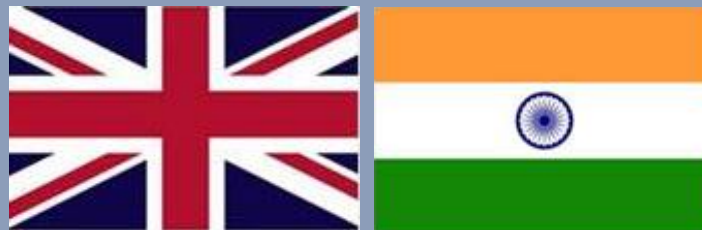




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# UK-India: Science and Innovation Collaboration

September 2012





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# Overview

- > What does the UK offer as a research partner?
- > What does the UK offer India as a research partner?
- > Current Indo-UK research collaboration
- > How can you work with the UK?
- > Further information



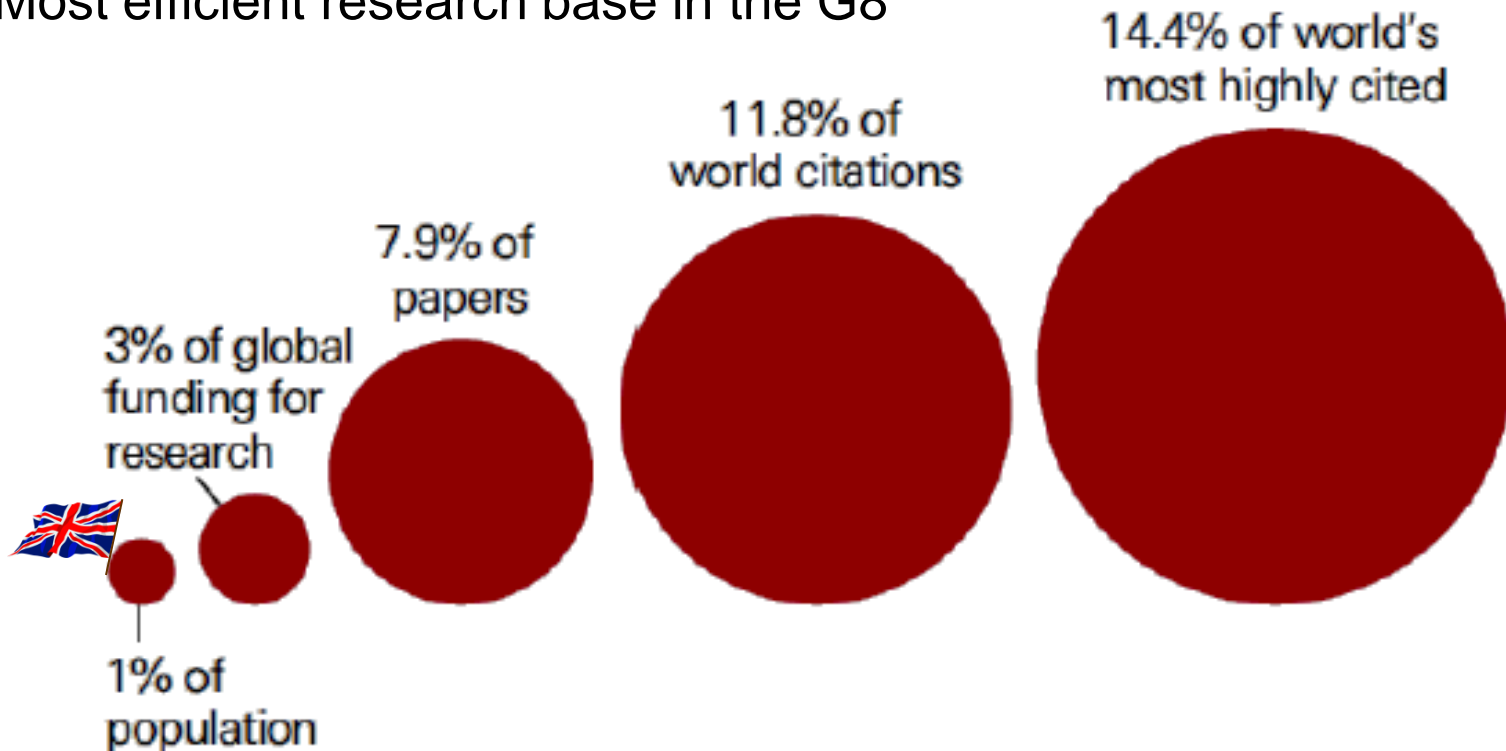
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What does the UK offer  
as a research partner?



