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Welcome from Johan Schot, Director of SPRU

Whether it be the provision of food, energy and healthcare, or the development of more inclusive, innovative economies, our aim is to deliver new fundamental knowledge on the nature and governance of these transformative changes, as well as to offer practical ideas and solutions for setting the direction of change towards more positive societal outcomes.

The world is currently facing a series of crises and persistent problems. The modern way of provisioning our basic needs is ultimately unsustainable and is already causing climate change on an unprecedented scale. It is clear that we cannot globalise our current ways of providing food, energy, mobility, healthcare and water. These issues cannot be solved by optimising current scientific and technological solutions, burning more fossil fuels, investing more money in high-tech medicine, nor by globalising value chains

and continuing to promote car-based mobility patterns. We need to move away from a costly 'business as usual' approach to these persistent problems.

At SPRU, we are working to address these issues head-on through an innovation policy lens that aims at transformative change. This work is focused on two primary aspects: the potential for innovation to radically reconfigure the entire economy and society, and the associated need to transform processes of innovation governance. This transformation must allow for more exploration and experimentation outside the narrow boundaries often set by incumbents – with scientific advice based on a wider range of perspectives – as well as nurture a policy-making process that provides an opportunity for various stakeholders to challenge different opinions.



Professor Johan Schot
Director of SPRU

Founded in 1966, SPRU was one of the first interdisciplinary research centres in the field of science and technology policy and management, and today remains at the forefront of new ideas, problem-orientated research and inspiring teaching.

SPRU, the Science Policy Research Unit based at the University of Sussex, is internationally recognised as a leading centre of research on science, technology and innovation policy.

PIONEERING RESEARCH

Our research addresses pressing global policy agendas, including the future of industrial policy, inclusive economic growth, the politics of scientific expertise and funding, energy policy, security issues, entrepreneurship and pathways to a more sustainable future. We are driven by a desire to tackle real-world questions, whilst also contributing to a deeper theoretical understanding of how innovation is shaping today's world.

Drawing on insights from across the social and natural sciences, engineering and humanities, SPRU builds on a proud tradition of interdisciplinary research at the University of Sussex. SPRU's pioneering research is known and respected worldwide. We are rated as one of the top ten science and technology think tanks in the world¹ and a 2012 study published in the journal *Research Policy*² ranked SPRU second only to Harvard University in terms of its research impact in innovation studies.

TRANSFORMATIVE TEACHING, TRAINING AND OUTREACH

SPRU offers high-quality, research-led teaching at postgraduate level (five distinctive Masters courses and PhD supervision) as well as bespoke training for policy professionals. The multidisciplinary nature of SPRU means that we can provide an extensive range of expertise and training in innovation policy to suit the needs of each individual student or organisation.

We are focused on delivering academic excellence in the collaborative production of knowledge across multiple disciplines. We also pride ourselves on having impact and engaging outside academic arenas – with policy-makers, stakeholders, the media and civil society – offering practical ideas, perspectives and solutions to ensure that innovation and change deliver positive societal outcomes.

1. http://repository.upenn.edu/cgi/viewcontent.cgi?article=1008&context=think_tanks
2. <http://www.sciencedirect.com/science/article/pii/S0048733312000698>

Major research initiatives

SPRU is home to several major research centres and collaborative projects:

Sussex Energy Group

The Sussex Energy Group (SEG) is one of the largest independent social science energy policy research groups in the world. SEG aims to identify ways of achieving transitions to sustainable, low-carbon energy systems whilst addressing other important policy objectives such as energy security and affordability.

Centre on Innovation and Energy Demand

The Centre on Innovation and Energy Demand (CIED), led by SEG in partnership with the Universities of Oxford and Manchester, is one of six research centres on End Use Energy Demand funded by RCUK. The Centre adopts a socio-technical perspective and looks at the emergence, diffusion and impact of low-energy innovations.

