



# **Centre for Science and Policy**

The Sciences and Technology in the Service of Society

Fourth Annual Report December 2012

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Scientific insights and policy making are inextricably linked. This is not only because scientific research and the scientific method are fundamental to evidence-based policy making, but also because progress in science and technology is a key driver of economic growth, social innovation and the delivery of policy objectives.

All too often, scientists and policy makers occupy separate worlds – which is why the Centre for Science and Policy is such an important initiative, bridging the gap between the government and leading researchers, and helping to translate scientific insights into the heart of the policy making process.

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*Rt Hon Oliver Letwin MP, Minister of State at the Cabinet Office* 

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Fourth Annual Report (December 2012)

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# The Centre for Science and Policy in 2012

Dr David Cleevely CBE FREng, Founding Director, and Dr Robert Doubleday, Executive Director

The Centre for Science and Policy's defining purpose is to help government make better use of science and technology in order to deliver better public policy. We fulfil this mission by facilitating interaction between government and academia, and particularly by building and supporting networks that lead to mutual understanding.

#### CSaP's growth

During 2012 CSaP has dramatically stepped up the scale and reach of its activities. Policy Fellowships, the Research Programme and Professional Development – all up and running during 2011 – have all grown and flourished in 2012. 36 new Policy Fellows were elected in the year, taking part in 1150 one-on-one meetings with researchers, almost twice as many as last year. Our first annual conference, two published papers, three professional development seminars, four policy workshops, six research projects and seven distinguished lectures also kept our network active and engaged – overall we supported and promoted more than 50 policy-related events in Cambridge and London.

#### CSaP's people

The medium for CSaP's impact is people. This report includes many typical examples – Policy Fellows, the network of researchers whom they meet, Associate Fellows and others – describing in their own words the benefits of being part of our network, and of the ways in which we link other networks together.

During the year we piloted mechanisms to improve links between academia and national security stakeholders in government, through our first Visiting Fellow; brought together expertise in cybersecurity, ecosystems, and innovation and growth through Policy Workshops; and created connections between the most senior officials in the Indian and UK administrations.

We have also put great emphasis on working with graduate students and early-career researchers, which this year led to a number of policy placements in Whitehall; interns from NERC and BBSRC coming to Cambridge; and the launch of Cambridge University Science and Policy Exchange (CUSPE), a studentrun society with the mission to build stronger links between early-career researchers and government policy makers.

#### CSaP's research

2012 was the first full year of CSaP's research programme, which aims to improve understanding of how science, policy and politics relate to one another by collaborating with a wide range of academic disciplines and policy practitioners. The programme published its first results in *PLoS ONE* and *Nature*, and launched new projects on biodiversity, national security, and horizon-scanning. We also kicked off a series of seminars looking at how government can make more effective use of scientists and scientific advice in the context of the move towards more open policy making.

CSaP will also be putting this research knowledge to use in training the next generation of policy leaders when Cambridge opens its doors to a new Master's programme in 2013. The Centre will be running the course on the scientific method and evidence as part of the Master's in Public Policy.

#### Looking forward to 2013

The platform that the Centre has built continues to present new opportunities. Looking forward, we plan to focus on addressing specific policy problems through working groups convened from within our network; extending our reach internationally; and building our research programme. During 2013 we propose to launch not only the working groups, but also a "Policy Leaders Fellowship" aimed at the most senior decision makers and influencers in the policy world.

We will continue to address both the policy and research constituencies, working with government to support the open policy-making agenda, and with academia to increase the policy impact of its work and the sophistication with which research addresses public challenges.

To support our ambitious plans for further growth, CSaP is establishing a 2013 Development Board to be chaired by Lord Oxburgh.

#### A note of thanks

We would like to re-iterate our thanks to all those who have given their time and expertise to support the work of the Centre in 2012; the list at the end of this report shows how many and varied they are. In particular, we thank Chris Tyler (who stepped down as Executive Director during the year to take up a new role as Director of POST); David Harding of Winton Capital; the Trustees of the Sir Isaac Newton Trust; and we remember Professor Sir Gabriel Horn, the moving force behind CSaP's predecessor, the Cambridge University Government Policy Programme, who sadly died this year and is greatly missed.



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# I feel invigorated and inspired to be brave and innovative in my advice to Ministers ...

# Pauline Reeves • Policy Fellow

#### Deputy Director, Sustainable Transport and Equalities, Department for Transport

When I joined the Policy Fellowship in 2012, the policy on Active Travel on which I had been asked to lead had become slightly stagnant. I wanted to understand what we could achieve if we properly assessed the barriers and opportunities, and how we could address them to achieve transformational and long-term change in the number of people who walk and cycle.

Policy makers understandably focus on the lifetime of a Parliament. My first week as a Policy Fellow gave me an opportunity to think more long-term, and I began to investigate, with the academics I met, how to achieve a vision for the next twenty years and beyond. This was a big policy shift for us in the Department. I was also struck by how little we had done to evaluate the policy interventions we had already made in this area. After my first week, I took the need for evaluation away as a key action point.

My discussions also highlighted the "silo" mentality we can sometimes have in policy. I was given contacts in other government departments who were working towards the same policy objectives as me: creating economic growth and cutting carbon. I also met a number of academics who specialised in behaviour change. It seems like a no-brainer now, but when I started this work I didn't consider it to be a behaviour change project, and yet that is what is emerging for me. Active Travel policy is about people and what can nudge them towards a mode shift to walking or cycling for short journeys.

I'd like to think I would have realised all this under my own steam but I don't think so. How many times do we really have the luxury in policy to sit outside the box for a week? I am now running an evaluation programme for my policy, I have established a cross-Whitehall group, and I have seconded an academic into my team to pull together all the research and evidence to strengthen my policy direction.

I feel invigorated and inspired to be brave and innovative in my advice to Ministers, knowing that if I can prove that this will deliver benefits that increase physical activity in this country, the policy need not change just because a government does.

# **Policy Fellowships Programme**

As it reaches the end of its second year of operation, our flagship Policy Fellowships Programme now boasts 70 members from a wide range of backgrounds and disciplines in Whitehall, Brussels and further afield, and from industry. In July 2012 we welcomed over half of the current Fellows at our Annual Reception in London, where we discussed the benefits of the Fellowship and its future development.



Policy Fellows are decision makers from the policy world who come to the University as the basis for building lasting links with researchers. Each Fellowship begins with an intensive week of one-to-one meetings with relevant researchers, and continues over two years with opportunities to take part in CSaP events, convene groups of researchers for specific discussions, and develop research agendas. Key to the programme's success is the fact that the agenda is set by the policy makers themselves; each Fellow specifies the questions he or she wants to explore, and the Centre convenes the people who can address those questions.

The case studies opposite and on the following pages (and the many others on our website) set out in the Fellows' own words the benefits they have gained – knowledge, challenge, stimulation, prestige, personal development, access to networks and space to think in new ways. Page 7 shows the connections that the programme created for new Fellows in 2012. 36 new Fellows were elected, undertaking 1150 meetings with almost 400 researchers. Many of the new Fellows were clustered into "streams" reflecting key themes – emerging technologies, behaviour and wellbeing, cybersecurity of infrastructure, growth and innovation. We were also pleased to be able to deepen relationships with key parts of government by building the Fellowship into several departmental learning and development programmes.

In addition, we hosted return visits, workshops and other events for many Fellows elected in 2011, and successfully piloted a new Junior Fellowship for early-career policy makers.

Page 9 illustrates the "life cycle" of the Fellowship, from the intensive initial week through the full two years of events and bespoke opportunities.

# If I fine away from the day-job to discuss, think and reflect in an intellectually demanding environment ... Jo

# Llyr Jones • Policy Fellow

#### Vice President, Latin America and Canada, Group Business Development, BAE Systems plc

Defence budgets in many markets are flattening or declining as governments implement deficit-reduction measures. At the same time, the need for capabilities to address more non-traditional threats to a nation's security – such as international terrorism and cyber attacks – is coming to the fore.

