

UK Science and Innovation Network Report

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Contents

Introduction	1
What is the Science and Innovation Network?	2
Why work with the Science and Innovation Network?	3
Industrial Strategy Sectors	4
8 Great Technologies	8
Global Challenges	10
UK Science and Innovation Leadership	11
Working with UK Partners	12
Building wider Science and Innovation relationships	16

*“Investment in science
is an investment in our future.”*

George Osborne, 2013

Introduction

Science and innovation play a crucial role in promoting prosperity and sustainable growth. They drive development of technology – including the 8 Great Technologies – that underpin the UK's growth sectors, including those for which the government published Industrial Strategy documents this year.

International collaboration is increasingly important, providing opportunities to work with the best in the world, gain access to large scale international facilities and endemic research sites. It encourages new ideas, fostering new opportunities for innovation in support of growth and to tackle global challenges. Recognising the importance of international collaboration the Government has announced the creation of an Emerging Powers Research and Innovation Fund of £375million to develop the scientific capacity in partner nations for their long term sustainable economic growth.

This report gives a brief introduction to the broad variety of areas the Science and Innovation Network (SIN) supports, and shows how SIN works in areas directly linked to the UK's innovation and growth priorities. These include the new UK industrial strategy sectors and the challenge to develop the 8 Great Technologies designed to propel the UK to long-term growth, and stay ahead in the global race.

This report provides only a snapshot of some of the work of the Science and Innovation Network. To hear more from our teams in 28 countries and territories, based in our embassies, high commissions and consulates please visit the website:

<https://www.gov.uk/government/world/organisations/uk-science-and-innovation-network>



David Willetts
Minister for
Universities and
Science

'The UK excels in research, development and innovation. I am delighted that the recently announced Emerging Powers Research and Innovation Fund will enable us to use these strengths to support development in these countries by helping build their scientific capacity. The Science and Innovation Network has and will continue to have a key role in building the UK's relationships with these emerging powers as well as those who are already developed science nations.'



Sir Mark Walport
Government Chief
Scientific Adviser

'International collaboration is essential for maintaining the quality of the research base and the creativity of our innovators. It leads to better research with greater impact and commercial products with greater potential in the global marketplace. The Science and Innovation Network acts as a gateway for UK organisations looking to find new international partnerships.'