# Concentrated excellence

- > Highest per capita number of Nobel Laureates in the G8
- > Most science and maths graduates per year in the EU
- > Most efficient research base in the G8





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# Commitment to science and engineering

- > UK Research budget protected at **£4.6bn per year** for current spending period
- > **Royal Society** – the national academy of science since 1660 (oldest scientific academy in the world)
- > Queen Elizabeth **Prize for Engineering**
  - £1 million international prize
  - Launched by leaders of all three political parties in UK
  - Indians on search and judging panel
  - <http://qeprize.org/>





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# An international partner

- > International research base:
  - > 63% of UK researchers have published whilst working abroad
  - > 46% of UK papers have international co-authors
- > Significant EU player:
  - > 41% of EU FP7 grants to date have had a UK partner
  - > To date, 2<sup>nd</sup> largest recipient of FP7 money, €3.7bn or 15%
- > UK Science and Innovation Network (SIN) overseas:
  - > 90 staff
  - > based in 42 British offices
  - > across 27 countries
- > 3 Research Council Offices:
  - > In India, China and USA

# 7 Research Councils in the UK



- Arts and Humanities Research Council (AHRC)



- Biotechnology and Biological Sciences Research Council (BBSRC)



- Economic and Social Research Council (ESRC)



- Engineering and Physical Sciences Research Council (EPSRC)



- Medical Research Council (MRC)



- Natural Environment Research Council (NERC)



- Science and Technology Facilities Council (STFC)

# A nation of innovators



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# A nation of innovators



*“...76 Nobel Prizes in Science and Technology”*

- > Around 20% of the world's top medicines were developed in Britain
- > Sir Frank Whittle, inventor of the jet engine

# A nation of innovators



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*“...London’s Tech City is the largest and fastest growing tech cluster in Europe”*

- > In 1990 Sir Tim Berners-Lee implemented the first successful communication between a Hypertext Transfer Protocol client and server via the Internet.



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# Comprehensive innovation ecosystem

A National Strategy for Innovation: <http://www.bis.gov.uk/innovatingforgrowth>

## R&D

- Knowledge transfer partnerships/networks
- Catapult Centres



## Tax/company incentives

- R&D tax credit, venture capital



## Competition framework

- Liberal trade & investment policy

## International Infrastructure

- Measurement, Standards, Intellectual Property



## Enabling climate, skills & legislation

- e.g. stem cells, design





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# UK Technology Strategy Board



- Linking academia and industry in sectors



- Centres in... high value manufacturing, satellite applications, future cities, connected digital economy, transport systems, offshore renewable energy, cell therapy

Knowledge  
Transfer  
Partnerships

- Academic to Business projects (6-36 months)

Collaborative R&D

- Collaboration for R&D



- Ideas from small businesses

Smart

- Public sector procurement from SMEs



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What does the UK offer  
India as a research  
partner?

# A committed partner



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The UK is committed to deepening the Indo-UK partnership...



“...the relationship between India and Britain stronger, wider, and deeper...a relationship that can benefit the world”