Working for a global company engaged in the development and delivery of advanced defence, security and aerospace systems, the questions I wanted to address as a Policy Fellow sat at the intersection of geopolitics, business and technology. CSaP's cross-disciplinary approach enabled me to gain new understandings in all three, through a perfectly designed programme that allowed me to engage with world-class researchers.

Regarding geopolitics, senior researchers in Politics gave valuable insights into aspects of international relations that critically affect global security. Discussions in the Institute for Manufacturing and Judge Business School furthered my understanding of industry and education in the Middle East, and of innovation in India. I was able to apply insights from many other discussions directly into my day-job.

Regarding technology, several Engineering Professors discussed their work on organisational performance, international manufacturing, technology route mapping and innovation acceleration, and I was pleased to be able to broaden the pre-existing links between my company and the IfM. At the Computer Laboratory I enjoyed a deeply challenging debate on cybersecurity in particular. Finally, Sir Richard Dearlove at Pembroke shared with me his wide-ranging perspectives on global issues, drawing on his time as Chief of the Secret Intelligence Service.

As well as the engagements which were all useful in themselves, I found time away from the day-job to discuss, think and reflect in an intellectually demanding environment immensely valuable. Over the next two years I look forward to making new contacts as my responsibilities and interests change, building relationships with other Fellows, and taking the opportunity to lecture at the University.



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... a sharp reminder to open up my own perspectives and develop new ways of thinking ...

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#### Andrea Lee • Policy Fellow

#### Deputy Director, Strategic Analysis, Department for Communities and Local Government

Working at a Government Department that aims to move decision-making power from the centre to local councils and communities, I wanted to explore the evidence on decentralised systems and whether they are more resilient and lead to better outcomes. But that was just the starting point...

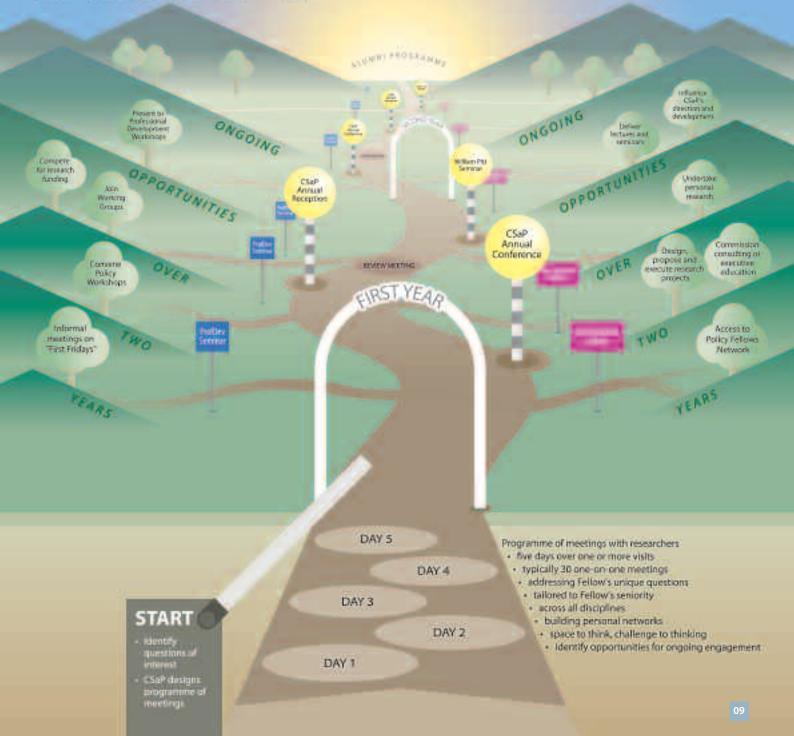
My Policy Fellowship began with a one-week visit to Cambridge where I had over thirty meetings with experts from many disciplines. With the whole of the University accessible to a Policy Fellow, it can prove difficult to confine yourself to a few lines of enquiry for fear of missing out on the sheer breadth of knowledge that is opened up for you. But I need not have worried; my questions were merely the starting point and provided hooks on which to have wide-ranging and fascinating conversations.

I would never have imagined at the outset that I'd find connections between manufacturing processes, active volcanoes, the engineering behind bridge building, community-based entrepreneurship, the Poor Laws and much more. I was also curious to learn more about how the University works and discovered it is in fact a decentralised system itself.

Undertaking the Policy Fellowship has been a sharp reminder to open up my own perspectives and develop new ways of thinking. CSaP provides the means to break down silos, and through unexpected conversations injects a level of challenge that is intellectually stimulating and very rewarding.

Thanks to the week in Cambridge, my team has been connected to a world-class network of researchers. Follow-up has already included connecting my policy colleagues to relevant academics; inviting speakers to come and talk in the Department; and collaborating on developing systems thinking and cities research. Thanks to the Policy Fellowship I feel sure that I have already made progress towards bridging the policy-research divide. Over the next year or so it will be important to maintain momentum in building the relationships, and ensure that we continue to learn from each other and embed this learning in policy development.

# Life Cycle of a Policy Fellow





# Jaideep Prabhu • Associate Fellow

#### Jawaharlal Nehru Professor of Indian Business & Enterprise, Cambridge Judge Business School

Meeting CSaP's Policy Fellows has been a wonderful way for me to learn from senior civil servants and share my learning with them. Scarcely a week seems to go by without my being invited to meet some fascinating and influential person from the UK government, Brussels, or the corporate sector.

There are four reasons why I have so enjoyed being part of the Programme. First, and most important, is the quality of the Fellows themselves: in terms of their background and experience and the questions they are grappling with. Talking to the Fellows, and hearing about their challenges, stimulates me to stretch my own thinking and helps me think of ways in which I can direct or modify my own research.

Second, I find that my own research and knowledge, when presented to the Fellows, suddenly come alive in a way that they do not when I discuss them with fellow academics. The practical yet strategic nature of the Fellows' contexts helps me see how my own research may or may not apply to complex, real-world contexts that are also frequently in flux. Third, through the Policy Fellows I frequently find out more about what my colleagues in other parts of the University are doing. Such serendipitous discoveries about complementary work to my own, in (say) Engineering or Computer Science, help me see my work in a wider academic context, in a world where most problems require interdisciplinary solutions.

Finally, the connections I have been able to make through the Fellows have helped me with my teaching and outreach activity. I frequently develop and deliver executive education programmes for senior Indian executives and civil servants, who often wish to meet and learn from their UK counterparts. CSaP and its network of influential Policy Fellows has helped with this important objective of taking UK and Western best practice to other parts of the world.

The excitement and insight I have experienced and the connections I have made through the Programme are truly remarkable. I believe strongly that the programme benefits not only the University, but also the UK, Europe and the world at large.

# **Policy Fellowships – Impact in the University**

The Policy Fellowships Programme is very much a two-way process. Just as important as the insights and challenges to thinking which it delivers to policy makers are the benefits for academia – the opportunities to learn first-hand about the needs and perspectives of government, and insights into the role of evidence alongside other factors in policy making. As one Professor put it – "I always learn so much!"

Making an impact on policy isn't a matter of handing down evidence from the ivory tower. It requires a real understanding of how research can be made "policy ready" without compromising objectivity. Given how much of the business of government is about delivery and implementation, it also requires close engagement with the practicalities and (therefore) the practitioners.

In addition, policy issues typically cross disciplinary boundaries, which is why Policy Fellows value so highly the chance to discuss their questions with many different departments and faculties. Likewise, researchers have welcomed the by-product of the scheme which brings academics together to approach common questions from many different perspectives.

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Discussions with Policy Fellows are not only enjoyable and interesting but also mutually beneficial. Getting a fresh eye from well-informed, engaged and very capable policy makers has the power to generate new ideas, raise new questions and introduce new perspectives for academic research.