STEPS Centre

The STEPS Centre, co-hosted by SPRU and the Institute of Development Studies, brings together development, science and technology studies with policy engagement activities involving partners in Africa, Asia, North and South America and Europe. Funded by the ESRC, STEPS researchers work on innovative approaches to social, technological and environmental sustainability that favour the rights, interests and values of marginalised and excluded peoples.

Harvard Sussex Program

The Harvard Sussex Program, formally established in 1990, is an inter-university collaboration for research, communication and training in support of informed public policy towards chemical and biological weapons.

TRANSrisk

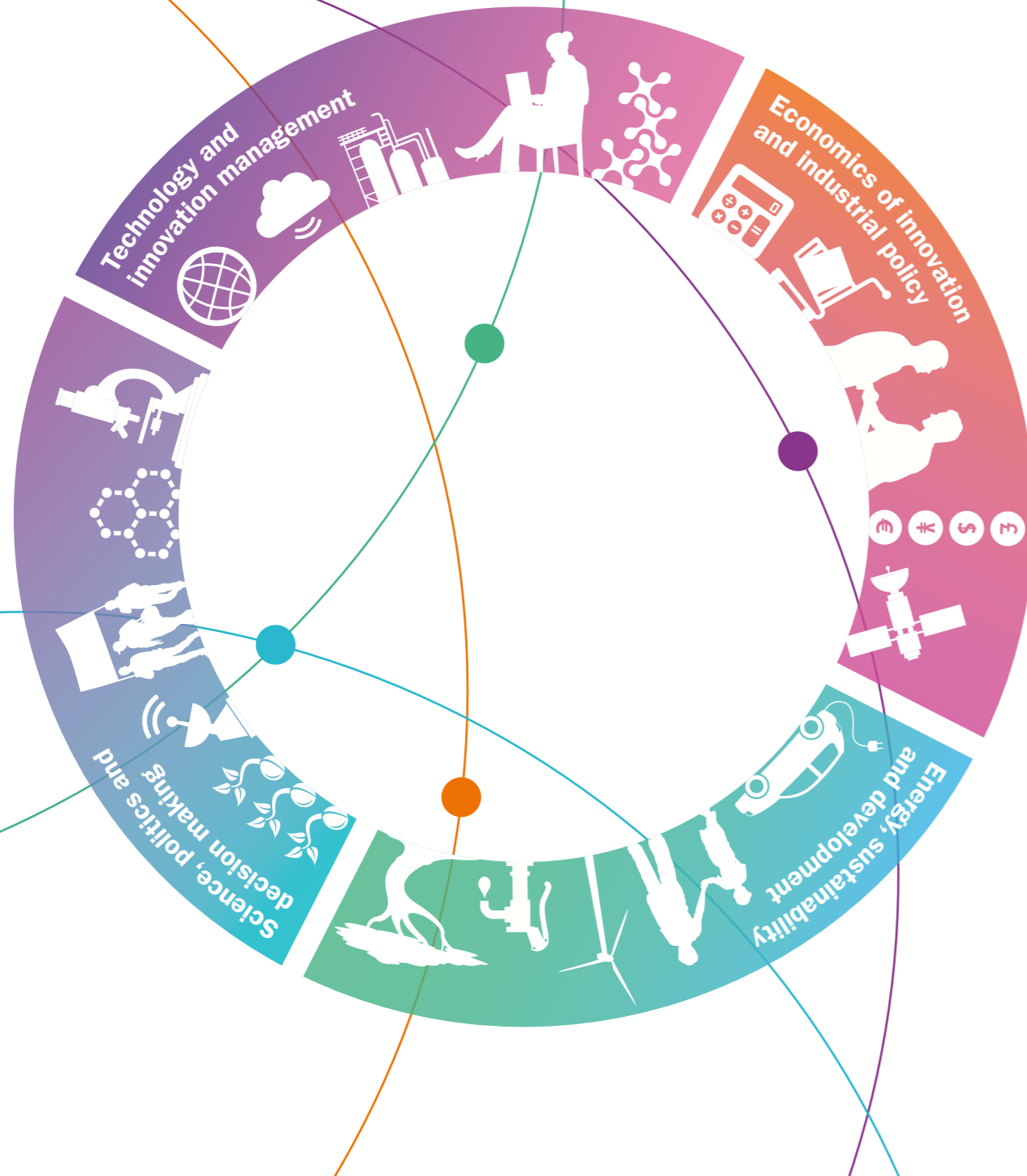
The TRANSrisk research programme (Transitions pathways and risk analysis for climate change mitigation and adaptation strategies) aims to support EU and global climate change goals by providing analytical tools for risk and uncertainty, in order to assess low-emission transition pathways that are technically and economically feasible and acceptable from a social and environmental viewpoint.