David Cameron, Bangalore, 2010

On his first overseas trip upon becoming Prime Minister

... including in Research and Innovation

# A committed research partner



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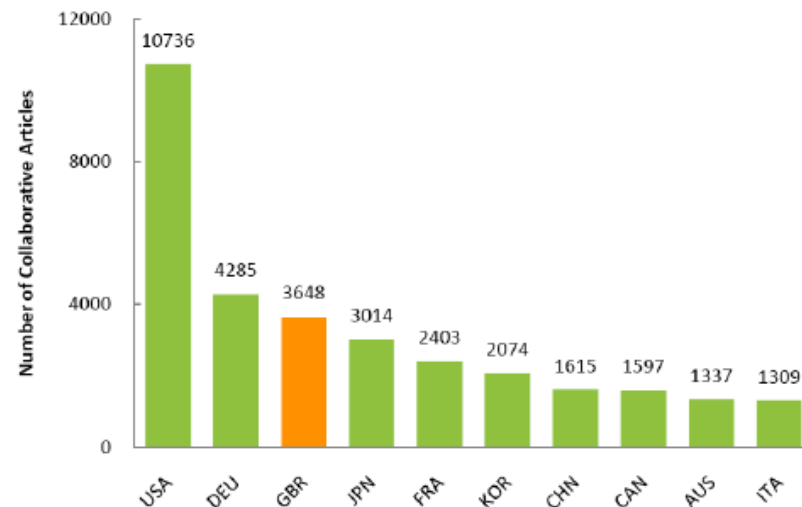
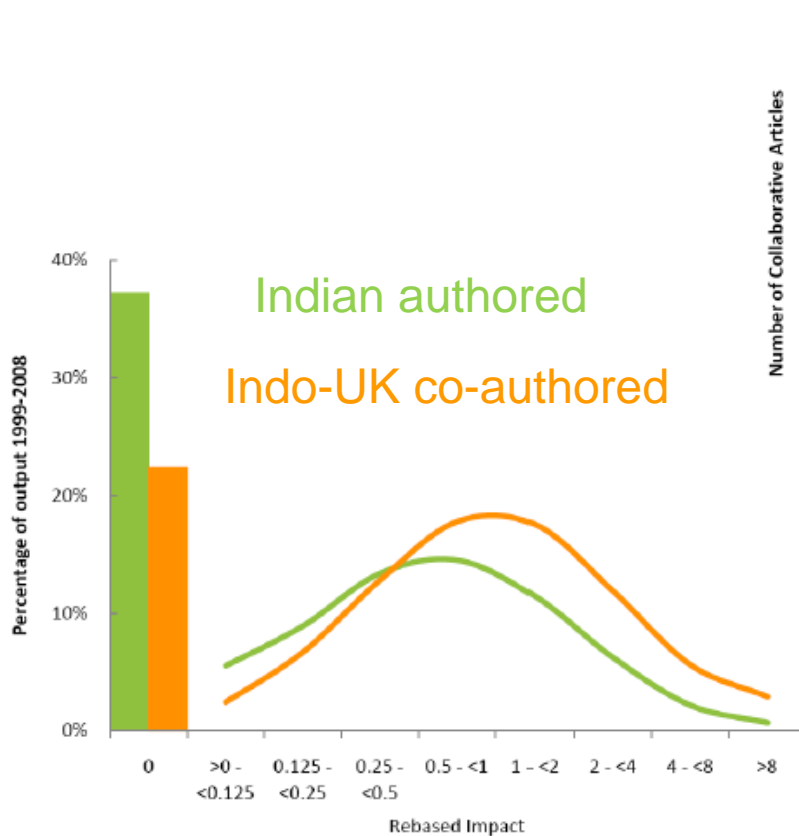
- > Research Councils: **over £90m of joint research** funding in the last 3 years with Indian Partners
- > Phase 2 of UK-India Education and Research Initiative, **£5m a year**
- > An **expanding network** in India, with new Knowledge Economy officers in:
  - Chennai
  - Kolkata
  - Pune
  - Hyderabad





# Benefits of collaboration with the UK

3<sup>rd</sup> largest number of co-authored papers with India



Co-authorship with the UK increases impact of publication

Evidence, Thomson Reuters (2010)





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# The UK team in India

Offices across the country:



Foreign & Commonwealth Office

RESEARCH COUNCILS UK INDIA

UK TRADE & INVESTMENT

DFID Department for International Development

BRITISH COUNCIL

BIS Department for Business Innovation & Skills



# Science & Innovation team in India



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Science & Innovation Team in India (with BIS Head of India & Gulf)  
Meet the team @ <http://ukinindia.fco.gov.uk/resources/en/pdf/SIN/2012/SINProspects>



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# Current Indo-UK research collaboration



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# A regular meeting of ministers

- > Indo-UK Science & Innovation Council
- > Created in 2004 by the Prime Ministers of both countries
- > Every Two Years, most recently April 2012 in London
- > Sets the direction for the bilateral science, technology and innovation relationship
- > Record of discussion available at: <http://bit.ly/sicrecord>



Chavan and Willetts - India, July 2010



Willetts and (late) Deshmukh – UK, April 2012

# Science & Innovation Network: activities



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## Research and Innovation workshops:

- > **Cyber Security** – London workshop April 2012
- > **Stem cells** – Bangalore workshop February 2012

