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Office

BIS

Department for
Business Innovation
and Skills

Science & Innovation Network Report

April 2008 to March 2010

Part I: Overview

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Foreword



Science and technology are major drivers of productivity and economic growth. They are essential to understanding and tackling the most serious challenges of our time, whether healthcare, food security or climate change.

The UK punches above its weight in many areas of science. We produce eight per cent of the world's scientific publications and attract a higher share of research and development from overseas than any other country in the G8.

The UK Government recognises, however, the importance of contributing to – and drawing upon – the best global scientific thinking: for our researchers, business leaders and policy makers. The Science and Innovation Network, based in our Embassies, High Commissions and Consulates across the world, leads this agenda. Together with UK Trade & Investment, the British Council and the Research Councils, it works with international partners in sectors ranging from education to finance.

This report highlights the varied activities of the Network – its value in both keeping the UK at the cutting edge of science and in stimulating strong, sustainable growth.

A handwritten signature in black ink that reads "David Willetts".

David Willetts MP

Minister of State for Universities and Science, Department for Business, Innovation & Skills

A handwritten signature in blue ink that reads "Henry Bellingham".

Henry Bellingham MP

Parliamentary Under-Secretary of State, Foreign & Commonwealth Office

Introduction

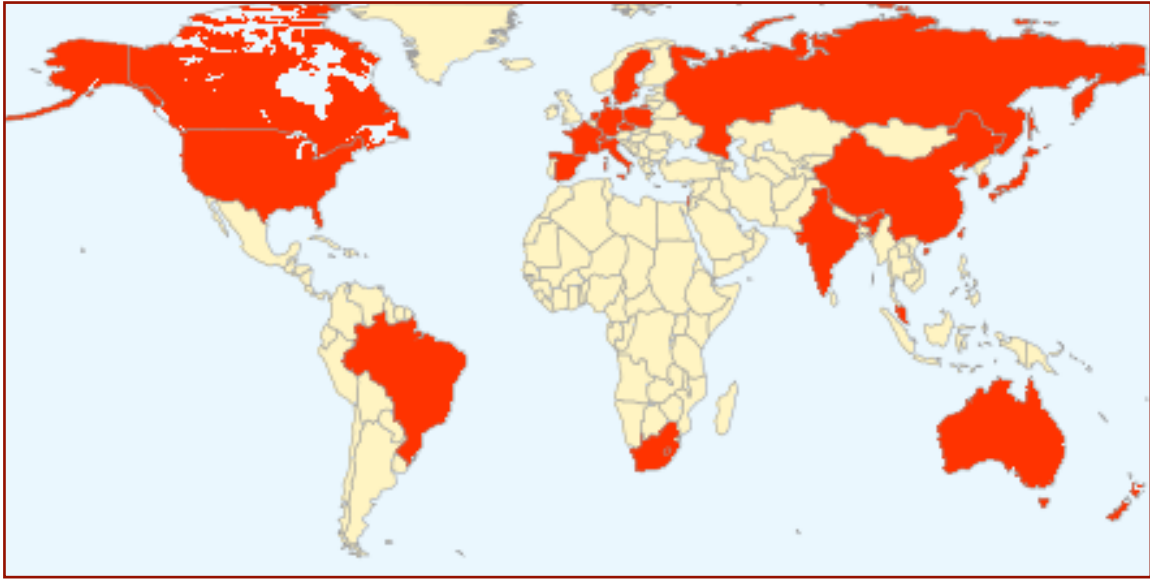


Figure 1: The Science & Innovation Network of around 90 staff in 25 countries and territories is based in 40 British Embassies, High Commissions and Consulates.

About this Report

This report highlights some of the achievements of the UK's global Science and Innovation Network (SIN) over a two-year period. Part I gives an overview with examples from around the network. Part II has country and regional profiles from places where the network is active, with many examples of successful outcomes.

Science and Innovation Matter to the UK

Strong science and innovation policies must be at the heart of any sustainable UK strategy for economic recovery. To be a global hub for business the UK needs also to be networked with the best science and technology. Global challenges such as climate change require the ability to engage other governments with sound science and find more innovative solutions internationally. International collaboration is fundamental to our endeavours in these areas. For these

reasons, the Department for Business, Innovation and Skills (BIS) and the Foreign & Commonwealth Office (FCO) jointly fund a network of Science and Innovation Officers overseas.

The Science & Innovation Network is a key delivery mechanism for strengthening the UK's capacity in this area through international collaboration.

"The UK's Science and Innovation Network (SIN)...demonstrates the value that can be created through interactions between science and diplomacy, particularly in targeted areas such as low-carbon technologies. Networking and Focal Point schemes with India, China, South Africa and South Korea have brokered long-term collaborations for UK science. We recommend that the geographic reach of SIN should now be extended, particularly across the Middle East, Africa and South America."

¹

¹ The Royal Society. (2010). *The Scientific Century: securing our future prosperity*.