Energy Systems

Professors Gordon Mackerron and Steve Sorrell are working on researching the social science issues involved in energy system integration as part of a new £20m EPSRC funded National Centre for Energy Systems Integration. The Centre bridges a pivotal gap in the drive towards a fully integrated, smart energy network, which is crucial to improving energy efficiency, driving down customer bills and reducing carbon emissions.

Sussex Sustainability Research Programme (SSRP)

A £3m investment by the University of Sussex funds this research programme – a collaboration with the Institute of Development Studies. It aims to support the sustainability of life on Earth through rigorous interdisciplinary research which stimulates action and influences policy. The programme builds on existing academic strengths across the natural and social sciences, including SPRU.



Science, politics and decision-making

The emphasis that leaders place on science and technology makes designing effective policies a priority worldwide. At the same time, scientific advice to inform policy-making is in high demand. From climate change to cyber-security, food technologies to fracking, controversies continue to erupt at the boundaries between science, politics and society.

Our world-leading research helps policy-makers – and wider democratic debates – to set directions and priorities for science and innovation policy, and enables them to navigate uncertainties and controversies. We apply a deep historical understanding to how the choices made about science and technology shape our societies. A particular focus of our work is advanced by The Harvard Sussex Program, co-hosted at SPRU for over 25 years. It uses technology as the lens through which to view issues of conflict and vulnerability, and understands forms of innovation that arise from the security landscape.

RESEARCH HIGHLIGHTS

Understanding biological disarmament
The work of Dr Cairtriona McLeish and Dr James Revill focuses on global efforts to eliminate biological and chemical weapons. Their interests include: the interplay between science and technology and security issues; biological and chemical

weapons regime evolution and adaptability; framings of security and threats; and the potential impact of security policies on innovation.

Democratising innovation – the politics of social change

Professor Andy Stirling's work on 'democratising innovation' addresses ways in which knowledge, values and interests get entrenched in science and technology, resulting in particular trajectories of change becoming locked-in and other less powerfully-reinforced possibilities becoming excluded. He concentrates on how to open up space for more plural, reasoned and accountable political processes for science and technology.

Managing antimicrobial resistance

Rising levels of drug resistance is a major issue both economically and socially. Research led by Dr Michael Hopkins looks at the development and use of diagnostics to address the AMR challenge, by analysing diagnostic tests that will best help detect and manage AMR, as well as innovation pathways that could bring good tests into widespread clinical practice more quickly.

The effectiveness of international funding for healthcare research

Professor Joanna Chataway is leading an international team of researchers looking at whether (and how) EC funding for R&D

on poverty-related and neglected diseases has delivered improvements in healthcare. They will develop conceptual frameworks and tools to help evaluate and understand complex relationships between health R&D and improved healthcare.

Technocratic internationalism

A six-part book series *Making Europe* (co-edited with Professor Phil Scranton) charts a new transnational history of Europe through the lens of technology. Professor Schot's contribution focuses on the role of experts in international decision making and unravels the technocratic origins of the European integration process and the dilemmas this poses for democracy.