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Michelle Baddeley, Faculty of Economics, University of Cambridge 2012 gave us many excellent demonstrations of the opportunities which the network throws up. For example, when Judge Business School Executive Education brought two cohorts of the most senior Indian civil servants to Cambridge for a bespoke course in leadership, CSaP was able to arrange meetings with the Head of the UK Civil Service (CSaP Associate Fellow Sir Bob Kerslake) and sessions at the Cabinet Office and HM Treasury, as well as visits to the House of Commons.

We have also seen more and more examples of researchers reaching out to Policy Fellows to become involved in research projects and proposals, while the programme itself is increasingly being featured in "pathways to impact" statements. At the same time, Policy Fellows find themselves much in demand as speakers, lecturers and panellists; CSaP is always happy to respond to requests to identify appropriate Fellows to support teaching, research and engagement activity across the University.

The Centre is grateful to all the researchers who have supported the programme this year by meeting Fellows and providing advice; and also to Pembroke College for helping us to provide the true "Cambridge experience" for our visitors.

If you would like to find out more, please visit our website or email **policyfellows@csap.cam.ac.uk**.



# Leila Luheshi • Junior Associate Fellow Senior Research Associate in Chemistry, and Policy Secondee in BIS

Science and scientific research have been my passion ever since I first stepped into a research laboratory as a 15-year-old on work experience. I consider myself extremely fortunate to be paid to spend my days investigating the inner workings of the brain and participating in the search for cures to some of the most devastating neurodegenerative diseases affecting our society today.

Like many scientists I have also become increasingly aware of the wider impact that scientific research can have on public policy. With this awareness has come a desire to understand and participate in the policy process – and particularly to contribute to better policy making by encouraging analytical and evidence-based approaches. CSaP has provided a fantastic platform upon which I have been able to do this, first by helping to facilitate and report on policy workshops, but more recently as a secondee working within Whitehall itself. I am currently working one day a week in the Department for Business, Innovation and Skills (BIS), helping to devise and analyse a call for evidence to inform the UK Government's agri-tech strategy. It has been particularly rewarding to participate in a project aimed at finding ways to convert the world-class research going on in our universities into innovations that will provide social and economic benefits both here and overseas.

One of my aims for the secondment was to understand more about the nature and origins of the gap between the generation and application of scientific knowledge and the formulation of public policy. Whilst it is clear that the two processes are far from perfectly aligned, my experience thus far suggests that the gap between them may not be as wide as I had first thought. Indeed, the process of developing the agri-tech strategy is not at all dissimilar to the process of writing a grant application for a new research project; a constant quest to balance ambition, excitement and new ideas with the reality of financial constraints, competing interests, contentious reviewers, and most of all... tight deadlines!

# **Professional Development Programme**

During 2012, CSaP has held three professional development policy workshops for early-career researchers. These interactive workshops provide an opportunity for participants to hear first-hand from senior academics and policy officials who work at the intersection between science and policy. They offer insights into the kinds of challenges and issues faced each day by science advisers and policy makers, and how these are resolved.



Professional development workshops are designed to allow attendees both to learn from the experiences of the more senior scientists, and also to discuss and contribute their own ideas on how the process of getting scientific evidence into policy making might be improved.

In 2012, more than 100 early-career researchers from 15 universities attended professional development workshops. The first of these, for health scientists, was held in partnership with the Centre for Diet and Activity Research (CEDAR) and the Cambridge Institute of Public Health; the second, for technology researchers, brought together a cross-disciplinary audience of computer scientists, zoologists, statisticians and chemists. The final workshop, for engineers, was sponsored and hosted by the Royal Academy of Engineering. These workshops enable early-career researchers to build peer networks with like-minded researchers from other academic institutions, and provide guidance to those who want to see how their research could have an impact outside academia. Several of those who have participated in these workshops have been inspired to take up short-term secondments in government departments. The senior scientists and policy professionals have also found them enormously beneficial, providing a rare chance to engage with more junior academics and help them realise the potential policy relevance of their research.

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The young researchers who attended the workshop and took part in the breakout sessions came from a range of disciplines and were very impressive: bright, informed and thoughtful. Altogether this was an excellent event and I hope there are more in future. I would urge my fellow researchers, both young and old(er), to attend.

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Professor Muffy Calder, Chief Scientific Adviser for Scotland

# Image: Second second

# **Graeme Reid • Associate Fellow**

#### Head of Research Funding, Department for Business, Innovation and Skills

A generation ago, the UK had the reputation of being good at science but not at commercialising it. Today, however, many UK universities are earning international reputations for the excellence of their work with business; the World Economic Forum now ranks university-business relations in the UK as second out of 144 countries. The University of Cambridge is now infused by businesses who want to be close to first-rate academics of all disciplines, working at the frontiers of knowledge in an environment that fosters intellectual exploration.

But what about the relationship between universities and government policy? Some areas – e.g. health, defence and economics – have long histories of collaboration, and interaction has been boosted by the appointment of Chief Scientific Advisers in almost every Department. But many relationships have been dependent on the personal contacts of key individuals. Even working in science policy, as I have for parts of my career, it is not easy to build the breadth of academic contacts that I would like to have. That's where CSaP comes in, making it so much easier for policy officials in government to meet stimulating people and hear challenges to received wisdom, and opening doors to new lines of thought and new ways of thinking.

I have had the privilege of being an Associate Fellow for two years. During that time I have met people from a far wider range of academic backgrounds than I would otherwise encounter. I particularly valued discussions in History and Philosophy of Science and with economic geographers, and the Computer Lab and Institute for Manufacturing are becoming regular ports of call. A growing number of BIS colleagues have become Policy Fellows and I am struck by the value they place on their Fellowships.

I am now working with CSaP to explore a further relationship: placements in government for researchers who want to contribute to the policy process at first hand. Perhaps, in future, this country will build a reputation for university-government relations to match the one we are acquiring for business collaboration.

# Professional Development – Policy Placements, CUSPE and Junior Fellows

As well as running its Professional Development Seminars, CSaP has brought its network to the service of early-career policy makers and researchers in a number of other ways – by arranging Policy Placements (as described by Leila Luheshi and Graeme Reid on previous pages), by supporting the development of Cambridge University Science and Policy Exchange (CUSPE) and the organisation of its events, and through the new Junior Policy Fellowships Programme.

During 2012, five Cambridge researchers have been offered Policy Placements. Typically they spend one day a week in London (in the Department for Business, Innovation and Skills, the Government Office for Science, or the Cabinet Office), working on projects such as the development of the agri-tech life sciences strategy, the future of manufacturing, or the role of biotechnology clusters.

The placements provide a unique opportunity to get first-hand experience of the policy development process, and to be involved at a strategic level in applying fundamental scientific research to tackle some of the great policy challenges of our time.

Over the last two years, CSaP has provided support to a group of PhD students at Darwin College to deliver the CONNECTIONS series of lectures, bringing prominent speakers to Cambridge to discuss current topics in the sciences which intersect with key policy issues. This year, building on the success of those lectures, a group of CSaP Junior Associate Fellows established a new society – Cambridge University Science and Policy Exchange (CUSPE) – to build stronger links between early-career researchers at Cambridge and government policy officials, within both the UK and the European Union. CUSPE is working with CSaP to support young researchers who not only wish to pursue careers in government, but who would also like to see how their research might



have an impact on policy and, ultimately, on society.

On the policy side, this year also saw the pilot phase of a new Junior Policy Fellowship, aimed at "fast stream" civil servants and young policy professionals in industry. By selecting from the most promising early-career policy makers and matching them up with the leading researchers of their generation, the scheme is designed to create a cohort of ambassadors for the value of scientifically-literate policy making.

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I was inspired to seek a three-month work placement in government after attending the the CSaP professional development policy workshop.

Working in the Behavioural Insights Team in the Cabinet Office has been a fantastic experience where I have been able to use my research to help government implement policies.

