Food Security and Nutrition** involves studying and mitigating the impact of over- and under-nutrition from the cellular level to the societal, drawing on strengths in biosecurity and trade, sustainable marine resources and sustainable agriculture. How people are affected by changes in the world arises in multiple themes, and the **Health and Wellbeing in a Changing Environment** sub theme will address the impacts of pollution, clean air, water and sanitation, bioengineering and materials, antimicrobial resistance, and malaria control. Where people live will be transformed. We have strengths across all faculties that contribute to the understanding and application for our **Future Cities**, such as the effects of urbanisation and migration on health and disease, and assessing and developing resilient and efficient infrastructures, urban design towards zero pollution, and waste and fire management.



4. OUR CAPABILITIES

Our capabilities draw on Imperial's collective approach to research, education and innovation. These are embedded in all that we do at the College and shape the attributes that our students will graduate with and take on to their future work and careers. Our excellence and strength in these areas make us unique in the UK, and uniquely placed to understand and tackle global challenges, create transformative impact and contribute to society:

Transdisciplinary

We work across disciplines, sharing ideas and expertise, to understand and change the world. Many of today's scientific questions demand perspectives and skills from multiple different areas.

Quantitative

We bring a quantitative approach to our work, embracing the possibilities of data and sophisticated statistical approaches. Our expertise in quantitative approaches is used together with qualitative inquiry to inform a holistic approach to discovery and application.

Entrepreneurial

We translate ideas into new products, services and companies, including contributing to industry and the economy.

Engaged

We collaborate with communities, stakeholders, governments and industry locally, nationally and internationally to ensure that our work is relevant, timely, and accessible. We play an important role as a 'civic institute' in public education and engaging society in science.



5. THE STUDENT EXPERIENCE

The Academic Strategy sets out our ambition to deliver a world class education and student experience.

Our focus on science, engineering, medicine and business provides an educational environment which is unique in the UK. One of the most distinctive elements of an Imperial education is that our students join a community of world class researchers. They learn alongside leading experts, actively engaging with research and discovery in their chosen field.

Our education offering is research and evidence based, enabling students to become independent learners, developing highly applicable skills and attributes, with the curiosity and drive to continue learning throughout their lives. The education experience is enhanced by technology, and provides opportunities for multidisciplinary working as well as collaboration in research, education, enterprise, engagement and outreach.

Building on the College's Learning and Teaching Strategy, the Academic Strategy incorporates a holistic approach to the student experience to ensure that learning and teaching innovations and developments are implemented in connection with the broader student experience, in response to changing needs in areas such as curricular and extra-curricular, wellbeing, community and the provision of services and support.

We aim to provide a student experience that is inclusive, outward looking and responsive to a diverse student body, in such a way that all Imperial students can thrive, regardless of their background. We will offer the same high-quality experience to all students. Our students are part of our academic community. Their collaborations with staff lead to an exchange of ideas and engagement that lasts a lifetime.

We will build strengths and invest in opportunities for the full lifecycle of the student experience, from before they begin their studies, while they are Imperial students, and following graduation, as members of our global alumni community. This will include opportunities that are reflective of the College's distinctive capabilities and strengths that support learning and teaching, student support, facilities and services and streamlined processes.



ENGAGING

We will be welcoming and inclusive to attract a diverse body of excellent students from all around the world

LEARNING

Students and staff will work as partners to create a student-centred experience with parity for all

SUCCEEDING

We will nurture a lifelong exchange of ideas and support across a global alumni network

6. IMPLEMENTING OUR VISION



The Academic Strategy allows us to identify areas of strategic priority and new opportunities that we can invest in and place more focus upon through targeted projects. We will work across our faculties, departments and Global Challenge Institutes to identify key actions that will help our community to drive this agenda.

Over the next few years, we will prioritise a number of College level opportunities to implement through a small number of targeted investments of people, time, space and money to promote projects which build upon the strengths described in the strategy and respond to opportunities which the College is uniquely placed to exploit.

These opportunities may include investing in people and places, developing new programmes, centres or research focus, building new partnerships and communities, or responding to external challenges that relate to our strategic themes or capabilities.