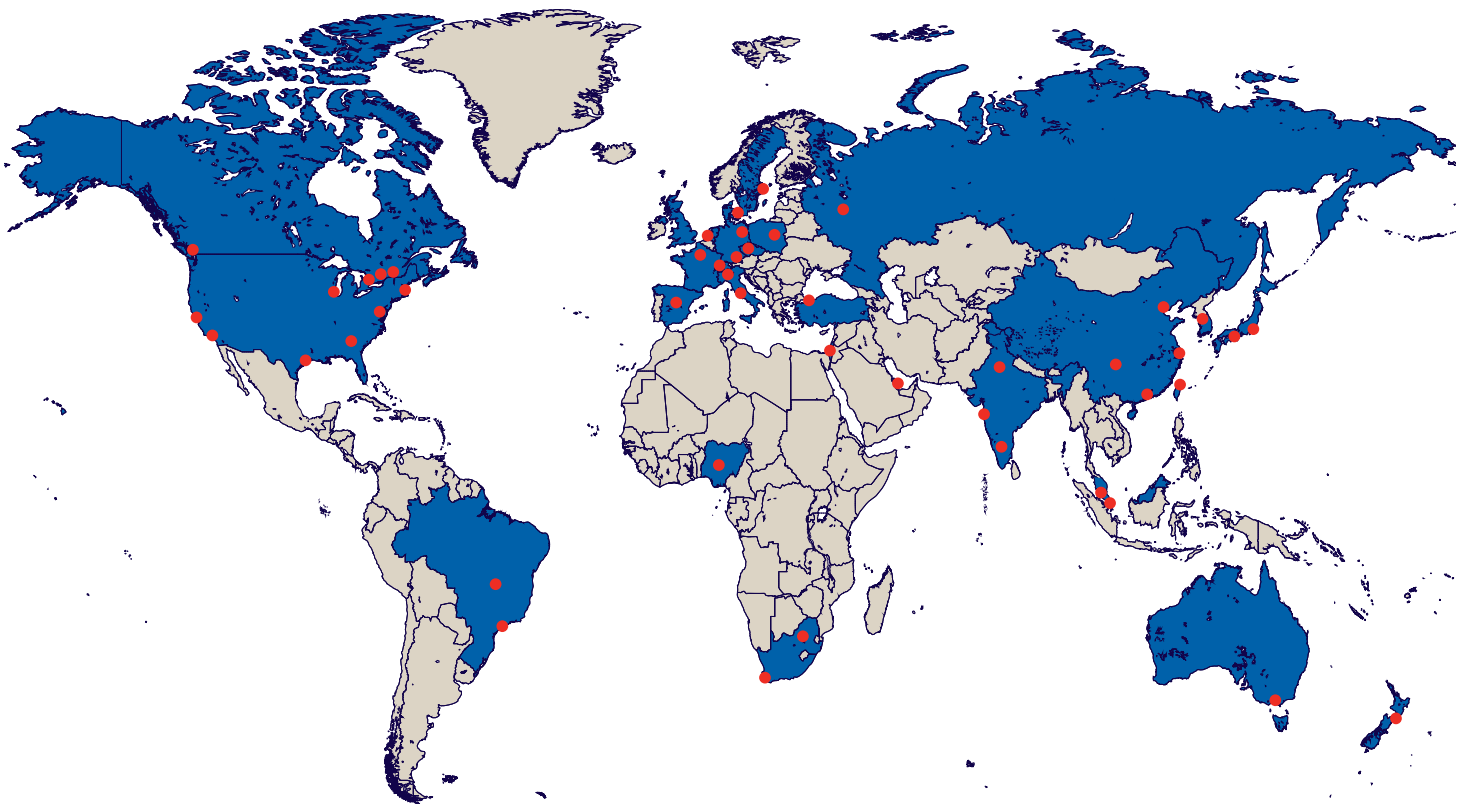


Hugo Swire
Minister of State,
Foreign and
Commonwealth Office,
and FCO Champion for Science
and Innovation

'This report illustrates the range of valuable work done by HMG's Science and Innovation Network. I am particularly pleased that the FCO has this year appointed an excellent new Chief Scientific Adviser, Prof. Robin Grimes, to drive this work. International science and innovation co-operation directly supports new growth opportunities for UK organisations, reinforces diplomatic relationships, and is an essential tool in our efforts to tackle global challenges ranging from climate change and food security to international health issues, none of which can be effectively addressed without effective international partnerships.'

What is the Science and Innovation Network?

The Science and Innovation Network (SIN) is jointly funded by the Department for Business, Innovation and Skills and the Foreign & Commonwealth Office. SIN has 93 staff, based in 28 countries and territories and 47 cities around the world.



SIN Officers are based in Australia, Brazil, Canada, China, Czech Republic, Denmark, France, Germany, India, Israel, Italy, Japan, Malaysia, Netherlands, New Zealand, Nigeria, Poland, Qatar, Russia, Singapore, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Turkey and the USA.

Why work with the Science and Innovation Network?

SIN works across the UK science and innovation ecosystem. As well as UK government departments, we work closely with the UK Research Councils, Technology Strategy Board, researchers from universities and a range of other bodies including the Royal Society and learned societies. The final section of this report introduces some of our partners.

SIN tailors its priorities to the local context. Its delivery model varies from small posts with one officer working across portfolios, often as part of a regional network, to large teams with individual sector specialists in places like China, India and the US.

What does SIN offer?

A first point of contact and gateway to science and innovation (S&I) opportunities: for UK and host country research institutions, universities and research and development (R&D) intensive business.

Policy insight: two-way flow of ideas to improve science and innovation policy in the UK and partner countries.

New international partnerships: SIN events and networking aim to identify new partnership opportunities, often acting as a catalyst for new projects.

A joined-up UK approach: SIN experts work at the heart of the UK's overseas Posts and closely with UK partner organisations to promote coherent UK engagement.

How to contact SIN?

The SIN global website provides links to SIN country information, including snapshots of the S&I landscape, local UK priorities and contact details for our teams. A number of teams also offer blogs or newsletters through which you can keep up to date with their work.

Visit
<https://www.gov.uk/government/world/organisations/uk-science-and-innovation-network>
for further details.



Industrial Strategy Sectors

In 2013, the UK government published an industrial strategy covering 11 sectors. This is designed to develop long-term strategic partnerships in sectors that can have the most impact on UK growth, including by developing and supporting innovative products and technologies.

The Science and Innovation Network has a number of years experience in many of the sectors covered, and is using the strategy to sharpen our focus and increase work in areas new to the network. This work cuts across new research or technology collaborations for UK organisations, helping attract inward research investment, or working with partners on regulatory or other measures to support growth in these areas. This section presents a sample of SIN activities in three industrial strategy sectors.





£600k

of Chinese funding for the development of the **UK/China Geospatial Engineering Centre**

Agricultural Technologies

Brokering best with best collaborations

UNITED STATES: Joint work between the Illinois Institute of Technology's Institute for Food Safety and Health (IFSH) and Campden BRI, a leading UK authority in food, is enabling research collaboration on food safety, quality and nutrition, with scope for greater harmonisation of regulatory procedures that will create new market opportunities for UK food products. Campden BRI's collaboration with IFSH was agreed this year, originating from a 2010 SIN workshop. IFSH is particularly important due to its state-of-the-art facilities and work with the US Food and Drug Administration.

Supporting UK Universities

CHINA: Geospatial technology plays a huge role in food security, through field management, improving crop quality, traceability and assurance and reducing environmental impacts. SIN supported the University of Nottingham with the development of the UK/China Geospatial Engineering Centre. This has resulted in £600k of Chinese funding for the centre; and a collaboration using technology and data assessment between the UK and China National Centres for Precision Farming.