## Links between centres of excellence:

- > **Bangalore – Cambridge Corridor** – links in clean tech, life sciences, IT and entrepreneurship
- > **Oxford-IISc Axis on affordable healthcare**
- > **National Aerospace Laboratories and Cranfield University** - Integrated vehicle health monitoring

# Science & Innovation Network: current activities



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## Policy advice, collaboration and reporting:

- > **Atlas of Ideas** - report on Indian research and innovation ecosystem published July 2012
- > **India's Global Innovation Roundtable** – SIN lead on engagement

## Public engagement

- > Proud participant in **IISc Centenary celebrations**
- > **British Geological Survey** engagement with **Geological Survey of India**
- > Find out the latest news at: <http://bit.ly/sinindiablog>
- > Find out about last year's highlights at:  
<http://ukinindia.fco.gov.uk/resources/en/pdf/SIN/2012/SINHighlights2011>

# Research Councils UK: RCUK India



- > Team of 5 based at the British High Commission, New Delhi
- > Facilitated **over £90m of joint research funding** with Indian partners
- > Indian funding partners include:
  - Department of Science & Technology
  - Department of Biotechnology
  - Ministry of Earth Sciences
  - Indian Council of Medical Research
  - Department of Atomic Energy
  - Indian Council of Social Science Research

- > Example UK-India co funded research projects:

- Chronic Disease
- Solar Energy
- Social Sciences



Department of  
Biotechnology (DBT)  
Indian Council of  
Agricultural Research  
(ICAR)



ICMR  
Indian Council of  
Medical Research



Department of  
Science and  
Technology (DST)



Ministry of Earth  
Sciences (MOES)















Department of  
Atomic Energy



Indian Council of  
Social Science Research

# RCUK India timeline




Since 2008 RCUK India has facilitated over £80 million of UK-India research funding, with 7 different research funders in India.

	2008/09	2009/10	2010/11	2011/12	Upcoming themes
<b>PARTNERSHIPS WITH INDUSTRY</b>					
   Department of Science and Technology (DST)	<b>Science Bridges</b> Three multimillion pound, innovation focused UK-India funded projects with significant industry involvement in the areas of: bioenergy, sustainable agriculture and bio pharmaceuticals.		<b>UK-India Impact Symposium</b> Meeting of academia, industry, policy makers and research funders to explore maximising the outcomes of UK-India research collaboration.		<b>Advanced Manufacturing and Impact</b> Bringing together UK-India academic and private sector partners in advanced manufacturing to agree areas for future collaboration and also to discuss Impact. <ul style="list-style-type: none"> <li>UK partner: EPSRC</li> <li>India partner: DST</li> </ul>
<b>DIGITAL ECONOMY</b>					
    Department of Science and Technology (DST)	<b>Next Generation Networks</b> A significant multimillion UK-India collaboration bringing together over 40 academic and private sector partners to bring online education, healthcare and early warning weather/natural disaster systems to remote areas in both India and the UK. £2.5m funding from RCUK Digital Economy programme with matched resources from DST India and £4m from industry and other sources.		<b>Bridging the Urban and Rural Divide</b> Multimillion pound collaborative partnerships tackling research questions on sustainable rural living in the UK and India, focussing on healthcare provision, rural enterprise, industrial optimisation and energy. £7.25m funding from RCUK Digital Economy and Energy programmes with matched resources from DST India.		
<b>SOCIAL SCIENCE AND ARTS AND HUMANITIES</b>					
    	<b>ESRC/ICSSR Scholar Exchanges</b> 29 scholar exchanges between 2008 and 2011, setting the scene for future collaborative activities in the social sciences.			<b>Indian-European Research Networking Scheme</b> New activity in social sciences research to bring together centres of excellence in France, Germany, the UK, the Netherlands and India. €0.9m funding from ESRC, with joint funding from ICSSR India and other EU partners.	<b>Researcher Mobility</b> UK-India partnership for increased researcher mobility. <ul style="list-style-type: none"> <li>UK partner: AHRC</li> <li>India partner: SARAI</li> </ul> <b>PhD Partnering Initiative</b> Developing a range of research areas of mutual interest including student exchange programmes in partnership with UKIERI and Indian funders. <ul style="list-style-type: none"> <li>UK partner: ESRC, India partner: Social Science funder. Other partners: UKIERI</li> </ul>



# RCUK India timeline

Since 2008 RCUK India has facilitated over £80 million of UK-India research funding, with 7 different research funders in India.