Multicriteria Mapping – helping to understand complex decisions

Multicriteria Mapping (MCM) is a web-based application for analysing complex issues, multiple options, deep uncertainties and contrasting perspectives. Developed by Professor Andy Stirling, MCM has been used in international policy appraisals spanning many different sectors. Combining qualitative and quantitative information, this is a unique web-based toolkit for systematically mapping the practical implications of scientific, technological and wider policy alternatives.



Economics of innovation and industrial policy

Modern capitalism faces great societal challenges. With Europe experiencing an era of financial crisis and austerity – in addition to serious global issues such as climate change, poverty, and the proliferation of armed conflicts – it is critical to address the pressing need for directing economic growth and driving the innovation required for sustainable, inclusive growth.

Economics of Innovation has been a historical backbone of SPRU's research portfolio, providing key theoretical and empirical tools for policy areas such as innovation, development and energy policy. Our research focuses on advancing the economic theory of innovation, whilst also resetting the foundations of orthodox economics and advancing the fields of evolutionary and institutional economics. We seek to understand the structure and dynamics of innovating firms and industrial systems and how to manage innovation capabilities in firms, including uncertainty in complex systems. Our key concern is to help strengthen innovation and industrial policies around the world.

RESEARCH HIGHLIGHTS

Mission-oriented innovation policy and patient finance

Professor Mariana Mazzucato explores the role of mission-oriented innovation policy in directing investment and innovation towards

smart, inclusive and sustainable growth. She is developing a new framework for the role of the state as shaping and creating markets, asking challenging questions about how public-sector investments are envisioned, justified and measured and how to socialise risks and rewards. She is also working on the relationship between financial market reform and innovation.

Technical change, employment and inequality

Research led by Professor Maria Savona investigates how technical change affects employment and income inequality. The aim is to support a range of actors to formulate responses to the economic and social pressures induced by increasing income inequality and the impact of robotisation on employment.

Innovation-fuelled, sustainable, inclusive growth

A study of the non-linear relationships between innovation, employment dynamics, structural change, and the globalisation of production and growth aims to put EU economies back on steady growth paths. Professors Mariana Mazzucato, Maria Savona and Dr Tommaso Ciarli will develop inclusive and sustainable policy scenarios and a framework to analyse pathways that link forms of technological innovation with structural change and inclusion in low income countries.

Energy and economic growth

Professor Tim Foxon investigates the relations between energy provision and economic growth in past surges of innovation leading to changes in technological and institutional systems, starting with the industrial revolution. He explores the implications of this for a low-carbon industrial strategy and transition to low-carbon energy systems and economies.

Patterns of inclusive innovation

Dr Matias Ramirez is looking at how producer networks and different lead organisations influence opportunities for the inclusion of small and micro producers in the introduction of new practices in industry and agriculture.

Infrastructure governance

Research focuses on investigating infrastructure business models, systems innovation and improving decision making to reflect the increasing demand for infrastructure investment and the interconnected nature of infrastructure. Professors Paul Nightingale, Jim Watson, Dr Ralitsa Hiteva and Dr Kat Lovell work on several flagship interdisciplinary projects: analysing business models for infrastructure development and delivery, and developing analytics to inform strategic infrastructure decision making.



Energy, sustainability and development

How do we meet the world's growing need for water, energy and food in an equitable manner without compromising the environment or future generations? Despite increasing reference to a more sustainable world, global progress remains very limited. We need to urgently explore the compatibility of growth and sustainability, whilst also addressing environmental degradation and poverty.

Since the 1970s, SPRU has been at the heart of international debates about the role of science, technology and innovation in fostering sustainability and development. We also have a long history of academic research with practical application in the critical area of energy policy. Our research seeks to identify ways to facilitate global transitions to a genuinely sustainable future, looking specifically at key areas such as energy, food, agriculture and water. Our aim is to help organisations, industries and policy-makers to ensure that appropriate technologies and innovations are developed and deployed with positive effects.