NEW ZEALAND: Three British Universities have won new contracts or developed collaborations following SIN agricultural technology missions. Liverpool John Moores University (LJMU) has signed contracts with AgResearch and is exploring new links with Fonterra Dairy. London's City University and Lincoln Ventures are exploring needs and applications for new sensors for agricultural and chemical monitoring. Durham University and the Cawthorn Institute have identified a novel antifouling remedy that uses nano-structured polymer surfaces to inhibit settlement of the larvae of fouling organisms.



Supporting investment into the UK

BRAZIL: Agriculture is a major industry in Brazil accounting for more than 30% of the country's GDP. Embrapa, a Brazilian public research company, looks for global solutions by partnering with state-of-the-art research institutes across the world. SIN demonstrated the UK's scientific excellence in this area and Embrapa opened their second 'laboratory exterior' (LabEx) in the UK this year, based at BBSRC's Institute of Food Research, which follows their successful first UK LabEx in Rothamsted Research, in 2010.

£450m

spent by the **UK government** in 2011/12 on **agri-food research and development**



\$1.7m

of **Samsung Advanced Institute of Technology** funding to date has been **awarded to UK universities**

Information Technology

Building Collaborations on internet of things technologies

TAIWAN: The UK is seen as a leading partner by Taiwan in the internet of things. UK company, Hildebrand has been awarded a technology licensing deal worth over £100k. This resulted from a meeting in June 2013 which initiated collaborations to tackle the challenges faced in the efficient running of modern cities, such as rising traffic congestion, growing populations, resource constraints and environmental concerns.

Reaching out to UK universities

KOREA: The Samsung Advanced Institute of Technology (SAIT), Samsung Electronics' early research arm, launched the Global Research Outreach programme in 2009 to support grants for research at universities outside of Korea. SIN has worked closely with SAIT to assist in the promotion of this program to UK universities. 2012 proved a fruitful year for UK universities, with grants going to the universities of Birmingham, Cardiff, King's College London, Oxford, Southampton, and the West of England. To date UK universities have attracted approximately \$1.7m of SAIT funding, making the UK the second largest recipient after the US.

Closer ties in High Performance Computing

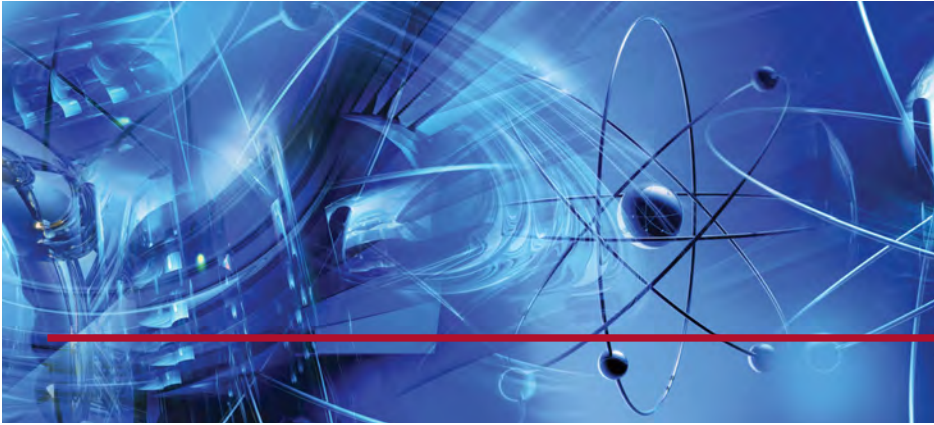
UNITED STATES: Two leading centres in the US and UK forged closer links between the two countries in the field of High Performance Computing (HPC) as a result of working with SIN. A visit in January by staff from California's Lawrence Livermore National Laboratory (LLNL) to the Hartree Centre, the HPC facility operated by the UK's Science and Technology Facilities Council (STFC), resulted in a MoU in August which will go towards expanding the industry's use of supercomputing to boost competitiveness. Based on an IDC report¹ The Hartree Centre estimates that successful exploitation of HPC in the UK could make a multi-billion pound contribution to the UK economy by 2020.

£25bn

could be generated for the **UK economy** by the **successful exploitation of HPC** by 2020

¹ IDC Corporation Report to the European Commission 'A Strategic Agenda for European Leadership in Supercomputing' September 2010





Nuclear

Building trust for research collaboration and industry solutions

JAPAN: In the wake of the Fukushima Daiichi nuclear power plant accident, an annual UK-Japan Nuclear Dialogue was established to bring together experts from both countries. A meeting in October 2012, hosted by Professor Robin Grimes and Professor Hajimu Yamana, focused on all aspect of nuclear energy generation as well as public engagement concerns, was followed by a workshop on Nuclear Safety R&D. As a result of the discussions, the Engineering and Physical Sciences Research Council and the Japanese Ministry for Science are developing a bilateral funding programme for nuclear research. The first call is anticipated in early 2014.