Based in Embassies, High Commissions and Consulates around the world, our Science and Innovation Officers understand both the UK and the local science and innovation landscapes. This combination of knowledge and access means the network is uniquely placed to identify and deliver on opportunities, influence key players in country and bring insight to UK decision makers. It promotes strategic partnerships between the UK and international science and innovation communities to enhance business, research and policy interests and investments.

The work of the network is guided by the following objectives:

Influence

- Science and innovation **policies** of governments, businesses and academia **influenced** to benefit the UK through lobbying and deployment of robust scientific evidence.
- **UK policy development informed** through identifying good practice internationally.

Opportunity

- International **science collaboration** of best with best **facilitated** to the benefit of the UK.
- International **innovation collaboration facilitated** to augment UK capabilities.

Science & Innovation Network Staffing



Figure 2: Number of positions in the Science & Innovation Network. Some positions are part-time.

In addition to using diplomacy to benefit UK science, science can be used to benefit diplomacy, sometimes giving common ground for engagement even when international relationships may stall in other areas.



Figure 3: Prof James McCarthy, President American Association for the Advancement of Science, Brian Ferrar, Head of US SIN and Dr Michael Dixon, Director Natural History Museum, celebrating the bicentenary of Charles Darwin. Darwin's grandson was the UK's first science attaché at the British Embassy in Washington.

Business planning for the network is intended to support the priorities of both BIS and the FCO. Its priorities are informed by:

- [The Global Science and Innovation Forum \(GSIF\)](#)
- [The Technology Strategy Board](#)
- [The Research Councils UK](#)

In this way, the Science & Innovation Network remains responsive to the prevailing needs of the UK.

Working with Partners



The distinct role of the Science & Innovation Network complements the work of other key partners such as UK Trade & Investment (UKTI), The British Council, Research Councils UK (RCUK) and the Department for International Development (DFID). These and other partners are central to the setting of priorities. They are consulted and included in the development of business plans. The S&I Network SIN teams are often co-located with main partners and in some cases have dual roles, for example, dividing their time between SIN and UKTI priorities. An example of this close collaboration with partners was the US SIN team working closely with UKTI on a Trade mission to the UK that resulted in four US companies establishing a UK presence on the Harwell Science and Innovation Campus.

The Science & Innovation Network works closely with Research Councils worldwide. In Japan, for example, the Japan Science and Technology Agency has co-funded joint research programmes with the Biotechnology and Biological Sciences Research Council (BBSRC) in the field of bionanotechnology (2004), extended to structural genomics and proteomics in 2005 and systems biology in 2008. Following a high level SIN workshop, a second agreement was secured with the Engineering and Physical Sciences Research Council (EPSRC)

in 2008 to create a new programme on advanced electronic materials, including spintronics, organic electronics and oxide electronics. In addition to co-funding worth an estimated £500K per year, these programmes have delivered access to cutting edge research facilities in Japan, in some cases leading to significant additional research funding for the UK. The Research Councils and the SIN team in Japan have supported numerous workshops and senior visits in these areas over the years in order to secure best-with-best partnerships and continued Japanese government support, including new Memoranda of Understanding (MoUs) signed in 2008 and 2009.

The Science & Innovation Network seeks to foster strategic partnerships across government. This is exemplified through its work with the UK Government Office for Science in particular, in promoting the international dissemination and impact of the Foresight Programme's major reports. This has led to the development of valuable opportunities to showcase UK scientific excellence. It has also helped forge productive international research and policy links that focus, for example, on the long-term sustainable management of flood risk and public health.

*"It is... clear that the network has successfully leveraged new funding from foreign sources that comfortably exceeds the relatively modest sums spent by the Government on the network... and it may be inferred that this has benefited the UK research base."*²

² Department for Business, Innovation and Skills. (2009). *Review of the Science & Innovation Network*.

Working for Britain

The Science & Innovation Network supports Britain, providing conduits between Parliament, policy makers, business and academia in the UK and their counterparts overseas.

Whether facilitating the visit of a Select Committee to look at the development and use of engineering skills in Japanese academia or collaborating with China on developing and applying research to combat infectious disease, the SIN is a vital piece in the jigsaw for promoting UK science internationally.



Figure 4: SIN China has been fully involved in the Shanghai Expo 2010, holding events in the UK Pavilion (pictured) including EU Member State Partnering and Science Bridges. 10 million visitors will visit the UK pavilion and 100 million Chinese have already engaged with the UK's social and digital Expo media presence. 81% came away with a positively changed attitude to the UK.

Measuring Success

Assessment of progress against the SIN objectives is monitored on a quarterly basis through a range of measures ("SIN metrics"), collated in a quarterly report. Findings from these reports are used to assess and

inform the work of the network.
Progress against less quantitative
outcomes is monitored against
agreed business plans.