Some financial investment for the priority projects will be provided internally by the College, with a dedicated, but limited, central budget for strategic projects. Identifying and leveraging external partnerships and investment will be essential to support and fund all the priority projects.

We will continue to deliver and invest in core College activities through departments and faculties who have responsibility for maintaining excellence in disciplinary expertise. The Academic Strategy builds on this work by enabling opportunities that reach across departments and faculties at College level for greater reach and impact.

Prioritisation approach

We have developed a prioritisation approach to inform the selection of and investment in College-level projects that support the Academic Strategy.

In year one, we will convene cross-College working groups around the four themes in order to refine the strategic sub-themes, build wider conversations that can lead to new collaborations and bring together key strengths across different parts of the College. These groups will generate ideas and proposals for investment and will be led by a Vice or Associate Provost and Dean, bringing together the College's expert researchers and teachers in their fields. Following the first year, these working groups will continue to review the strategic themes, identify synergies and connect activities across themes, and to provide a cross-College perspective to identify potential and future opportunities as the Strategy progresses over the next few years.

Twice a year, the Provost's Board will consider a gathered field of proposals brought forward by the working groups or from the academic community directly, following a '3 Gateway' prioritisation process. Proposals which are selected for further development will be subject to consideration at a second and possibly third 'gateway', depending on the complexity of the project and scale of the investment required. Depending on the nature of the proposal, some projects will need to be triaged into existing College processes for consideration, for example capital or IT projects. As a proposal passes through each gateway, a greater level of resource is released in order to develop the proposal, until the project is eventually given final permission to proceed.

Gateway 1 is for the ‘approval of concept’. Typically, Provost’s Board may approve a level of resource sufficient to develop a full proposal. For example, an approval of concept for a new cross-College research programme may include support from Finance to develop robust costing, support from Advancement to test the ‘market’ for philanthropic support, and support from Estates to understand the space implications of the programme, together with funding for a Project Officer to bring together the cross-College academic case for support.

At Gateway 1, a short proposal setting out the academic rationale of the proposal is required. A proforma is provided in order to help proposers to address all the criteria which Provost’s Board will consider as part of the prioritisation process. Proposals must be endorsed by either a Dean, Vice-Provost or Associate Provost.

In considering Gateway 1 proposals, Provost’s Board will assess proposals according to the following criteria intended to assess the academic case, practicality and business proposition:

To what extent does the Project:

- fit with the Academic Strategy?
- draw on College strengths?
- have an impact across faculties?
- position the College to achieve excellence?
- require College-level action or support?

Is the Project:

- timely?
- affordable?
- realistic?

To what extent does the Project:

- fit with other College Strategies as appropriate?
- address College strategic risk register?
- leverage external resource?
- support the College’s financial position?

At Gateway 1, Provost’s Board will be able to make a number of decisions:

- To approve the concept, and to provide resources to develop the proposal further.
- To ask that the proposal be revised, for example in order to broaden its scope or to combine it with one or more similar proposals.
- To reject the proposal as not being well-fitted to the Academic Strategy.

Successful proposals will then be moved on to be considered at Gateways 2 and (if required) Gateway 3. Some proposals may be approved in full at Gateway 2 if they do not require significant new resource. The criteria for these gateways will depend to a considerable extent on the nature and scale of the project, and guidance will be given to projects on an individual basis.



7. MEASURING SUCCESS



Success will be measured against the following criteria:

- To support world leading research, education and innovation
- To enhance the impact of our research, education and innovation
- To attract the highest calibre students, staff and partners
- To influence external agencies through advice and guidance on major global issues
- To efficiently and effectively prioritise opportunities that deliver our strategies
- To deliver individual strategic projects against specific assessable objectives

Specific means to measure progress will be defined further, but will include existing metrics, such as NSS survey results, research performance measures, research income, as well as qualitative assessment.

8. WAYS TO ENGAGE



You can find out more about the Academic Strategy online

www.imperial.ac.uk/academic-strategy

Or get in touch at

academicstrategy@imperial.ac.uk

If you have an opportunity or project that you would like to be considered in the Academic Strategy investment prioritisation process, you can speak to your Head of Department in the first instance, or get in touch at

academicstrategy@imperial.ac.uk