Brokering relationships in nuclear energy research

INDIA: Since 2009, SIN has been working with the RCUK India team and the Engineering and Physical Sciences Research Council (EPSRC) to build collaboration between the UK and India in nuclear energy. As a result, 12 projects with a total of £4m have been identified and funded by RCUK, with matched resources from the Indian authorities, underpinning this strategically important energy source for both countries.



£4m

allocation for
**12 nuclear energy
projects** identified
and **funded by
RCUK** in India

Brief examples from some of the other industrial strategy sectors:

Aerospace

CANADA: Helping establish partnerships in aerospace, with 2 completed and 4 in-progress projects through the Canadian Networking Aeronautics Programme for Europe (CANNAPÉ); completed projects worth about €22 million each.

Offshore Wind

SWEDEN: The University of Edinburgh and Supergen Marine generated a multi-country bid to the European Energy Research Alliance.

Oil and Gas

BRAZIL: São Paulo's FAPESP research agency week in London included an announcement of their joint Research Centre for Gas Innovation with BG Group.

Construction

GERMANY: A consortium of 18 partners including research institutions and SMEs from the UK, Germany, Spain and India, led by the University of Bath, has secured EU funding of €9m for an R&D project on 'Eco-innovative, Safe and Energy Efficient Wall Panels and Materials for a Healthier Indoor Environment'.

Life Sciences

SOUTH EAST ASIA: SIN has supported a range of institutions establishing partnerships on health. Key successes include the Lee Kong Chian School of Medicine formed jointly by Imperial College and Nanyang Technological University; and the partnership between the National University of Singapore's Saw Swee Hock School of Public Health and London School of Hygiene and Tropical Medicine.

8 Great Technologies

In autumn 2012 the UK government highlighted 8 Great Technologies where the UK can lead the world, announcing an additional £600m investment to support their development. The identified technologies are areas in which the UK has world-leading research, have a range of applications across a spectrum of industries and have the potential for the UK to be at the forefront of commercialisation. Here is a sample of SIN's work in three of the 8 Great Technologies.

Synthetic Biology

UNITED STATES: In September 2013 we launched a campaign to support UK-US collaborations that will enhance the synthetic biology pipeline from research to commercialisation. The campaign started in Boston focusing on academic partnerships and funding opportunities. In San Francisco, SIN and UKTI led a joint mission in partnership with the BioIndustry Association supporting several members of the Synthetic Biology Leadership Council and eight promising UK companies, to meet with local start-up companies and investors. The campaign runs to February 2014.

EUROPE: In October 2013 our teams from France, Germany and Poland worked with the UK Synthetic Biology Leadership Council to convene a European workshop on approaches to intellectual property, standards and other regulatory challenges around synthetic biology. The workshop positioned the UK as a driver of the development of this technology, resulting in a paper summarising recommendations for future actions.

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Regenerative Medicine

SOUTH AFRICA: A September 2013 workshop on cell mechanics in Cape Town has led to British universities, including Southampton and University College London, and small businesses forming a consortium with South African partners to bid into the EU's Horizon 2020 programme. The unique workshop, also with EU partners, brought together one of only two groups in the world combining computational mechanics and *in vivo* methods to help prevent heart failure.

CANADA: A trilateral meeting of Canadian, US and UK experts - including the UK Cell Therapy Catapult - has created new draft standards and regulatory approaches for therapies derived from mesenchymal stem cells. This addresses an important challenge in making cell therapies a commercial proposition and part of routine clinical practice.

Space

NIGERIA: The UK Space Agency and the Nigerian Space Research and Design Agency have agreed to sign an agreement on joint technical co-operation in 2014. Nigeria and the UK are also jointly investing in a NovaSAR UK-built earth observation satellite. Its development should create 300 jobs in the UK, and an estimated £1bn return on investment over 10 years.

CHINA: After a workshop in 2012, two space projects moved into development. A £100k project between Rutherford Appleton Laboratory (RAL) and the National Natural Science Foundation of China to upgrade technology for China's FY3/4 meteorological mission, and between RAL and the Beijing University of Aeronautics and Astronautics. Space commercial opportunities for the UK are also growing: the National Physical Laboratory won a £1.8m contract for microwave antenna to improve accuracy in satellite communications. This remote sensing should help across sectors in China, including urban and farm planning, and disaster management.

RUSSIA: In May 2013, the UK and Russia agreed to step up collaborations in Science and Space at the bilateral meeting at Sochi. We followed this with a series of space lectures across Russia, timed to coincide with the Exomars Project and a ministerial joint commission in October which resulted in the intention to sign an Intergovernmental Agreement on Space between the UK Space Agency and the Russian Federal Space Agency (Roscosmos). In February 2013, SIN supported the Open University to be the first institution to be granted access to analyse the Chelyabinsk Meteorite, leading to a scientific paper which was submitted to Science.

Brief examples from some of the other 8 Great Technologies:

Energy Storage

QATAR: Collaboration between Shell, Qatar Petroleum and Imperial College London - Carbonates and Carbon Storage Centre. This is currently Imperial College London's largest overseas research investment.