Encouraging International Research Collaboration

Encouraging International Research Collaboration

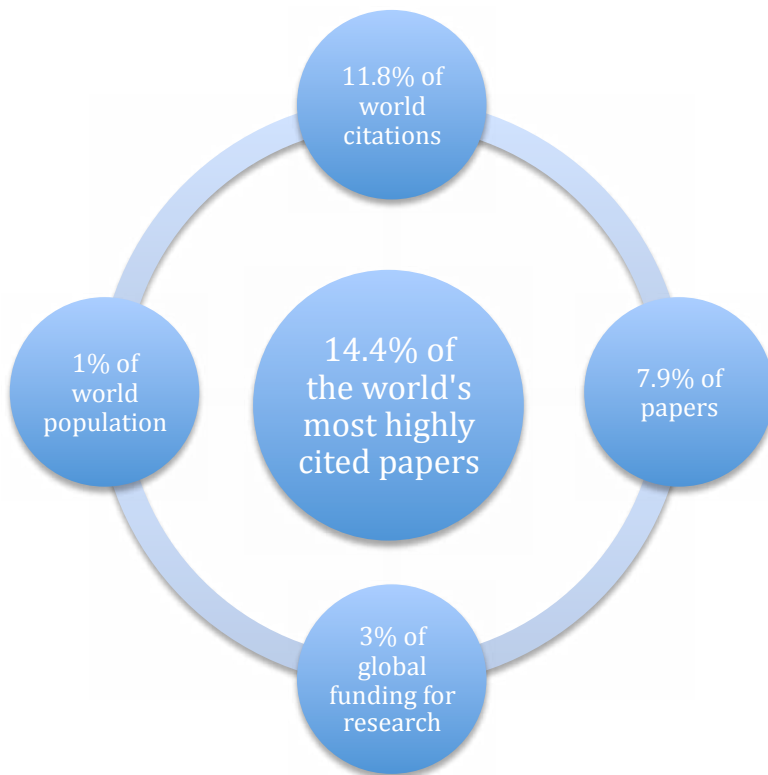


Figure 5: The UK's share of global science (The Royal Society, 2010)

Collaboration between UK universities and research laboratories and public and private sector counterparts abroad is one of the UK economy's most important foundations. Collaboration and linkages can form naturally. But this does not always happen. Differences in language, culture and infrastructures for science and innovation create barriers to collaboration. The S&I Network breaks through these barriers, facilitating collaboration and increasing access to foreign funding for UK researchers. It does this through negotiating bilateral programmes, organising scientific workshops, conferences and a variety of other networking

activities. Below are just a few examples of how the S&I network had made a difference in the last two years. These range from forging links with stem cell researchers in the US and leveraging \$36M in funding, to gaining better access for UK researchers to Canadian polar resources.

Energy

In October 2009, SIN Brazil organised a mission with key Brazilian researchers as part of BIOEN-FAPESP (Bioenergy Programme for FAPESP, the State of São Paulo Research Funding Agency). Because of this, the University of York is going to receive €3.5M to develop research in **second-generation biofuels**.

In February 2010, the Indo-UK Science and Innovation Council, organised by the S&I Network in India, agreed **jointly-funded sustainable energy research programmes** worth £30M between the Engineering and Physical Sciences Research Council (EPSRC) and the Indian departments for Science and Technology and Atomic Energy. These agreements represent a step change in the mechanisms for encouraging research collaboration between the two countries in this crucial area and formed the foundation for high-level discussions on science when Prime Minister David Cameron visited India in July 2010.

Two **carbon capture and sequestration** workshops organised by the US S&I team resulted in scientific exchanges and a number of significant collaborations, including between

the British and Texas Geological Surveys.

At least thirteen UK-US collaborations resulted when forty top engineers and scientists from across the US and UK participated in a **nuclear engineering** workshop organised by SIN US and the Engineering and Physical Sciences Research Council. UK PhD students have **access to unique equipment, radioactive materials and expertise** thanks to an S&I team supported collaboration between the University of Birmingham and the Idaho National Laboratory (INL).

Health

The Medical Research Council worked with SIN Germany, building on links established in a trilateral workshop organised by SIN France, and have recently launched a 3-year collaborative research programme with Germany and Canada **worth £3M**. The workshop on **neuro-degeneration research**, initiated by SIN France, explored synergies between the UK dementia strategy, similar efforts in Germany and the focus given to Alzheimer's under the French Presidency of the EU. SIN and the MRC brought together around 60 key experts from France, the UK, and Germany, as well as high-level representatives from the main funding agencies. The workshop put the UK at the heart of the developing European Neuro-Degeneration Joint Programme (NDJP), with MRC now leading the strategic research agenda and 3 UK workshop participants sitting on the programme scientific advisory board.



Figure 6: From left to right: Prof Chris Kennard (MRC), Kenan Poleo (SIN Berlin), and Dr Helge Braun, Parliamentary State Secretary to Germany's Federal Research Ministry about to sign the endorsement of an MoU between Canada, Germany and the UK on research into neuro-degenerative diseases.

In addition, the UK Department of Health selected a key French workshop participant to address the UK dementia research summit; two UK scientists were invited to sit on the French Alzheimer's Research Committee; and a German participant submitted genetic samples to the UK-led Alzheimer's genome study, which subsequently identified two new genes implicated in disease onset.