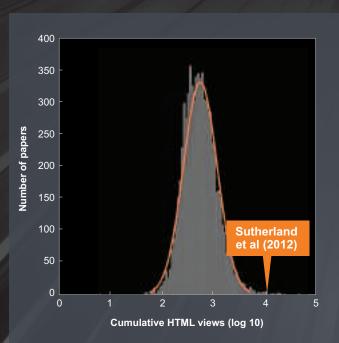
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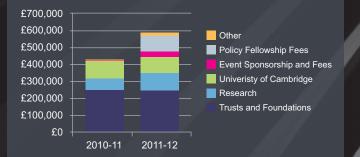
Marcos Pelenur, PhD student at the Centre for Sustainable Development, University of Cambridge

# Highlights of 2012

	2011	2012
Number of new Policy Fellows	25	36
Number of researchers meeting Policy Fellows	280	382
Number of meetings between researchers and Policy Fellows	681	1150
Attendees at professional development workshops	97	126
Attendees at distinguished lectures and conferences	658	1048

All of CSaP's major Programmes – Policy Fellowships, professional development workshops, and lectures and conferences – achieved wider reach in 2012



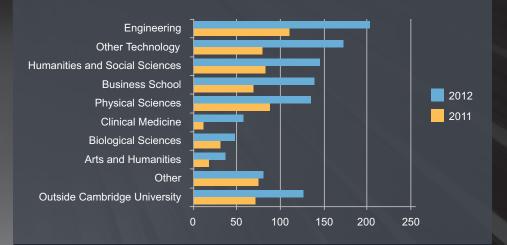


#### CSaP sustained or increased revenue from all sources in 2011-12, with particular growth in fee and sponsorship income

Includes research income accounted for within or outside CSaP, but excludes donations supporting the Master's in Public Policy

CSaP's first published paper, Sutherland et al (2012), A Collaboratively-Derived Science-Policy Research Agenda, became one of the handful of most viewed papers on PLoS ONE

Cumulative number of HTML views of PLoS ONE papers at the third month after publication. Most papers have around 1000 views at this point, but Sutherland et al (2012) had over 10,000 (Source: PLoS One Metrics)



The Policy Fellowships Programme delivered almost twice as many meetings with researchers in 2012 as in 2011, with an increase in all the disciplines which the programme reaches

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An excellent initiative, bringing together senior policy makers and academics to help generate new policy responses to complex social and economic challenges. Good policy making requires access to the best evidence base. Cambridge University Policy Fellows act as a bridge between the public sector and cutting edge research, helping to translate scientific insights into the heart of the policy making process.

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Sir Jeremy Heywood, Cabinet Secretary



The University elected as its new Chancellor a former Minister of State for Science, Lord Sainsbury of Turville (second from right); and the new Director of the Judge Business School, Professor Christoph Loch (far left), joined CSaP's Executive Committee



# Johannes Vogel • Research Partner

#### Director General, Museum für Naturkunde, Berlin

Early in 2012, I returned to Germany after working in the UK for 23 years – including eight years as Keeper of Botany at the Natural History Museum in London – to take up a joint role as Director General at the Museum für Naturkunde and Professor of Biodiversity and Public Science at Humboldt University. Because of my longstanding professional and personal interests in biodiversity science-policy interactions, I was drawn to CSaP early on, as a professional organisation that wants to use the best science to inform policy.

In May 2012 CSaP hosted a superb workshop *Biodiversity, Science and Policy*, focusing on the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), a global behemoth set on defining the scope and purpose of biodiversity for decades to come. Some may consider IPBES sufficient for single-handedly doing all that is needed to preserve life on earth, including our own; but others believe the protection of biodiversity requires diverse stakeholders, innovative models of public participation and open scientific dialogues. The workshop developed several propositions – such as the need for both global and local solutions, and to recognise different kinds of knowledge – which were quickly taken up by the scientific establishment, resulting in a Commentary and Editorial for *Nature* and an International Museum Fellowship grant by the German Federal Cultural Foundation.

The ideas developed through CSaP discussions are now strongly influencing two new developments: my appointment as vice-chair of the Bioeconomy Council, advising the German Government on the re-structuring of the German economy towards a greener, sustainable and biobased economy by 2030; and EU-BON, a five-year EU grant, led by the Museum für Naturkunde on behalf of 25 European and global partners (including CSaP), which will establish a common platform for biodiversity observation and monitoring.

Robust science, relevance and strong partnerships are key to the success of such developments, and thus being part of such an excellent venture as CSaP is vital for success.

# **Science and Policy Research Programme**

CSaP's research programme, launched in September 2011, aims to improve understanding of how science, policy and politics relate to one another. It does so by collaborating on empirical research with a wide range of academic disciplines and policy practitioners. The programme has three broad objectives: to increase academic understanding of the role of science in policy; to bring in-depth understanding of policy to interdisciplinary research projects; and to improve the practice of science policy.

#### Contributing to deeper insight

CSaP's research programme published its first results during 2012. In March a paper of 40 questions defining a science-policy research agenda appeared; it has subsequently been viewed over 14,000 times (Sutherland et al 2012). In May initial findings from our study of the strengths and weaknesses of the current model of Chief Scientific Advisers were reported (Doubleday and Wilsdon 2012).

The programme has also hosted Dr Tristram Riley-Smith (see case study overleaf) during his inquiry into the barriers to more effective engagement between science and government. The insights generated by this study are feeding directly back to government policy and practice through pilot projects testing different methods for improving engagement.

#### Collaborative work with interdisciplinary science

During 2012 CSaP collaborated with scientists from the Natural History Museums in London and Berlin, and from Lancaster University, focusing on research to improve the use of scientific and lay knowledge of biodiversity in policy. An international conference, supported by CRASSH, was held in Cambridge in May. This collaboration led directly to CSaP's role leading the policy research strand in EU-BON, the €9 million EU project on improving the quality and availability of biodiversity data in public policy.

#### Advising on advice

The insight and expertise generated by the research programme is contributing to government thinking around the world. For example, CSaP has been commissioned by Research Councils UK to help them better understand how major research programmes can address public problems (Doubleday and Teubner 2012); and the Japanese Government has consulted CSaP's research in re-designing its scientific advisory system following the "triple disaster" of March 2011.

#### Plans for 2013

CSaP's ambitious plans for its research programme include a project to understand how research funded by the Ecosystem Services for Poverty Alleviation Programme can be more effectively translated into action; a horizon-scanning process to identify major emerging science and policy questions for the UK Government; and a collection of essays on future directions for scientific advice to government.

The research programme is made possible by funding from a wide range of sources, including Cambridge Humanities Research Grants Scheme, CRASSH, European Union 7th Framework Programme, Isaac Newton Trust, Natural History Museum London, RCUK, RCUK Global Uncertainties Programme, and the BIS Sciencewise-ERC programme.



#### **Tristram Riley-Smith • Visiting Fellow** Ministry of Defence

I joined CSaP in January 2012, on an out-placement from government – a year-long Visiting Fellowship supported by RCUK's Global Uncertainties Programme. My starting point was a commitment to improving engagement between the National Security (NS) community and the UK research base, in the recognition that researchers have a vital contribution to make to the security of the UK and the wider world.

I started with a six-month Inquiry Phase, conducting 76 interviews with academics, HMG officials, and industry representatives. This revealed that there were cultural, and to a lesser degree logistical, obstacles hampering effective engagement. We need to find ways to nurture relationships of trust, and to accommodate and join up fundamental research and applied science and technology.

I have subsequently been trialling a number of practical mechanisms to bridge the gap. These are about improving access and visibility, achieving more knowledge exchange, making commitments to partnership and collaboration,

and turning research into capabilities through "pull-through". For instance, I am testing the feasibility of releasing NS data to researchers, and have run a pilot NS Fellowship Scheme involving academics from twelve different universities.

My Fellowship culminated in a conference in December, when participants from academia and government reviewed progress and next steps. The results will now be considered by the National Security Council's Science & Technology Committee. The ultimate aim is to develop initiatives that make a significant contribution to the UK's NS Strategy, promoting strategic co-operation between end-users and academics and supporting the transformation of early-stage research into products and services.