Big Data

SOUTH AFRICA: In December 2013, 10 UK High Performance Computing (HPC) researchers joined the annual HPC meeting in Cape Town supported by SIN. The meeting focused on HPC in the era of Big Data. The strong UK participation helped place the UK at the heart of the computational, data management and data complexity opportunities that the Square Kilometre Array telescope project will present.

Agri-science

INDIA: Workshops run by SIN and RCUK India led to £30m worth of joint calls for research proposals in farmed animal health, bio-energy and crop genomics. These were co-funded between BBSRC and the Indian Department of Biotechnology.

Global Challenges

Science and technology have a vital role to play in addressing some of the planet's most pressing challenges, such as how to simultaneously meet water and energy needs; build resilience to natural and technological disasters; tackle climate change and address global health challenges. SIN supports a broad range of projects in this area, some recent highlights include:

Co-ordinating a global response to Ocean Acidification

EUROPE: Ocean Acidification is described as the ongoing decrease in ocean pH caused by human CO₂ emissions. It is the little known consequence of living in a high CO₂ world, sometimes dubbed as the 'evil twin of climate change'.

SIN Netherlands, Sweden and Denmark and the Natural Environment Research Council (NERC) helped strengthen UK leadership in this field through a 19-nation collaboration on a new report, the Implementation Plan of the Global Ocean Acidification Observing Network.

The report (to be published in December 2013) was the result of a workshop in St Andrews, bringing together 80 experts from UK, US, Mexico, Chile, Brazil, South Africa, China, Taiwan, Japan, Australia, South Korea, India, France, Germany, Sweden, Denmark, the Netherlands, Israel and Spain. The workshop

has also generated new scientific collaboration and science policy initiatives.

Building collaborations to address food security

SOUTH EAST ASIA: SIN has supported collaboration between researchers from UK and Vietnam to sequence the genome of Vietnamese rice, characterising the genetic diversity of traditional varieties that could yield good harvests in the face of climate change. The project involved the UK's Genome Analysis and John Innes centres together with the Institute for Agricultural Genetics in Vietnam.

Tackling dementia

GLOBAL: It is estimated that over 35m people around the world live with dementia. The associated costs are estimated around £400bn annually. In 2012, Prime Minister David Cameron launched a major challenge on dementia and in 2013 a special G8 Summit on Dementia is an initiative of the UK G8 Presidency.



SIN helped the Department of Health organise cross-sector consultation meetings in all G8 countries ahead of the Summit.

Sustainable use of resources

GERMANY: Science and innovation crucially informs complex policy challenges. The Royal Society of Chemistry and SIN Germany worked together on the report 'Resources That Don't Cost the Earth', launched in Berlin in late 2012 by Foreign Secretary William Hague. The report focuses on sustainable ways to ensure the security of supply of rare or critical materials for industry. It followed a 2011 RSC/SIN Conference on the theme, which led to joint collaboration on innovation in the use of critical raw materials and strategic partnership between UK Waste & Resources Action Programme (WRAP) and German counterparts; as well as informing wider UK policy.

UK Science and Innovation Leadership

SIN's role is continually evolving to support government and UK research priorities. As well as some of the UK's innovation and growth priorities supported through the Industrial Strategy and 8 Great Technologies, SIN is active across a wide spectrum of UK research strengths. Some recent examples include:

Neuroscience

JAPAN: Neuroepigenetics is a new frontier which looks to understand how changes to DNA can affect the brain. UK and Japan are playing leading roles in promoting basic research towards clinical application. Two SIN supported workshops in 2013 helped secure new collaboration between five UK universities and four Japanese institutes including the RIKEN Brain Science Institute. A £1m research programme on 'The Use of Next Generation Optical Microscopy for Neuroscience Disease Challenges' is being established, to be funded jointly between the Japan Science and Technology Agency (JST) and the Medical Research Council (MRC).

Graphene

NEW ZEALAND: Manchester University is collaborating with New Zealand's Plant & Food Research on a funding bid for genome-based Graphene Biosensor work following a mission in early 2012.



Biofuels

CHINA: University College London (UCL) has established a joint biomass energy laboratory with Tianguan Group in Nanyang, Henan. This project in Low Carbon City Development has already had £1.6m investment from Tianguan. SIN are currently working with UCL to maximise the benefits of this partnership, with a further project designed to enhance collaboration with a potential extra £500k of Chinese funding.



Carbon capture and storage

CANADA: Canada and the UK are home to some of the best carbon capture and storage expertise worldwide. SIN has facilitated bilateral agreements between key players from both countries granting UK access to some unique facilities in Canada.

Applied Photonics

GERMANY: SIN helped establish the Fraunhofer Centre of Applied Photonics at the University of Strathclyde, launched in April with investment of around £3m from the German government into the UK knowledge economy.