In February 2010, SIN India facilitated the signing of a Memorandum of Understanding between the UK Medical Research Council and the Indian Council for Medical Research, which has led to the launch of a joint £4M programme on chronic non-communicable disease between India and the UK.

In the United States the S&I Network supported the development of a strong network between **UK and US stem cell and regenerative medicine** researchers. UK engagement with the \$3 billion California Institute for Regenerative Medicine (CIRM), facilitated by SIN US, resulted in CIRM and the Medical

Research Council announcing two joint projects in October 2009, leveraging \$36M in California funding. The team's stem cell programme has also facilitated 50 new research collaborations, a further \$2M in joint UK/US funding, eleven joint papers, fifteen 'novel' techniques transferred to UK labs, nine unique research materials sent to UK labs, and access for three UK groups to specialised US equipment.

SIN China facilitated a stem-cells focal point mission to China in 2009. The visit resulted in the signing of two agreements with Kings College London: a memorandum of understanding with Shanghai University of Traditional Chinese Medicine (TCM) and an open 'material transfer agreement' with the Shanghai Innovative Research Centre of TCM.

The SIN sponsored 2010 UK-Canada 'Science of Age Supportive Built Environments' study tour to the UK in March 2010 brought together experts and policy makers to exchange best practice and collaborate on the **Science of Age-supportive Built Environments**. Grant applications and collaboration has resulted. Two UK researchers involved in the project have already agreed to serve on the international Advisory Board.

SIN Sweden brought together researchers and policy makers from nine European countries in January 2010 to discuss how to preserve and utilise the mental capital of elderly people. Those involved in ageing research and mental health research needed a joint forum to discuss the issue, the strengths of different country and discipline approaches, and to create a forward looking

research agenda. Participation in social settings reinforces confidence, reduces isolation, and benefits others in society. Under the patronage of DG SANCO³ and Professor Sir John Beddington's Foresight Team they developed a checklist of research gaps in this emerging field.

Infectious Disease

In the area of infectious diseases and disease control, SIN has had some notable successes.

To harness the best quality science in **tackling the global threat of infectious diseases**, the S&I team in Singapore facilitated a new funding partnership between Singapore's A*STAR⁴ and the UK's Medical Research Council (MRC). Following a series of infectious disease workshops and travel grants, the team worked with the organisations to earmark £2.2M for joint research. Six initial projects have been selected to develop treatments and vaccines for diseases including gastric flu, hepatitis B, dengue and tuberculosis.

"It's through international collaborations such as this one that we can accelerate our understanding to develop future treatments and ultimately save thousands of lives".

Wendy Ewart, MRC Director of Strategy

Many new partnerships resulted from workshops organised as part of the 'UK-Singapore Partners in

³ Directorate-General for Health and Consumer Affairs, part of the EU Commission

⁴ Agency for Science, Technology and Research

Science' programme, involving 250 UK scientists and 8,000 Singaporeans. These include joint publications, grants and even a co-authored book. For example, one UK-Singapore collaboration focused on gastric and oesophageal cancer, the latter being the fastest growing cancer in the UK. In addition to three joint publications, their new therapeutics recently entered clinical trials. A partnership between Warwick and Nanyang Technological University has resulted in a new lab facility at Biopolis in Singapore to increase our understanding of how the brain works.



Figure 7: Warwick University and Singapore's Nanyang Technological University agree a joint neuroscience research facility

SIN-supported co-operation between Oxford University, the China Centre for Disease Control and Sinovac Biotech Ltd⁵ has yielded results with the potential to stem pandemic flu, with a **new avian H5N1 vaccine** passing Phase 2 clinical trials. Co-operation continues in other areas, including HIV and mental health. With estimates of the impact of pandemic flu at several percent of world GDP – over 10% in the worst case – this co-

⁵ A biopharmaceutical company based in Beijing

operation is helping protect both health and economic development.

Biotechnology

A SIN Japan workshop created the **first bilateral link in the emerging, and potentially highly significant, area of synthetic biology**. The participants recognised the strategic importance and benefits of strong research links between the two countries, and there was a strong desire on the part of both groups of researchers to establish a UK-Japan network in synthetic biology for developing collaborative research activities. The recommendations made at the workshop were communicated to the funding agencies in both countries, which contributed to the ongoing discussions between JST (Japan's funding agency) and MEXT (Ministry of Science) for possible large budget allocation to the field covering synthetic biology. JST also listed synthetic biology as one of their strategic target areas for the financial year 2011.

Sustainable Agriculture

Two years of intense activity⁶ led by SIN Brazil produced some significant outcomes that have brought the science and innovation communities in the two countries together. A major achievement was the establishment in March 2010 by Embrapa, the £400M agri-business and research arm of the Brazilian Government, of a Labex (**Virtual International Lab**) at the

⁶ The UK-Brazil Year of Science, launched in March 2007, and The UK-Brazil Partnership in Science and Innovation that concluded in March 2009.

Rothamsted Research Institute in Harpenden.



Figure 8: Embrapa Labex-UK Office Opening Ceremony in London.