At the same time, I'm pleased to have been able to act as a guinea-pig for CSaP in piloting the role of Visiting Fellow. My project has been enriched by access to the Centre's diverse and high-quality network and propelled forwards by the goodwill that exists towards CSaP in government and academia.

# **Research Advisory Board**

The Research Advisory Board has provided invaluable advice and guidance during the first full year of CSaP's research programme. Chaired by Professor James Wilsdon, the Board operates informally to support Dr Robert Doubleday in his role as head of the programme.



**Professor James Wilsdon (Chair)** Professor of Science and Democracy at SPRU, University of Sussex



**Professor Sir Tom Blundell** Director of Research and Professor Emeritus in the Department of Biochemistry, University of Cambridge



**Professor Sheila Jasanoff** Pforzheimer Professor of Science and Technology Studies, Harvard Kennedy School



**Professor Frank Kelly CBE** Professor of the Mathematics of Systems, University of Cambridge, and Master of Christ's College



**Professor Brian Collins CB** Professor of Engineering Policy at UCL and former CSA at BIS and DfT



**Professor Susan Owens OBE** Professor of Environment and Policy, University of Cambridge



**Dr Claire Craig** Deputy Head, Government Office for Science (GO-Science)



**Professor Martin Daunton** Master of Trinity Hall, and Professor of Economic History, University of Cambridge



**Professor Andrew Gamble** Professor of Politics, University of Cambridge



**Professor William Sutherland** Miriam Rothschild Professor in Conservation Biology, University of Cambridge



**Professor Johannes Vogel** Director General, Museum für Naturkunde, Berlin, and Professor of Biodiversity at Humboldt University



**Professor Sir Mark Welland** Head of the Nanoscience Centre, Department of Engineering, University of Cambridge, and former CSA at MoD

# **Events Programme**

The events that CSaP organises, promotes or otherwise supports cover a very wide range of themes and styles – from Policy Workshops in which small teams of researchers and policy makers explore the most challenging problems at the intersection of science and government, up to full-scale conferences at which members of the network meet in public forum. Our events involved more than 1250 participants in the course of the year.



#### **CSaP Annual Conference**

2012 saw the launch of the CSaP Annual Conference Series. The first conference, on 8 March, focussed on risk and uncertainty, with sessions considering the precautionary principle and resilience in complex systems. The keynote address was given by the UK Government's Chief Scientific Adviser, Sir John Beddington, who presented the conclusions of the Blackett Review on high-impact low-probability events (in between visits to the BBC to reassure the nation about the risk of solar storms, which were at a peak level of activity on that day).

#### **Policy Workshops**

Other highlights of the year included a Policy Workshop for the Heseltine Review Team. A core group of officials from across Whitehall, assembled by Lord Heseltine to draw up a comprehensive economic plan to improve the UK's ability to create wealth, came to Cambridge for a workshop with researchers from many disciplines relevant to innovation, growth and competitiveness. As a follow-up, CSaP Special Adviser Philip Guildford facilitated a further workshop exploring how systems thinking could help put the jigsaw of ideas together into a coherent whole, and mapping out a new structure for delivering growth.

The Centre also ran Policy Workshops on how the concept of ecosystem services could be made more politically tractable, and on understanding the exposure of national infrastructure to cyber attack. In addition, a consultation seminar for a small group of policy makers and researchers, led by Downing Street Policy Adviser Rohan Silva, discussed the practical realities of bringing the implications of research to the attention of policy makers.



#### **Lecture Series**

Over 900 people attended the lectures which CSaP supported this year. Speakers included Jaan Tallinn, co-founder of Skype; Mark Henderson, Head of Communications at The Wellcome Trust and former science editor of *The Times* (whose lecture in Cambridge was repeated in the Cabinet Office); and Dominique Ristori, DG of the EC's Joint Research Centre. The Cambridge Public Policy (CPP) lecture series, supported by CSaP, featured the Rt Hon lain Duncan Smith, Secretary of State for Work and Pensions; Lord Young of Graffham, Enterprise Adviser to the UK Prime Minister; and Lord O'Donnell, former Cabinet Secretary.

#### **Events Programme in 2013**

Looking forward, the theme of the 2013 Annual Conference will be future directions for scientific advice in Whitehall. Leading speakers from government and academia will explore the changing role of the analytical professions, the ways in which government can make better use of external academic expertise, and the nature of evidence in more open policy making.

Keynote speakers will include CSaP Associate Fellow Sir Bob Kerslake (Head of the Home Civil Service) and Sir Mark Walport (incoming Government Chief Scientific Adviser). The parallel "case study" seminars which will form the core of the event will be led by Policy Fellows, making use of the practical experience of working with academia which they have gained through the Centre. Running up to the 2013 conference, CSaP is working with collaborators (the Institute for Government, the Alliance for Useful Evidence, SPRU and the ESRC STEPS Centre at Sussex University, and Sciencewise-ERC) on a series of four seminars looking at ways in which government can make more effective use of scientists and scientific advice in the context of Civil Service Reform.

Speakers in the 2013 CSaP and CPP lecture series will include two cross-benchers from the House of Lords, Lord Turner and Baroness Neuberger; past and future Government Chief Scientific Advisers, Sir David King and Sir Mark Walport; and Professor Cass Sunstein of Harvard Law School, former Administrator of the White House Office of Information and Regulatory Affairs.

The Centre would like to record its gratitude to all the sponsors and partners who supported this year's events programme, including Defra, Natural England, the Cabinet Office, Willis Research Network, Lloyd's of London, the Institution of Engineering and Technology, the Royal Academy of Engineering, Transworld Publishers, the Institute for Government, the Alliance for Useful Evidence, SPRU and the ESRC STEPS Centre at Sussex University, Involve, Sciencewise-ERC, and the Centre for Diet and Activity Research (CEDAR).

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A fantastic opportunity to interact directly with the policy makers who are grappling with the issues ...

Jon Crowcroft • Associate Fellow

#### Marconi Professor of Networked Systems, University of Cambridge

As a Professor in the Faculty of Computer Science, many of the things I work on – both in research and education – potentially entail important policy considerations. CSaP's programmes, particularly the Policy Fellowships and the Policy Workshops, provide a fantastic opportunity to interact directly with the policy makers who are grappling with the relevant issues in government and industry.

Over the past two years, I have met more than fifteen Policy Fellows, who have raised a wide range of questions – from "what technological changes will shape the development of the internet over the next five to ten years?" to "what do we know about the social connectivity of older people, and how does it vary across the population?" via "how can governments best exploit citizen-generated data and 'big data' analysis?". The questions are always unique, though there are consistent themes around innovation, resilience and cybersecurity. The flow of value from these discussions falls readily into one of two typical patterns. On the one hand, it's often the case that some piece of technology which we are researching could have an impact on policy – for example, free broadband for all, or more usable information systems, could both have a high societal value, and could reduce the cost of delivery of health, education and other government services. On the other hand, understanding the threats to national services and infrastructures can inform the requirements on the resilience of computing systems for the future.

Thus the impact of the discussions with policy makers can be felt either in a change in the direction of policy, or a change in the emphasis in our own research. Both results are pleasing, in that they make my work more relevant and act as feedback that means that the funding agencies get better value for money.

This is the second year that I have been extremely happy with the experience of working with the Centre for Science and Policy and its network, and I look forward to continuing this in 2013.

# **Associate Fellows**

The Centre is fortunate to benefit from the guidance of its Associate Fellows – a title which recognises the role of a few distinguished members of our network who have made a significant contribution to the relationship between research and policy and to CSaP's objectives and development.