2008/09	2009/10	2010/11	2011/12	Upcoming themes
<b>HEALTH AND LIFE SCIENCES</b>				
 <p>Department of Biotechnology (DBT) Indian Council of Agricultural Research (ICAR)</p> <p>ICMR Indian Council of Medical Research</p> <p>MRC Medical Research Council</p> <p>DFID Department for International Development</p> <p>BILL &amp; MELINDA GATES foundation</p>		<ul style="list-style-type: none"> <li><b>Global Alliance for Chronic Disease</b> A multilateral partnership of health agencies across the world, including the UK and India, to address the growing burden of chronic diseases. MRC (UK) and ICMR (India) are member organisations.</li> </ul>	<ul style="list-style-type: none"> <li><b>Non-communicable Chronic Disease</b> Four collaborative grants tackling UK and India challenges in chronic disease such as diabetes, obesity and cardiac health. £3.1m funding from MRC with matched resources from ICMR India.</li> <li><b>Global Food Security</b> Multimillion pound, multilateral initiative on sustainable crop production to enhance global food security, with funding from the UK, India and the US. £10m commitment from the UK's BBSRC and DFID with matched resources from DBT/ICAR India and the US.</li> </ul>	<ul style="list-style-type: none"> <li><b>Livestock Health and Crop Sciences</b> Following on from the initiative in global food security, working towards a sustained programme of potential joint activities in livestock health and crop sciences. UK partner: BBSRC India partner: DBT</li> </ul>
<b>ENERGY</b>				
 <p>Department of Science and Technology (DST)</p> <p>Department of Atomic Energy</p> <p>BBSRC Bioscience for the Future</p> <p>Energy The New Carbon Future</p>	<ul style="list-style-type: none"> <li><b>Solar Energy</b> Two multimillion pound collaborative UK-India projects aimed at developing cheaper and more efficient production of photovoltaics. Consortia include a significant number of private sector partners. £5m funding from RCUK Energy programme with matched resources from DST India.</li> </ul>	<ul style="list-style-type: none"> <li><b>Fuel Cells</b> Four UK-India jointly funded proposals including significant industry involvement addressing small scale energy generation in rural areas. £3m funding from RCUK Energy programme with matched resources from DST India.</li> <li><b>Nuclear Research Exchanges</b> UK-India joint research and researcher exchange programme in civil nuclear technology. Six collaborations supported so far with a second round expected in 2012. £1.2m funding from RCUK Energy programme for phase 1 with matched funding from DAE India.</li> </ul>		<ul style="list-style-type: none"> <li><b>Storage and Smart Grids</b> Building on current joint successes in energy, developing new joint activity in smart grids and energy storage. UK partner: RCUK Energy programme. India partner: DST</li> <li><b>Bioenergy</b> Potential joint research collaboration to build on bioenergy research strengths of UK and India. UK partner: BBSRC India partner: DBT</li> </ul>
<b>CLIMATE CHANGE</b>				
 <p>Ministry of Earth Sciences (MOES)</p> <p>NATURAL ENVIRONMENT RESEARCH COUNCIL</p> <p>Living With Environmental Change</p>			<ul style="list-style-type: none"> <li><b>Changing Water Cycles</b> A significant UK-India partnership as part of the Living With Environmental Change programme to improve predictions on future patterns of flood and drought in the context of climate change. £2.7m funding from NERC with matched resources from MOES India.</li> </ul>	<ul style="list-style-type: none"> <li><b>Climate Change</b> Building on the successes already achieved, further work with Indian funders to progress collaboration through the global partnership in climate change, The Belmont Forum. UK partner: NERC India partner: MOES</li> </ul>

# UK India Education And Research Initiative (UKIERI): Phase 1



## Covered Period 2006-2011

- > **182 UK India partnerships**, over 600 institutions, 55 individual awards, **88 travel grants**, **40** policy dialogue and networking **events**, **393** opportunities for **British students** to visit India and **105 work placements** for Indian graduates.