This will allow UK and Brazilian scientists to work on new agro-technologies - especially in the areas of pest and disease management. Embrapa is one of the largest research organisations in agriculture in the world, and certainly the largest in tropical agriculture.

"The global challenges facing agriculture require a global response. Increasing sustainable crop production with reduced inputs to meet increasing world food demands, while addressing the impacts of climate change and demand for bioenergy, needs international cooperation and a shared research agenda. Following the recent UK-Brazil Year of Science, this new initiative to strengthen scientific relationships with Brazil will make an important contribution to meeting these challenges".

Professor Sir John Beddington, Government Chief Scientific Adviser

The two countries are currently designing activities to ensure such technologies are transferred on to third countries, especially in the African continent.

Engineering

A joint experimental study and paper on an electromagnetic non-destructive testing (NDT) method for rail track inspection resulted

from SIN China's support for Newcastle University to attend a key international Forum. As a result of SIN's facilitation, the University was able to co-organise the Far East NDT international Forum in Shanghai and showcase their work to around 600 delegates from around the world. High-speed rail services are being adopted increasingly in the UK and particularly in China, with a need for improved inspection and safety methods. This project has helped develop knowledge transfer, partnerships and collaborative research. Further joint initiatives and research being developed will help maintain the UK as a leader in NDT research and structural health monitoring.

Telecommunications

The S&I team in India played a significant role in UK and Indian scientists and industrial engineers launching a £9M project on '**Next Generation Networks**'. The project is aimed at bringing online education, healthcare and early warning weather/natural disaster systems to remote areas in both countries. The project received a grant of £2.5M from the Engineering and Physical Sciences Research Council and £2.5M from the Indian Department of Science and Technology. A consortium of industrial partners from the UK and India, which includes British Telecom, Infosys Technologies and Wipro, has provided an additional £4M to the project.

Space

SIN China support in **space collaboration** with China has addressed export control issues, secured political support to speed up agreements, and over the course

of 6 bilateral workshops, built networks between top UK and Chinese experts.



Figure 9: Anhui province, China, taken from Beijing-1 satellite

A virtual 'Sino-UK Joint Space Science and Technology Laboratory' is now in place and significant opportunities have been identified in planetary exploration, earth observation, climate change and scientific instrumentation. The UK's Surrey Satellite Technology Ltd. is in discussion with Beijing's BLMIT on a follow-on project to the highly successful Beijing-1 satellite that has been operating routinely for 5 years in orbit and has contributed to the international charter on major disasters, helped monitor pollution, biodiversity, agriculture, and climate change impacts.

Nanotechnology

As a direct outcome from a workshop on **nanosafety** organised by the S&I team in France, the two countries are working towards a **bilateral knowledge exchange call worth over €1M** to be launched in March 2011 and funded by the Natural Environment Research Council (NERC) in conjunction with a French partner organisation and industry. The workshop also contributed significantly to the development of the UK Nanotechnology Strategy, which

specifically tasks SIN to help identify best practices and ensure that the UK is embedded in strong international nanotechnologies business collaborations. Four follow-up events focusing on different aspects of nanosafety and responsible innovation are being organised and financed by a number of French and British partners.

A UK-Russia Roundtable on **nanometrology** resulted in a decision to organise specific Rusnano⁷ missions to the UK that took place at Cambridge University and the Royal Society in 2010. The Deputy Director of Kurchatov Institute, Russia's leading research and development institution in the field of nuclear energy, confirmed that a few potential research collaborations resulted from his meetings at the University of Manchester Nanometrology conference in 2010.

As part of SIN China's Nanotechnology Strategy, SIN facilitated a visit of leading UK nanotechnology academics to Beijing. This resulted in new UK-China university partnerships as well as further UK-China postgraduate exchange opportunities. 2010-11 will see a number of bilateral events in both China and the UK covering issues from nano-manufacturing to water treatment and smart grids.

A Nanomission to Germany in 2008 focussed on nano-enabled clean energy technologies. A highlight of the mission was an international workshop with Swiss, German and

⁷ Russian Corporation of Nanotechnologies

Polish participants. Organised jointly by the Nanotechnology Knowledge Transfer Network (KTN), the Materials KTN and SIN Germany, £30K grant funding for the event leveraged some £0.5M, a 50/50 split between commercial income and EU research funding. In addition, it also led to two lecturer secondments, three student exchanges and an international Memorandum of Understanding (UK-Poland-Germany) on research collaboration. Furthermore, a UK-German collaboration developed joint IP and a UK participant raised venture capital on the basis of a bilateral collaboration with a German company. SIN Germany and Switzerland organised a follow-up mission to Germany and Switzerland in March 2010 to give UK participants access to a different range of research organisations. Immediate outcomes include five non-disclosure agreements.

Innovation for Business

Innovation for Business

The S&I Network strengthens the UK's innovation capacity through access to the very best international research and development. Often working with UK Trade and Investment colleagues, the S&I Network helps technology-intensive UK-based companies penetrate the supply chains of multi-national enterprises and global markets. It also provides intelligence to UK policy makers and innovation networks on overseas science and technology advances and helps UK companies to access and benchmark overseas technologies.