**Professor Carol Brayne** Director, Institute of Public Health, University of Cambridge



**Professor Brian Collins CB** Professor of Engineering Policy at UCL and former CSA at BIS and DfT



**Dr Claire Craig** Deputy Head, Government Office for Science (GO-Science)



**Professor Jon Crowcroft** Marconi Professor of Communications Systems, University of Cambridge



**Professor Andrew Gamble** Professor of Politics, University of Cambridge



**Mr David Howarth** MPP Course Director and Reader in Law, University of Cambridge



Sir Bob Kerslake Head of the UK Home Civil Service and Permanent Secretary, CLG



**Professor David MacKay** CSA at DECC, and Professor of Natural Philosophy, University of Cambridge



**Professor Theresa Marteau** Director of Behaviour and Health Research Unit, University of Cambridge



**Professor Ben Martin** Professor of Science and Technology Policy Studies, SPRU, University of Sussex



**Professor Susan Owens OBE** Professor of Environment and Policy, University of Cambridge



**Dr Miles Parker OBE** Deputy CSA at the Department for Environment, Food and Rural Affairs



**Professor Jaideep Prabhu** Director of the Centre for India & Global Business, University of Cambridge



**Dr Graeme Reid** Head of Research Funding, Department for Business, Innovation and Skills



**Dr Emily Shuckburgh** Head of Open Oceans, British Antarctic Survey



**Professor David Spiegelhalter OBE** Winton Professor of the Public Understanding of Risk, University of Cambridge



**Professor William Sutherland** Miriam Rothschild Professor in Conservation Biology, University of Cambridge



**Professor James Wilsdon** Professor of Science and Democracy at SPRU, University of Sussex

# **Executive Committee**

The work of the Centre for Science and Policy is guided by an Executive Committee comprising a range of eminent Cambridge academics and senior representatives of the University from all scientific disciplines, together with the Founding Director. As at the end of 2012 its members are:



**Professor Ian White (Chair)** Van Eck Professor of Engineering, Department of Engineering, University of Cambridge, and Master of Jesus College



**Dr Jennifer Barnes** Pro-Vice-Chancellor for International Strategy, University of Cambridge, and President of Murray Edwards College



**Professor Frank Kelly CBE** Professor of the Mathematics of Systems, University of Cambridge, and Master of Christ's College



**Professor Christoph Loch** Director, Judge Business School, University of Cambridge



**Dr David Cleevely CBE** Founding Director, Centre for Science and Policy, University of Cambridge



**Professor Steve O'Rahilly** Head of Department and Professor of Clinical Biochemistry and Medicine, Department of Clinical Biochemistry, University of Cambridge



**Professor Lord Eatwell** Director of the Centre for Financial Analysis and Policy (CFAP), University of Cambridge, and President of Queens' College



**Professor Lynn Gladden CBE** Pro-Vice-Chancellor for Research and Shell Professor of Chemical Engineering, University of Cambridge



**Professor Alan Hughes** Margaret Thatcher Professor of Enterprise Studies, and Director of the Centre for Business Research, University of Cambridge



**Professor Lord Rees OM** Astronomer Royal, Past President of the Royal Society, and former Master of Trinity College



**Professor Sir David Wallace CBE** former Director of the Isaac Newton Institute for Mathematical Studies, University of Cambridge, and Master of Churchill College

The Directors of CSaP are also grateful for all the advice and guidance provided from the outset of the Centre by Professor Sir Tom Blundell, who stepped down from the Committee this year.

# **Centre for Science and Policy Team**

The Centre's programmes, projects and network are supported by a small team based in Cambridge, which brings together all the necessary skills and expertise in event management, marketing, programme development, fundraising, networking and research.



*Front row*, from left: **Linden Smith** (Head of Development) is in charge of building a sustainable base for the Centre's fundraising and future development; **Jackie Ouchikh** (Head of Programmes) designs and delivers events and runs the Professional Development Workshop initiative; **David Cleevely CBE** (Founding Director); **Rob Doubleday** (Executive Director); **Ricarda Kather** (BBSRC Policy Placement PhD Student) supports the Policy Fellowship Programme and CSaP events; **Tristram Riley-Smith** (Visiting Fellow) is researching and trialling ways to improve engagement between National Security stakeholders and academia. *Back row*, from left: **Philip Guildford** (Director of Research, Department of Engineering) is a Special Adviser to the Centre; **Nick Gray** (Associate Adviser) provides consulting support for the Policy Fellowships Programme; **Henry Rex** (Policy Assistant) supports CSaP's and CPP's events programmes and administrative activities.



CSaP works closely with **Miranda Gomperts** (Head of Programme Development, Cambridge Public Policy) who is responsible for fundraising, supporting the MPP and building the Cambridge Public Policy framework.

# Financial Report – Year to 31 July 2012

The Centre for Science and Policy is grateful for the support of its principal funders, particularly the David Harding Foundation, the Isaac Newton Trust and the University of Cambridge. Without their generous support, none of our achievements during 2012 would have been possible.

As the table below shows, during Financial Year 2011/12 (to 31 July), the Centre received £488k of income from all sources for its core activities in engagement and the delivery of events. The Centre's total expenditure was £479k in the same period. The Centre has carried forward a balance of £687k into FY 2012/13, an increase of £9k on the balance at the start of 2011/12.

In addition, the Centre's research activities attracted over £100k of grant income, the majority of which is accounted for elsewhere in the University.

The continuing impact of our activities has underlined once more that there is a significant unfilled need for building relationships between researchers and policy makers. In order to sustain our activities in the longer term, we are actively seeking other sources of funding – from Trusts, Research Councils, the European Union, private philanthropy and other sources. In 2012 we appointed a Head of Development to establish a sustainable base for our fundraising work, and we are in the process of establishing a 2013 Development Board to be chaired by Lord Oxburgh.

	FY 2010/2011	FY 2011/2012	Breakdown of 18.0%
Total Income, including donations and interest	£426k	£488k	Expenditure (2011/12)
Expenditure	£400k	£479k	Policy Fellowships
Net Income	£26k	£9k	Policy Workshops Distinguished Lectures Networking events
Total Funds brought forward as at 1 Aug	£652k	£678k	Professional Development     Research
Total Funds carried forward as at 31 Jul	£678k	£687k	<ul> <li>Fundraising</li> <li>Management and administration</li> <li>CRM and communications</li> </ul>

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The new technologies which are transforming our society and economy are essentially mathematical, raising complex questions that policy makers urgently need to address.

CSaP is playing a vital role in connecting the policy world with those who can help formulate those questions and point to solutions.

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Professor Frank Kelly CBE, Professor of the Mathematics of Systems, University of Cambridge

# A Note of Thanks

The creation of CSaP and its on-going operations would not have been possible without the support of the David Harding Foundation, the Isaac Newton Trust and the University of Cambridge. CSaP would also like to record its gratitude to all the members of the University and others who have given their time this year to support our programmes and events and to meet visiting Policy Fellows, including:

Prof Chris Abell (Dept of Chemistry); Dr Maria Abreu (Dept of Land Economy); Stephen Aldridge (Dept for Communities and Local Government); Dr Anne Alexander (CRASSH); Dr Anna Alexandrova (Dept of History and Philosophy of Science); Dr Linda Allan (Dept of Chemical Engineering and Biotechnology); Prof Phil Allmendinger (Dept of Land Economy); Dr Julian Allwood (Dept of Engineering); Dr Abir Al-Tabbaa (Dept of Engineering); Dr Jenny Amery (Dept for International Development); Prof Ash Amin (Dept of Geography); Prof Ross Anderson (Computer Laboratory); Prof Christopher Andrew (Faculty of History); Francesco Anesi (POLIS); Dr Annela Anger-Kraavi (4CMR); Gini Arnold (World Health Organisation); Jerry Arnott (Civil Service Learning); Stuart Arnott (Mindings); Dr Michael Arnott (Cambridge Enterprise); Dr Michelle Baddelev (Faculty of Economics); Prof Shankar Balasubramanian (Dept of Chemistry); Prof Andrew Balmford (Dept of Zoology); Richard Banks (DECC); Dr Tarak Barkawi (formerly POLIS); Dr Claire Barlow (Dept of Engineering); Dr Jennifer Barnes (International Strategy Office); Dr Alistair Baron (University of Lancaster); Rob Barrett (Royal Academy of Engineering): Prof Michael Barrett (Judge Business School): Dr Matt Bassford (RAND Europe); Dr John Battersby (Institute for Public Health); Prof Sir David Baulcombe (Dept of Plant Sciences); Pilgrim Beart (AlertMe.com); Adam Beautement (University College London); Sir John Beddington (GO-Science); Adrian Beecroft (Dawn Capital); Dr Jim Bellingham (School of the Physical Sciences); Sir Brian Bender (formerly BIS); Prof Lionel Bently (Faculty of Law); Dr Alastair Beresford (Computer Laboratory); Jennifer Betts (Queen's University Belfast); Xinya Bian (Dept of Engineering); Prof Michael Bickle (Dept of Earth Sciences); Stephen Bird (Dept of Geography); John Bird (The Big Issue); Prof Christopher Bishop (Microsoft Research Cambridge); Dr Mike Bithell (Dept of Geography); Dr Jason Blackstock (University of Oxford); Dr Alan Blackwell (Computer Laboratory); Dr Robert Bloomfield (Natural History Museum); Prof Sir Tom Blundell (Dept of Biochemistry); Dr Barbara Bodenhorn (Dept of Social Anthropology); Dr Helen Bodmer (BIS); Dr Adam Boies (Dept of Engineering); Prof Sir Leszek Borysiewicz (Vice-Chancellor); Dave Bosworth (Dept of Materials Science & Metallurgy); Nathan Boublil (French Foreign Trade Advisors); Charles Boulton (Dept of Engineering); Briony Bowe (DECC); Dr Gary Bowman (Centre for Risk Studies); Dr Billy Boyle (Owlstone Nanotech); Laure Brévignon Dodin (Institute for Management); Dr Michael Bravo (Dept of Geography); Prof Carol Brayne (Institute for Public Health); Jonathan Breckon (NESTA); Samir Brikho (AMEC); Lord Alec Broers (House of Lords); Julie Brown (Judge Business School): Prof Willy Brown (Faculty of Economics): Dr Clare Bryant (Dept of Veterinary Medicine); Nicola Buckley (Office of External Affairs & Communications); Simon Burall (Involve); Dr Brendan Burchell (Dept of Sociology); Peter Burge (RAND Europe); Patrick Burgess (Capital Shopping Centres Group); Dr Gemma Burgess (Dept of Land Economy); Dr Hilary Burton (PHG Foundation); Creon Butler (HM Treasury); Michael Cahn (Cambridge Cycling Campaign); Prof Muffy Calder (Scottish Government); Mark Cantley (formerly European Commission): Prof David Cardwell (Dept of Engineering): Dr Seppe Cassettari (GeoInformation Group); Noelle Caulfield (Churchill College); Dr Jonathan Cave (RAND Europe); Dr Richard Cawley (European Commission); Prof David Cebon (Dept of Engineering); Prof Andrew Challinor (University of Leeds); Paul Chamberlain (Dept for Communities and Local Government): Lucy Chambers (Open Knowledge Foundation): Dr Deeph Chana (Imperial College): Prof Howard Chase (School of Technology); Prof Jo Chataway (RAND Europe); Prof Daping Chu (Dept of Engineering); Dr Colin Church (Defra); Dr Alex Churchill (Ministry of Defence); Dr Chi-Kong Chyong (Judge Business School); Martin Clark (Allia); Dr Mike Clark (Dept of Pathology);

Prof John Clarkson (Dept of Engineering); Dr Richard Clayton (Computer Laboratory); Sarah Clover (AmeyCespa); Dr Andrew Coburn (Centre for Risk Studies); Dr Claire Cockcroft (Babraham Institute); Prof Brian Collins (University College London); Charles Collis (Dyson); Ivan Collister (formerly Number 10 Policy Unit); Annalijn Conklin (MRC Epidemiology Unit); Dr David Connell (Centre for Business Research); Prof Paul Cornish (University of Bath); Dr Andy Cosh (Centre for Business Research); Lucia Costanzo (BIS); David Cotterill (Cabinet Office); James Cotton (OneSpaceMedia); Charles Cotton (Cambridge Phenomenon); Dr Tom Counsell (DECC); Polly Courtice (CPSL); Sherry Coutu (Cambridge Angels); Howard Covington (Science Museum); Dr Claire Craig (GO-Science): Prof Tim Crane (Faculty of Philosophy); Nicholas Crawford (Wilberforce Society); Dr Douglas Crawford-Brown (4CMR); Dr Hilary Cremin (Faculty of Education); Dr Nathan Crilly (Dept of Engineering); Prof Jon Crowcroft (Computer Laboratory); Dr Elizabeth Curmi (Dept of Engineering); Vanessa Cuthill (ESRC); Dr Joanna Dally (GO-Science); Prof John Danesh (Dept of Public Health & Primary Care); George Danezis (Microsoft Research Cambridge): Prof Martin Daunton (Faculty of History): Frank Davies (Child Poverty Unit); Paul Davies (Institution of Engineering and Technology); Stephen Davison (Office of External Affairs & Communications); Prof Dame Sandra Dawson (Judge Business School); Natalie Day (Oxford Martin School); Dr Mark De Rond (Judge Business School); Prof Simon Deakin (Judge Business School); Sir Richard Dearlove (Pembroke College); Dr Lucy Delap (Faculty of History); Dr Joanna Depledge (POLIS); Nicole Dewandre (European Commission); Jenny Dibden (Dept for Work and Pensions); Brendan Dick (BT); Dr Lynn Dicks (Dept of Zoology); Prof Adrian Dixon (Peterhouse); Dr Anne Dobrée (Cambridge Enterprise); John Dodds (BIS); Prof Dame Athene Donald (Dept of Physics); Dr Amy Donovan (Dept of Geography); Rowan Douglas (Willis Research Network); Prof Dame Ann Dowling (Dept of Engineering); Dr Lynnette Dray (Dept of Architecture); Dr Louise Driffill (CPSL); Hilary Duke (Churchill College); Sandie Dunne (formerly Local Government Association); Dr John Durrell (Dept of Engineering); Michael Eaton (Welsh Government); Prof Lord John Eatwell (Judge Business School); Prof Marcial Echenique (Dept of Architecture); Mike Edbury (GO-Science); Dr Geoffrey Edwards (POLIS); Robin Eggar (Winton Capital Management); Elaine Eggington (IP Pragmatics); Dr Bruno Ehrler (Cavendish Laboratory); Dr Miles Elsden (Dept for Transport); Mike Emmerich (New Economy); David Evans (Technology Strategy Board); Michael Evans (Green-Tide Turbines); Dr Stephen Evans (Institute for Manufacturing); Prof James Fawcett (Cambridge Centre for Brain Repair): Dr William Fawcett (Cambridge Architectural Research); Dr Wai Yi Feng (Faculty of Education); Prof Andrea Ferrari (Dept of Engineering); Prof William Fitzgerald (Dept of Engineering); Dr Ivan Flechais (University of Oxford); Chris Fleming (GO-Science); Prof Paul Fletcher (Dept of Psychiatry); Dr Andrew Flewitt (Dept of Engineering); Dr Julian Flowers (Institute for Public Health); Dr Chris Floyd (formerly Rolls Royce); Dr Simon Ford (Institute for Manufacturing): Prof John Forrester (Dept of History and Philosophy of Science): Fiona Fox (Science Media Centre); Oliver Francis (Centre for Diet and Activity Research); Prof Robin Franklin (Dept of Veterinary Medicine); Prof Sir Richard Friend (Dept of Physics); Rory Gallagher (Cabinet Office); Dr Edoardo Gallo (Faculty of Economics); Prof Andrew Gamble (POLIS): Chris Ganie (BP): Alberto Garcia-Mogollón (CUSPE): Dr Simon Gardner (Environment Agency): Dr Toby Gardner (Dept of Zoology): Martin Garratt (Cambridge CleanTech); Prof Loraine Gelsthorpe (Institute of Criminology); Maria-Christina Georgiadou (Dept of Engineering); Dr Jenny Gibson (Dept of Psychiatry); Debbie Gillatt (BIS); Prof Chris Gilligan (Dept of Plant Sciences);