RESEARCH HIGHLIGHTS

Energy policy for energy security
Professor Benjamin Sovacool works on issues pertaining to energy policy and security, climate change mitigation and adaptation. His research focuses on renewable energy and energy efficiency,

global energy justice, the politics of large-scale energy infrastructure, designing public policy to improve energy security and access, and building adaptive capacity to the consequences of climate change.

Understanding social innovation

Grassroots innovation and the politics of sustainable developments, principally in Europe and Latin America, is a key research area for Professor Adrian Smith. He analyses how grassroots groups develop and advocates novel and inclusive solutions for sustainability. Our researchers are part of a project developing a theoretically-informed understanding of transformative social innovation, with a focus on hackerspaces, fablabs, seed swapping and living labs.

Resilience and vulnerability at the Urban Nexus

In conjunction with researchers in Holland and Brazil, Professor Fiona Marshall, Dr Saurabh Arora and Dr Ralitsa Hiteva are examining how vulnerabilities within urban communities are constructed through trade-offs and aggravations between food, water and the environment, and their impact on existing forms of insecurity and injustice.

Policy mixes

Research by Dr Florian Kern and Dr Paula Kivimaa identifies policy goals and instruments that can potentially foster or obstruct the emergence and diffusion of low-energy innovations in the areas of mobility, heat and electricity use. They analyse existing policy mixes by identifying gaps, complementarities, synergies and trade-offs. Initial findings show that policy mixes for sustainability transitions should involve instruments that aim to 'create' new and 'destroy' old technologies and practices.

Low carbon innovation in China

As part of an international team, Dr Adrian Ely and Dr Sam Geall explore the extent, nature and social implications of low-carbon transitions in China. Their work compares government-led, high-tech 'indigenous innovation' with emergent, lower-tech approaches in the areas of agriculture, energy and mobility.

Urban transformation and energy pathways

Research by Dr Lucy Baker into sustainable cities (in Africa) focuses on how to move towards integrated energy strategies in different cities, with a view to reducing carbon intensity, increasing the electrification of specific neighbourhoods and combating energy poverty.



Technology and innovation management

High-growth firms such as Google or Apple often create value and grow because they are innovative. Yet innovation can disrupt existing industrial structures, requiring organisations to change their behaviour. Innovation, and the benefits it generates, does not happen easily or automatically.

In an increasingly competitive international environment, understanding how to effectively manage technology and innovation has become critical to success.

SPRU is a global leader in research and teaching in innovation management. Our work focuses on enhancing innovation in all types of organisations and across all sectors. It involves developing and delivering tools to improve the management of innovation within organisations, as well as between organisations and their suppliers and customers.

Key aspects of our work include: technology strategy, new technology-based firms, complex systems and products, high-growth new ventures, innovation in business models, infrastructure sectors, healthcare, biopharmaceuticals and services, the management of knowledge and intellectual property. One of SPRU's strengths is our pervasive interest in the direction of technological change (not just its pace and impact), understanding the varied pathways through which science, technology and

innovation may develop, and how that can be strategically managed.

RESEARCH HIGHLIGHTS

Intrapreneurship

Professor Joe Tidd and Dr Josh Siepel are part of the Intrapreneurship Hub – a collaborative venture between the School of Business, Management and Economics at Sussex, with the SDA Bocconi School of Management in Italy and Renmin University in China. The Hub aims to study and promote entrepreneurial behaviour and innovative outcomes in established organisations.

Smart urbanism

Research by Professor Adrian Smith is analysing how smart urbanism experiments reshape urban knowledge politics in European cities, and direct contemporary debates on smart urbanism. With researchers in the Netherlands, Germany and France, the project is interested in grassroots appropriations of 'smart' techniques. Professor Smith will DIY smart urbanism in Barcelona to see whether and how it results in a different way of developing the city, compared to the corporate promotion of smart cities.