The S&I Network has regularly been instrumental in boosting innovation in UK business. Achievements range from support for the agreement between Plant Bioscience Limited (part BBSRC owned innovation company) with Embrapa, the Brazilian Agricultural Research Corporation, to working on green energy with UKTI to broker a £4.5m deal between the UK's Refgas Ltd and Singapore-based IUT Global.

Innovation underlies much of US SIN's projects and outcomes. For example, SIN informed UK government policymakers, by using local knowledge of US innovation to respond to the UK's Hauser review, and arranging Cabinet Office engagement in a Harvard workshop on innovation in public service.

SIN supports entrepreneurship in UK universities through workshops on entrepreneurship with US partners such as the National Council of Entrepreneurial Tech Transfer, and providing access to key US innovation experts and institutions. An example of this was an MIT roundtable on

innovations in energy organised during a visit by the Foreign Secretary.



Figure 10: Professor Sir John Beddington at the Monju fast breeder reactor, Japan

The S&I Network in the US works closely with UKTI to **promote the UK as a place for inward investment**. Examples of successes include contributing to a UKTI R&D programme virtual team, which led to 6 research contracts worth £0.2M being awarded to four UK universities – Bristol, Bath, Leeds and Edinburgh – by Hewlett Packard. The company also joined the Board of RCUK's cross-council Digital Economy Programme and is currently co-sponsoring the Engineering and Physical Sciences Research Council's Industry Awards for ICT Research scheme. The US S&I team also worked closely with UKTI on a Trade mission to the UK which resulted in four US companies establishing a UK presence on the Harwell Science and Innovation Campus.

A visit of senior Indian innovation policymakers to the UK to explore collaboration between the two countries, organised by the S&I team in India, has **led to significant new relationships** and proved instrumental in changing the perception of Indian policymakers about UK's innovation ecosystem. As a result of the visit, £174K worth of projects were agreed:

- DST funded research by Indian and UK Universities linking innovation clusters in Bangalore to the Cambridge Phenomenon
- A virtual incubator between Imperial College London and the DST
- A programme to deliver UK technology transfer training in India, marketing the UK's strengths across India
- A project on methods for maximising the impact of Indo-UK research

UK missions to Japan on RFID (radio frequency identification) technology in 2007 and 2009 led to a **strengthening of the UK innovation base**. The YRP Ubiquitous Networking Laboratory led by Professor Sakamura - inventor of the world-renowned operation software called TRON - agreed to establish a laboratory in the UK. The Association for Automatic Identification and Mobile Data Capture (AIM UK) has led discussion with BIS and UKTI and, since 2006, has worked closely with Professor Sakamura on international standardisation under the EU-funded CASAGRAS⁸ project. This has now been successfully expanded with support from the EU Framework Programme 7. The S&I team also identified collaboration opportunities with RICOH and Fujitsu Frontech.

⁸ Coordination And Support Action for Global RFID-related Activities and Standardisation

The British Embassy Tokyo hosted the Medical Research Council (MRC) Technology Showcase, the first to be held outside the UK, reflecting the MRC's recognition of Japan as an increasingly important partner for collaboration in medical research and application. The showcase followed links previously established by MRC-Technology in Japan and supported by the S&I team, including a technology transfer agreement with Kyoto University.



Eight top scientists from MRC's research centres and the Chief Executive of the MRC visited Japan and presented to an audience of industry and academic leaders. The event enabled MRC and MRC-Technology to identify new opportunities for research collaboration and licensing agreements with Japanese pharmaceutical and biotech companies and academic groups. As a result, **several Japanese companies have subsequently sought to develop links to MRC**

research institutes and find new collaborative partners, and also to establish a base to support communication with UK hospitals.



Following a successful **UK-Canada workshop on Marine Energy** held in Ottawa in October 2007, developed and organised by the Canada S&I team, the team organised a follow-up in October 2008. Titled '*Paths to Commercialisation*', the follow-up was held in Edinburgh. **The workshops led to the establishment of a UK-Canada research network, joint applications for research funds (NSERC) and ongoing exchanges with the University of Edinburgh, as well as work towards the commercialisation of new tidal and wave technologies.** This was done in partnership with UKTI who are involved in many of the SIN projects. At a recent follow-up meeting at GLOBE in March 2010, British Columbia's Energy Minister

and other key stakeholders discussed furthering UK-Canada activities in Marine Energy.

SIN Brazil work led to the **signing of a cooperation agreement** between PBL (Plant Bioscience Limited – an innovation company partially owned by BBSRC) and Embrapa, the Brazilian Agricultural Research Corporation. The agreement foresees the development of new technologies for Brazilian agricultural markets and the promotion and marketing of new innovations emerging from Embrapa's large research network. **The agreement gives Embrapa the right to access a group of patented technologies from PBL's portfolio. PBL will add selected Embrapa innovations to its portfolio and market these to the global industrial sectors.** This partnership will help in identifying and evaluating better commercialisation opportunities and defining more promising strategies for Embrapa products.