Ocean renewable energy

SOUTH EAST ASIA: Marine power is a growing green clean source of power which has the potential to sustain thousands of jobs in a sector worth a possible £15bn to the economy by 2050. Following a regional workshop on ocean renewable energy, which brought together leading researchers from UK and South-East Asia, a 'South-East Asian Collaboration for Ocean Renewable Energy' (SEACORE) network to share knowledge and best practice in the region has been formed. A formal partnership was also agreed between Nanyang Technological University (NTU) and University of Strathclyde.

£15bn

Marine power estimated to be worth by 2050

Working with UK Partners

As this report has illustrated, collaboration with UK and overseas partners is integral to SIN's approach. This ranges from SIN's aim to help support the science goals of all British government departments, to the wide range of work with researchers from British universities. SIN co-ordinates locally with UK organisations who have a base in the countries where we work, and assists others working from the UK. This section illustrates some of SIN's principal partners and ways in which we work together:

British Council

www.britishcouncil.org

As part of the British Council's role as the UK's international organisation for educational opportunities and cultural relations, the British Council works to link scientists globally, provide information for researchers and encourage grass roots discussion of science.

SIN and the British Council work together in a number of ways. For example, in 2013 SIN has helped to support and promote the new British Council Researcher Links programme which supports early career researchers in 20 countries.

RUSSIA: SIN supported the British Council with the Researcher Links project resulting in £70k of matched funding from the Russian Foundation for Basic Research.

ISRAEL: The British Council and SIN jointly run the Britain-Israel Research and Academic Exchange Partnership Programme (BIRAX) Regenerative Medicine Initiative. BIRAX is a five-year £10m programme bringing world-leading scientists from the UK and Israel together to help solve health challenges.

UK Intellectual Property Office (UKIPO)

www.ipo.gov.uk

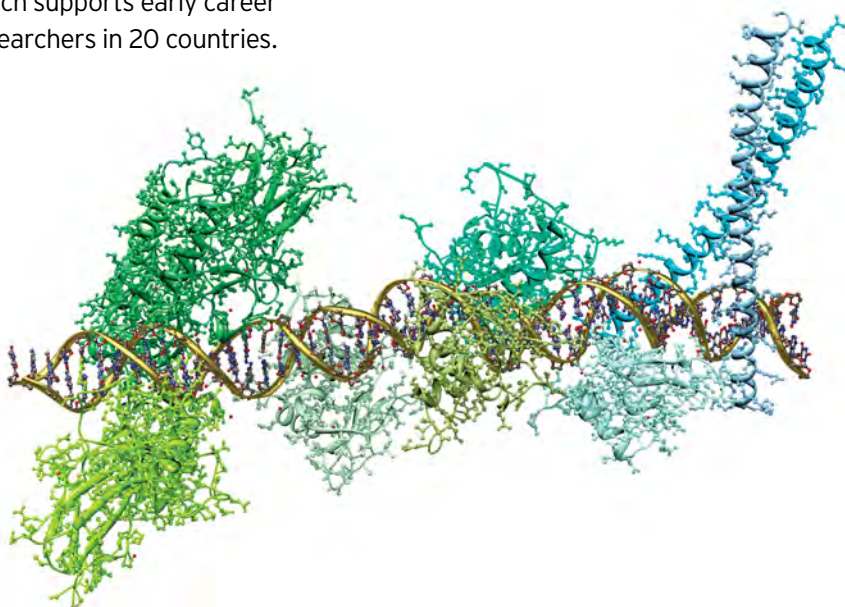
The UK IPO aims to promote innovation by providing a clear, accessible and widely understood IP system which enable both the economy and society to benefit from knowledge and ideas.

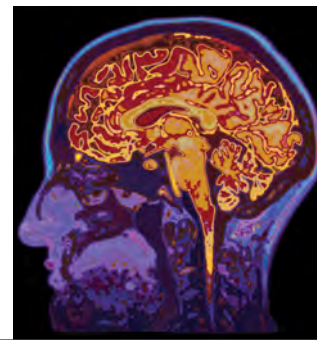
SIN's work with the UK IPO includes collaboration with UK IPO's new network of IP attachés based in Brazil, China, India and South East Asia (based in Singapore).

CHINA: A joint workshop in China on best practice in managing IP in technology transfer agreements which has informed a new factsheet for UK audiences.

INDIA: A practical toolkit was launched in March 2013 to provide model agreements and guidance on how to manage intellectual property arising from Indo-UK R&D projects between academia and industry.

SOUTH KOREA: The IPO and SIN's Seoul team are also developing a toolkit for R&D collaboration.





BRAZIL: Hosting a biodiversity in the Amazon event promoting the exchange of best practices and fostering potential opportunities for collaboration on public and private management of innovation.

NESTA www.nesta.org.uk

NESTA is an independent charity with a mission to help people bring great ideas to life.

In 2012 and 2013 SIN has worked with NESTA on two of its major reports.

INDIA: In 2012 'Our Frugal Future: Lessons from India's Innovation System' explored the policies, institutions and industries driving innovation in India, mapping how the geography of India's research and innovation is changing, and identifying opportunities for the UK.