Responsible innovation and happiness: a new approach to the effects of ICTs
Responsible innovation is centered on

the idea that new technologies must be 'ethically acceptable, sustainable and socially desirable' yet there is no agreed substantive view of what is good, right and desirable. Professors Ed Steinmueller and Adrian Smith are investigating how new technologies affect individual users' subjective well-being or 'happiness' by focusing on digital fabrication technologies.

Innovative firms

The work of Professor Paul Nightingale and colleagues – on innovative, high-performance firms, business models and financing – now underpins venture capital policy across Europe, and the increasing emphasis on innovation in how firms capture value.

Digital innovations

Dr Puay Tang is currently researching how the impact of new digital innovations, such as 3D printing has the potential to disrupt the operation and appropriateness of the current Intellectual Property regime. New models of appropriation may therefore need to be considered. An associated theme lies in how such new digital innovations may affect the product life cycles of many consumer products.



Study at SPRU

SPRU is the largest academic body in the world studying science, technology and innovation. With Masters and doctoral students from all over the world, our postgraduate courses provide aspiring professionals with the knowledge and skills to analyse and guide policy, managing scientific change and technological innovation within public-sector organisations, non-governmental organisations and companies.

From technology policy and managing innovation, to fostering sustainability, international development and understanding complex energy systems, students at SPRU benefit from working at the frontier of new knowledge on some of today's most pressing global policy agendas.

Working with outstanding scholars, our students are an integral part of the development of new research agendas as part of their training. We pride ourselves on offering problem-led rather than discipline-based teaching.

Ambitious to develop and achieve in their chosen specialisms, our bright students come from a range of academic backgrounds. What makes them special is their thirst for knowledge, open-mindedness and curiosity, and interest in tackling some of today's pressing challenges. Our courses will put graduates in a great position to help to shape the future.

Please see our online prospectus for further details:

► www.sussex.ac.uk/spru/study

AS A SPRU STUDENT YOU WILL HAVE:

Access to extensive expertise

Our academics are world-class researchers in their respected fields of study, who pioneer new understandings and approaches in the governance of science, technology and innovation.

Work experience opportunities

There are opportunities for students to be placed in policy institutions, firms, governmental departments, not-for-profit and non-governmental organisations to conduct research for their dissertation.

A multidisciplinary research environment

SPRU's emphasis on problem-led academic study means that students experience a range of interdisciplinary interactions across multiple sociopolitical perspectives. This has created a unique SPRU style, consisting of inter- and intra-disciplinary study, strong empirical research and an emphasis on developing new analytical tools, theoretical frameworks and policy approaches.

Opportunities for collaboration and creativity

SPRU students are invited to participate in weekly research seminars as well as in conferences and workshops. Working closely with our academics, students also

have the opportunity to learn and contribute directly to SPRU research as part of their training.

MASTERS COURSES

Energy Policy

This course provides broad-based, interdisciplinary social science training for future energy policy professionals working in the public, private and not-for-profit sectors to be able to analyse policy problems and to propose and evaluate viable policy solutions.

Sustainable Development

Our Sustainable Development course gives students the knowledge and skills to translate theories of innovation into effective development policies and practices, to achieve inclusive growth in the Global South.

Project Management

With this Masters course you will gain a compelling set of critical skills for managing projects in today's dynamic business and economic environment.

Science and Technology Policy

Our MSc in Science and Technology Policy was the world's first course in this subject area and remains the most comprehensive introduction to this field providing a solid foundation in the language, logic and

tools of policy analysis for investigating specific science and technology policy and recommending policy solutions.

Strategic Innovation Management

This course enables students to develop the knowledge and skills to lead and manage innovation at both operational and strategic levels.

SCHOLARSHIPS

To celebrate fifty years of shaping innovation research, teaching and policy – and to help the very best students to study at SPRU – we are offering a number of £10,000 scholarships that can be used for any of our five Masters courses. To be eligible to apply, you must have either a First or 2:1 undergraduate degree in any discipline (or equivalent). In addition, you must meet all the University's general entrance requirements as well as apply for a Masters course, receive and accept an offer.