In 2010 SIN Germany's long-term networking and reporting activities around the Fraunhofer Society of Applied Research became an important factor in the high-level discussion on the innovation landscape in the UK. In 2009/10, **SIN Germany was instrumental in organising several meetings between UK ministers, BIS officials and Fraunhofer management;** in providing numerous briefings and benchmarking reports on the Fraunhofer's role and model in Germany; and in supporting a bilateral workshop between Fraunhofer institutes and UK universities.

These activities were fed into the Hauser Review of Innovation, with contributions on innovations systems from other parts of the SIN Europe and Global Network, and resulted in suggestions for new UK Technology & Innovation Centres. The Coalition government continues the debate, focusing on the need to improve knowledge transfer between science and industry. The Fraunhofer Society could provide a model for a new BIS innovation strategy to help promote UK technology-based products and services on the global markets. SIN Europe's networking and reporting will therefore continue to play an important role.

In 2009, Chief Government Scientific Advisor Prof. Sir John Beddington met with the Presidium of the Russian Academy of Sciences and Minister of Education and Science Andrei Fursenko and agreed to consider a new UK Russia Joint Commission on Science and Innovation for 2010. In February 2010, a new First Secretary for Science and Innovation set up a dedicated Science and Innovation section at the Embassy in Moscow. The section was launched through a high level networking event for key innovation guests including from the State Duma, innovation think tanks, organisations representing small and medium-sized enterprises (SME's), institutes and universities.

The Singapore S&I team worked with UKTI to broker a **£4.5M deal between the UK's Refgas Ltd and Singapore-based IUT Global,** who will jointly construct and showcase a new green energy facility. Malcolm Wicks, former Energy Minister, witnessed the signing of the

agreement between the two companies in November 2008. **The cutting-edge UK technology will allow Singapore to convert inorganic waste into 'syn-gas',** which will then be mixed with biogas produced by an existing process. This combined mixture will power gas turbines, generating 30-40% more electricity from the same waste.

SIN China proposed and helped agree a regular high level UK-China Innovation Dialogue, following BIS Innovation Director General Philip Rycroft's discussions with Chinese Ministries and his address to the international Pujiang Innovation Forum. The Dialogue allows both countries to learn from and understand each other's innovation systems. Many international businesses find difficulties with aspects of China's indigenous innovation policies and following Hillary Clinton's recent visit to China the US is now also setting up a dialogue on these issues.

In partnership with Lancaster University, **SIN China hosted a "Low Carbon Disrupters" workshop** at Zhejiang University, highlighting the importance of low tech/low cost "disruptive innovation"⁹. Several high-level Chinese government officials and influencers attended and spoke. The event identified several British and Chinese examples of disruptive innovation and illustrated how Chinese industry is moving into the sector – thereby opening up

⁹ An innovation that improves a product or service in an unexpected way, such as targeting a different set of consumers or lowering the price

opportunities for collaboration. A report ensued on 'Game-Changing China: Lessons from China on Low-Carbon Disruptive Innovation', published in English and Chinese, as did a special issue of the Journal of Knowledge-based Innovation in China (to be published in Autumn 2010).

Informing and Influencing International Policy

Informing and Influencing International Policy

The importance of science and innovation to the UK is much broader than direct economic benefit. Underpinning domestic and foreign policy with sound science strengthens the UK's international position. Global challenges such as pressure on natural resources, climate change and infectious disease can only be met through engaging our scientific community. Wider ethical and social issues play an increasing part in harnessing new developments for the common good.

The Science & Innovation Network has a crucial role in influencing policy overseas - such as paving the way for collaborating in stem cell research with the US or China - and informing UK policy development across a wide range of subjects. An example of the latter was SIN input to the Hauser review on technology and innovation centres in the UK, detailed below.

Energy

Efforts by SIN Japan to raise awareness of **UK green IT initiatives** led to increased business and government engagement with the UK. Following a Green IT mission to Japan in November 2009, a delegation visited the UK to learn more about Home Energy Management and Smart Metering. The results of this fieldwork will be made publicly available through the Japanese government's New Energy and Industrial Technology Development Organisation. The mission also promoted UK Green IT initiatives and proposed a Memorandum of Understanding to

establish a formal relationship between the British Computer Society and the Japan Electronics and Information Technology Industries Association, focusing particularly on data storage.



An ESRC funded UK social science researcher group carried out a study to identify best practices in **public demonstration programmes to accelerate the deployment of wind power, photovoltaics and fuel cells** in Europe, Japan and the USA. The S&I team in Tokyo supported visits to over 20 leading organisations throughout Japan to examine demonstrator projects for wind power, photovoltaics and fuel cells. A number of academic papers were produced and the final report will be published in 2010, including recommendations for UK departments and agencies to plan future demonstration projects effectively.