CHINA: In 2013, 'China's Absorptive State: research, innovation and prospects for China-UK collaboration' draws on the latest literature, with new interviews and new data to chart the growth and nature of innovation and research in China. It sets out a roadmap for more strategic UK China research and innovation collaboration that maximises

opportunities and minimises risks. Both reports were co-funded by the Department of Business, Innovation and Skills as part of a project consortium.

Research Councils UK <http://www.rcuk.ac.uk>

RCUK is the strategic partnership of the UK's seven Research Councils who annually invest around £3bn in research. The RCUK Overseas Teams work with the research funding organisations in their respective countries to facilitate collaboration between researchers in the UK and abroad. SIN and RCUK work closely together across the globe.

INDIA and CHINA: Since opening offices five years ago, joint research funding of over £150m in India and £57m in China has been allocated.

BRAZIL: SIN facilitated a mission to Brazil where BBSRC signed an agreement with CNPq, Brazil's federal research agency, to work towards joint peer review.

FRANCE: The Arts and Humanities Research Council launched a Videogames Research Networking call to support the development of interdisciplinary working.

Royal Academy of Engineering <http://raeng.org.uk/>

The UK's national academy for engineering, bringing together the country's most eminent engineers from all disciplines to promote excellence in the science, art and practice of engineering. The Academy works closely with SIN to help drive bilateral and multilateral engagement with partner academies and engineering communities in many countries and regions, especially Europe, the US, China, Japan, India and Brazil. It is also leading a programme of engineering capacity building activities with sub-Saharan Africa, and is responsible for the Queen Elizabeth Prize, a high-profile, global £1m prize which recognises world-changing advances in engineering that have made a difference to humanity.

FRANCE: Working with the Royal Academy of Engineering, SIN promoted the prize and used the opportunity to build recognition of the UK's excellence in engineering with a launch event at the Ambassador's Residence in Paris, for an audience from industry and academia. Following on from this, we secured sponsorship from GSK and the National Council of Engineers and Scientists of France to hold a celebratory event on behalf of Louis Pouzin, which focused on the importance of engaging the next generation of engineers.



Working with UK Partners

The Royal Society <http://royalsociety.org/>

The Royal Society is the UK's national academy of science, and is a self-governing fellowship of many of the world's most distinguished scientists drawn from all areas of science, engineering, and medicine.

SIN works with the Royal Society on a wide variety of activities in many countries and regions. Recent examples include:

RUSSIA: Working with SIN Russia on the UK-Russia biennial ministerial joint commission (October 2013) where Secretary of State Vince Cable and Minister Livanov of Russia's Ministry of Education & Science signed a Joint Statement on science and education co-operation.

CHINA: The inaugural visit of Sir Paul Nurse FRS (Nobel Laureate), an important precursor to a step change in STI cooperation with China.

BRAZIL: Working with SIN on FAPESP's European engagement programme.

Royal Society of Chemistry (RSC) <http://www.rsc.org/>

The RSC is the professional body for chemistry in the UK and the largest organisation in Europe for advancing the chemical sciences. The RSC's strategic objectives focus on building networks, developing skills and talent, and collaboration through knowledge-sharing. With a worldwide network of 320,000 chemical scientists actively engaged and offices in the UK, China, Brazil, India, Japan, USA and with the well established PAN Africa Chemistry Network, the RSC is well placed to connect effectively governments, companies and academics to help solve key global societal challenges. Recent examples of collaborative work include:

BRAZIL: The organisation of several symposia in different universities, including in the Amazonas region, to promote sustainability and green chemistry.

NIGERIA: The RSC and SIN Nigeria organised the Pan African Chemistry Network conference in partnership with Procter and Gamble with the unique outcome of establishing the RSC/P&G/Unilag Collaboration Lab at Lagos University.

INDIA: An international workshop in collaboration with SIN India on Water Quality took place in August, leading to a report with key recommendations for future research and policy actions.

Technology Strategy Board (TSB) www.innovateuk.org

The TSB, the UK's innovation agency, aims to accelerate economic growth by stimulating and supporting business-led innovation. TSB's initiatives include support for collaborative R&D projects between business and academia, Knowledge Transfer Networks, and the £1bn network of Catapult technology and innovation centres to help businesses transform ideas into new products and services. SIN's work with the TSB includes promoting the role of Catapult Centres.

GERMANY: In 2013, SIN supported Sir Mark Walport's visit to Germany to launch the 'Future of Manufacturing' report along with Dick Elsy, Chief Executive of the UK High Value Manufacturing (HVM) Catapult. SIN is exploring further visits from UK HVM

£1bn

of investment into the network of world-leading Catapult Centres to transform the UK's capability for innovation





and Transport Catapults to connect with German Fraunhofers in 2014.

INDIA: In 2013, SIN helped TSB secure its first partnership agreement outside Europe, with India's Department of Science and Technology. The resulting programme was launched in November, providing up to £10m joint funding for business-led projects helping commercialise research outputs. The programme aims to support innovative products and services to deliver economic and social benefits and is initially focused on affordable healthcare and energy systems.