Prof Lynn Gladden (Research Strategy Office); Prof Robert Glen (Dept of Chemistry); Adam Glinsman (AMG Capital Advisers); Dr Dervila Glynn (Cambridge Neuroscience); Prof Simon Godsill (Dept of Engineering); Prof Simon Goldhill (CRASSH); Prof Michael Goldsmith (University of Oxford); Prof Susan Golombok (Centre for Family Research); Dr Miranda Gomperts (Cambridge Public Policy); Dr David Good (School of Biological Sciences); Dr Dougal Goodman (Foundation for Science and Technology); Amy Goymour (Faculty of Law); Dr Jonathan Grant (RAND Europe); Eileen Green (Pembroke College); Prof Sir Mike Gregory (Institute for Manufacturing); Prof Clare Grey (Dept of Chemistry); Ross Gribbin (DECC); Prof George Griffin (St George's University of London); Dr Simon Griffin (MRC Epidemiology Unit); Prof Emily Grundy (Dept of Geography); Dr Graham Gudgin (Centre for Business Research): Philip Guildford (Dept of Engineering): Tim Guilliams (CUSPE); Prof Peter Guthrie (Dept of Engineering); Dr Allègre Hadida (Judge Business School); Dr Alex Hagen-Zanker (Dept of Architecture); Dave Hall (OneSpaceMedia); Prof Lisa Hall (Dept of Chemical Engineering and Biotechnology); Dr Cesare Hall (Dept of Engineering); Dr David Halpern (Cabinet Office); Simon Hampton (Google): Aoife Haney (Judge Business School): Prof Chris Hankin (Imperial College London); David Harding (Winton Capital Management); Dr Tony Hargreaves (Dept of Architecture); Dr Rob Harle (Computer Laboratory); Richard Harries (Dept for Communities and Local Government); Mitchell Harris (Ministry of Defence); Dr Neil Harris (Dept of Chemistry): David Hart (British Airways): Dr Jim Haseloff (Dept of Plant Sciences): Prof Jonathan Haslam (POLIS): Dr Helen Haugh (Judge Business School): Dr Hermann Hauser (Amadeus Capital Partners); Patrick Hawke-Smith (Development Office); Dr Robert Hayes (Microsoft Institute for Advanced Technology in Governments); Dr Laura Haynes (Cabinet Office); Lorraine Headen (Development Office); Prof Sir Brian Heap (European Academies Science Advisory Council); Dr Adam Heathfield (Pfizer); Barry Hedley (Judge Business School): Simon Heffer (journalist and broadcaster): Mark Henderson (Wellcome Trust); Kathryn Hesketh (Centre for Diet and Activity Research); Sir Jeremy Heywood (Cabinet Office); Prof Simone Hochgreb (Dept of Engineering); Prof Ian Hodge (Dept of Land Economy); Bill Hodson (Frazer-Nash Consultancy); Dr Suzanne Hoelgaard (Dept of Social Anthropology): Michael Hoffman (Palamon Capital Partners); Elizabeth Hogben (GO-Science); Dr Philipp Holliger (MRC Laboratory of Molecular Biology); Dr Chris Hope (Judge Business School); Prof Andy Hopper (Computer Laboratory); the late Prof Sir Gabriel Horn (King's College); Dr Ian Hosking (Engineering Design Centre); David Howard (Lothbury UK); David Howarth (POLIS); Dr Candice Howarth (Global Sustainability Institute); Dr Sally Howes (National Audit Office); Dr Tim Hubbard (Wellcome Trust Sanger Institute); Revd Dr John Hughes (Jesus College); Prof Alan Hughes (Centre for Business Research); Dr Rex Hughes (Wolfson College); Prof Mike Hulme (University of East Anglia); Prof Dame Caroline Humphrey (Mongolia and Inner Asia Studies Unit); Dr David Humphreys (Centre for Diet and Activity Research); Prof Felicia Huppert (Wellbeing Institute); Dr Julian Huppert (House of Commons): Dr Stephanie Hurst (Dept for Communities and Local Government): Dr Shamus Husheer (Cambridge Temperature Concepts); Ilian Iliev (Cambridge IP); Prof Christos Ioannidis (University of Bath); Dame Sue Ion (Royal Academy of Engineering); Dr Richard Irvine (Dept of Social Anthropology); Dr Agnieszka Iwasiewicz-Wabnig (NanoDTC): Adam Jackson (HM Treasury): Prof James Jackson (Dept of Earth Sciences): Dr Laura James (Makespace); Shirley Jamieson (Cambridge Enterprise); Dr William Janeway (Cambridge Endowment for Research in Finance); Prof Sheila Jasanoff (Harvard Kennedy School); Dr Susan Jebb (MRC Centre for Human Nutrition Research); Prof Paul Jeffervs (University of Oxford): Prof Nick Jennings (Centre for the Protection of National Infrastructure); Dr Houyuan Jiang (Judge Business School); Dr Ying Jin (Dept of Architecture); Dr Marina Jirotka (University of Oxford); Dr George Joffé (POLIS); Dr Stephen John (Department of History and Philosophy of Science); Tim Johnson (World Conservation Monitoring Centre); Prof Edward Johnson (Wolfson College); Prof Adam Joinson (University of the West of England); Stephen Jolly (Office of External Affairs & Communications): Dr Aled Jones (Anglia Ruskin University): Dr Llvr Jones (BAE Systems): Prof Rod Jones (Dept of Chemistry); Tim Jones (Allia); Gary Kass (Natural England); Dr Paul Kattuman (Judge Business School); Maia Kavanagh Williamson (formerly Centre for Science and Policy); Peter Kellner (YouGov); Prof Frank Kelly (Statistical Laboratory); Prof Michael Kelly (Dept of Engineering): Karen Kennedy (Wellcome Trust Sanger Institute): Dr Clive Kerr (Institute for Manufacturing): Susannah Kerr (Office of Julian Huppert MP): Sir Bob Kerslake (Cabinet Office); Halima Khan (NESTA); Mark Khater (Institute for Manufacturing); Prof Kay-Tee Khaw (School of Clinical Medicine); Dan Kim (POLIS);

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#### **Picture Credits**

CSaP is very grateful to the University's Department of Engineering for permission to use its photographic images in this report, as follows: *Front Cover, Inside Front Cover & Inside Back Cover*. Tim Butler ('Nanoscale antenna array radiation pattern simulation' – detail from a MATLAB simulation of the radiation pattern from a square array of carbon nanotubes when illuminated from above by a laser). *Page 29*: Harry Coles ('Presentation of blue phases' – a blue phase lagoon).

# **Public Policy at Cambridge**

#### Cambridge Public Policy

Together with the Department of Politics and International Studies (POLIS), CSaP has played a critical role in the development of a broader initiative at the University of Cambridge, Cambridge Public Policy (CPP), the aim of which is to coordinate, promote and support all public policy research and training across the University, with a view to launching a School of Public Policy in the years to come. In October 2013 CPP will launch the new Master's in Public Policy, providing rigorous training in the development of evidence-based policy, with a strong emphasis on the impact of science and technology on all areas of government.

www.cpp.csap.cam.ac.uk



Cambridge University Science and Policy Exchange (CUSPE) is a student-run society founded in 2012 by PhD students and post docs with the support of CSaP. CUSPE's mission is to build stronger links between early-career researchers at Cambridge and government policy officials, both within the UK and the European Union. The society strives to support young researchers who want to influence policy from an innovative research perspective as well as those who wish to pursue careers in government.

www.cuspe.org





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