Health

In the US, the S&I team has actively influenced stem cell policy at state level towards a regulatory framework compatible with the UK, through participation in the Interstate Alliance on Stem Cell Research (IASCR). This is an essential backdrop for **international collaboration in stem cell research**. Through IASCR and information exchange with key

Congressional leaders, the team also informed the development of US national stem cell policy and regulation, particularly on the ethical derivation of stem cell lines and informed consent. The US S&I team also engaged with states that were looking to ban human embryonic stem cell research, in particular Texas, to prevent them from influencing future Federal policies and to keep open opportunities for collaboration.

Working with colleagues from the Department for International Development (DfID), the S&I team in India facilitated a joint workshop between the UK National Institute for Clinical Excellence (NICE) and the Indian National Health Systems Resource Centre (NHSRC).



Figure 11: A local health worker checks on a child at a Nutrition Rehabilitation Centre in Madhya Pradesh (courtesy of DFID)

Workshop participants included officials from the Ministry of Health and Family Welfare, civil society and think tanks involved in Indian health policy and public health. It looked at **UK experience of evidence based practice in health services provision**, including cost analysis, clinical guidelines, and quality frameworks. There is significant interest among Indian institutions in the methods and resources that NICE have developed; DfID will fund

NICE to run a series of policy workshops to capitalise on this.

In 2008, the Canada and US S&I teams invited the UK Foresight team to share their **“Tackling Obesities: Future Choices”** report, network with scientists and policy makers and discuss the Foresight model with high level government, university and industry representatives. The Foresight Obesity symposium led to continued collaboration with Health Canada, Provincial Governments and researchers, as well as informing the foresight process within the Canadian Government.

Innovation

The power of the global S&I Network was harnessed when Dr Hauser called on teams from Singapore, South Korea, China, Japan, Sweden, France, Germany, Denmark, Netherlands, USA, and Israel to support his **review on the current and future roles of Technology and Innovation Centres in the UK**. SIN posts from every corner of the globe shared their expertise and insight on best practices and examples from their host countries. Dr Hauser’s report was published in March 2010 with a roadmap for improving the UK’s capability in translating scientific leads into industrial success.

SIN China launched a suite of translations of UK science and innovation papers at a seminar co-hosted by the Ministry of Science and Technology. Addressing over 100 Chinese officials on the UK’s policies, the team responded to questions and circulated flash drives with the translations. There was considerable interest in the UK’s

approach to challenge-led innovation, leading to a paper on the topic. Subsequent public speaking and other events at cities around China by SIN staff have **promoted the UK's innovation and IPR agenda**. The Ministry welcomed the UK's innovative approaches and said the event was a 'first' they would like to repeat.

Emergency Planning

The S&I team in the US worked with the Government Office for Science (GO-Science) Foresight Team to arrange two workshops in the US to share best practice from the Foresight Reports on obesity and flooding. These were arranged with the US Centers for Disease Control and the US Army Corps of Engineers respectively. As a result of the Flooding workshop, which included participation by the Government Chief Scientific Advisor, the US Army Corps of Engineers have implemented Foresight Flood Risk mitigation strategies in 3 US pilot locations (New York, Washington, Oregon). Plans for a national Foresight study are progressing under the leadership of the US Army Corp's Institute for Water Resources in Washington DC.

Polar Science

The Canada S&I team wrote, negotiated and achieved ministerial sign-off in February 2009 of a Polar Research collaboration Memorandum of Understanding between the UK and Canada. The MoU will enable easier access to the Canadian Arctic, including facilities, logistics and resources, by the broader UK scientific community represented by NERC.



Figure 12: Anthony Cary, the British High Commissioner in Canada, discusses the MoU on CBC's 'The National' on 11 February 2009

A number of collaborations are already underway as a result.

Working with Parliament

Working with Parliament

Through its unique combination of knowledge and access, the Science & Innovation Network is able to support the international work of Parliamentary Committees on a wide range of subjects. SIN officers regularly contribute articles for *Science in Parliament*, the Journal of the Parliamentary and Scientific Committee.



The US team facilitated six visits by Parliamentary Committees on subjects ranging from science and engineering in government policy to genomic medicine. The House of Commons Select Committee on Business Enterprise and Regulatory Reform visited Washington DC, North Carolina and Boston to study the impact of research parks on economic development. Their findings were incorporated into a widely distributed report. One of the visits also resulted in the first ever joint inquiry between Committees of the House of

Commons and the US House of Representatives, when the respective Science and Technology Committees reported on the international regulation of geoengineering.

The House of Commons Innovation, Universities, Science and Skills Committee visited Japan to look at the development and use of engineering skills in Japanese academia, government and industry, focusing on nuclear engineering and plastic electronics as two sectors of Japanese strength. The visit, facilitated by SIN Japan, identified possible opportunities to extend collaboration into engineering sectors, building for example on existing alliances with UK engineering companies and universities and led to greater opportunities for policy dialogue.

Find more details about the Science and Innovation Network on the BIS and FCO websites:

<http://www.bis.gov.uk/policies/science/sin>

<http://www.fco.gov.uk/en/about-us/what-we-do/working-in-partnership/working-with-stakeholder-groups/science-innovation/science-innovation-network/>

Department for Business, Innovation and Skills www.bis.gov.uk

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