CHINA: TSB has announced a second agreement, this time with China's Ministry for Technology, for collaboration on sustainable manufacturing with the first competition opening in December.

UK Trade and Investment (UKTI)

www.ukti.gov.uk

UKTI works with UK-based businesses to ensure their success in international markets, and encourage the best overseas companies to look to the UK as their global partner of choice. SIN's work often helps bring direct benefits to UK business. Recent examples include:

CZECH REPUBLIC: Cross team-working in Prague to deliver £15m of UK technology contracts.

RUSSIA: UK-Russia ministerial agreement on space imports set to save the UK space industry £50m in tax annually.

JAPAN and CHINA: SIN helping secure smart grids research and development and investment to the UK potentially worth £8m and £20m respectively.

FRANCE, BRAZIL, JAPAN and RUSSIA: SIN and UKTI worked together with UK partners at the London 2012 Olympics and Paralympics to showcase UK expertise in rehabilitation technologies. Results include £60k investment for Imperial College's technology designs, agreements for UK company 'Physiofunction' to deliver master-classes internationally, and planned Russian federal investment in UK biomechanics technologies. UK Brazil collaboration for the 2016 Rio Olympics already

includes work with research centres and initial discussions with 2020 Tokyo Olympic planners have focused on technology expertise required to deliver a successful games.



Building wider Science and Innovation relationships

All the examples in this report illustrate how SIN's work, including collaboration with a range of UK partners, strengthens the international science and innovation relationships we need for future prosperity and sustainable growth. In addition to specific sectoral or thematic collaborations, SIN helps support high level bilateral and multilateral dialogues which look across the range of ways we work together.

At a ministerial level, the UK participates in a number of bilateral science forums – usually on a two-yearly basis. These include forums with China, India, Israel, Japan, Qatar, Russia, Singapore, South Africa and South Korea. This page illustrates some of this year's meetings. At a multilateral level, the UK's 2013 Presidency of the G8 has included a meeting of science ministers and presidencies of national academies, a special G8 Innovation Conference and a G8 Summit on Dementia.

SOUTH AFRICA: David Willetts, Minister of State for Universities and

Science, participated in the Ministerial UK-South Africa Bilateral Forum in September 2013 putting science, innovation and higher education at the heart of our relationship with South Africa. He announced a £200k Scientific Seminar Scheme and became the first non-South African Minister to visit the main £1.5bn Square Kilometre Array telescope site.

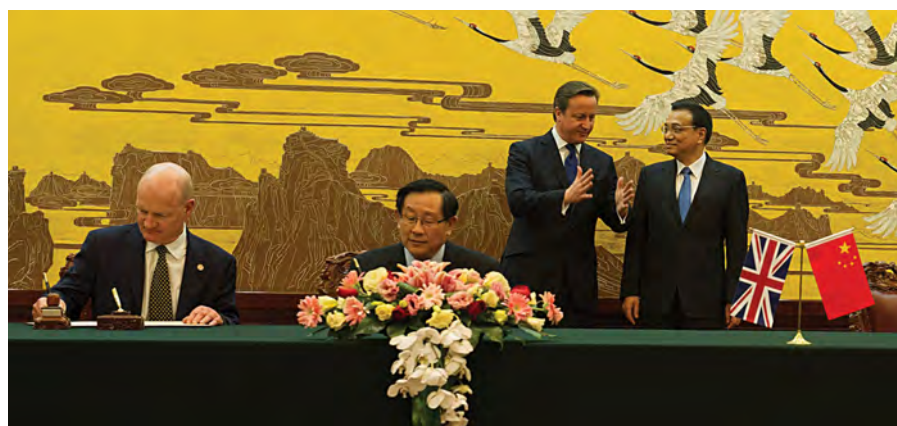
SOUTH KOREA: The state visit of South Korean President Park Geun-hye to the UK in November generated a number of new agreements in energy and engineering, including

a South Korean public-private partnership with the universities of Newcastle and Strathclyde for masters and PhD courses in ocean engineering.

CHINA: During the Prime Minister's visit to China in December 2013, David Willetts oversaw the signing of six significant science agreements, including a joint £200 million fund for research and innovation and a new commercial satellite contract for Surrey Satellites worth over £100 million.

RUSSIA: The Ministerial Joint Committee on Science and Technology Cooperation in October 2013 included agreements on space, life sciences and innovation.

G8: The G8 Science Ministers meeting took place in June 2013 in London. It was the first time that G8 Science Ministers and academies met under a G8 Presidency in this format. At the top of the agenda was dealing with global challenges, namely antibiotic resistance in medicine, and how governments can work together to develop new antibiotics and employ them more wisely. Climate change, energy security and neurodegenerative diseases like Alzheimer's were also discussed. A statement was signed by all the G8 Science Ministers proposing collaboration on global challenges, global research infrastructure, open scientific data, and increasing access to the peer-reviewed, published results of scientific research.





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