## Example Projects

- *University of Cambridge & CCMB Hyderabad*
  - role of India in evolutionary history
- *University of Liverpool and Karnataka University* – colon cancer
- *IIT Kanpur and University of Nottingham*
  - osteoarthritis
- *IIT Kanpur and University of Durham*
  - river dynamics

# UK India Education And Research Initiative (UKIERI): Phase 2



## Phase Two 2011-2016

- > Programme extension agreed in 2010 with **joint funding** from both Indian and the UK governments
- > Worth approx **£5m per year**
- > Programme to deliver in areas of mutual interest jointly agreed to support research, innovation and skill development
- > **MoUs agreed with DST and UGC** to support institutional partnerships on jointly agreed themes
- > Opportunities for subject innovators for collaborative work and information exchange
- > **56 research partnerships** awarded in 2011 across all areas

# UK India Education and Research Initiative (UKIERI): Phase 2



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## Example Projects

- > *University of Westminster and Anna University*
  - Malaria Diagnosis and Classification
- > *Cardiff University and IIT Madras*
  - Innovation in High Voltage Electrical Insulation for Electrical Energy Systems
- > *Edinburgh University and University of Calcutta*
  - Evaluation of toxicity due to silver nanoparticles in Indian Sundarban mangrove wetland
- > *University of Birmingham and University of Jammu*
  - Triggering High Energy Physics
- > *Imperial College , London and Christian Medical College*
  - Sensor-based training system for home rehabilitation of the stroke paralyzed arm & hand



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# How can you work with the UK?



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# How can we help?

## We can:

- > Put researchers with complementary expertise in contact
- > Facilitate funding for travel and workshops to initiate collaboration, subject to availability
- > Facilitate funding for research and innovation collaboration, within strategic priorities and available budgets in the UK and India

## > Just get in touch!

- [scienceandinnovation.india@fco.gov.uk](mailto:scienceandinnovation.india@fco.gov.uk)
  - [rcuk.india@rcuk.ac.uk](mailto:rcuk.india@rcuk.ac.uk)
  - [UKIERI@in.britishcouncil.org](mailto:UKIERI@in.britishcouncil.org)
- > Or find out the latest news at: <http://bit.ly/sinindiablog>

# Funding for Indo-UK research collaboration

Major Schemes Include:

Scheme		Value	Timing
Joint RCUK India Funding	Joint research funding between UK research councils and Indian partners in areas of complementary strength	Over £90m to date	See following slide
Wellcome Trust	R&D for Affordable Healthcare in India	£45m	Ongoing
Wellcome Trust-DBT Alliance	Aims to build excellence in the Indian biomedical scientific community by supporting future leaders in the field.	£80m	Ongoing

- > For more information, and other opportunities, go to: <http://bit.ly/Fundingopps>

# Open RCUK Funding Opportunities

- > Current opportunities:
  - RCUK-DST Smart Energy Grids and Energy Storage
    - Call for proposals closes November 2012, (£10m total)
  - BBSRC-DBT Bioenergy and Biofuels
    - Call for proposals closes 9<sup>th</sup> October, (£10m total)
  - EPSRC-DST Advanced Manufacturing
    - Call for proposals closes 29<sup>th</sup> September, (£6m total)
  - EPSRC-DfID-DECC Energy and International Development
  - Call for proposals 28<sup>th</sup> September, open to researchers from the UK and developing countries (£12.5m total)
  - EPSRC-Wellcome Innovative Engineering for Healthcare
  - Call for proposals 10<sup>th</sup> December, £10m per project, Overseas research organisations eligible for funding
  
  - For more information visit: [www.india.rcuk.ac.uk](http://www.india.rcuk.ac.uk)



# Funding to support Indo-UK research collaboration



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Scheme		Value	Timing
UKIERI	Joint funding pot agreed to support research, innovation and technology transfer	£5m per year	2011-2016
Royal Society Networking	For mid-career scientists who want to organise a small three-day scientific seminar between groups of scientists from India and the UK	Up to £12k	3 day workshop
S&IN – Global Programme Fund	Funding to bring together UK and Indian scientists to identify collaboration opportunities	£10-30k	March 2013
S&IN – Small Projects Fund	Funding to bring together small numbers UK and Indian scientists to initiate contact	Up to £4k	March 2013

# Current Research Council schemes: Fellowships



David Phillips: Deadline 20<sup>th</sup> September

<http://www.bbsrc.ac.uk/funding/fellowships/david-phillips.aspx>

**EPSRC**

Engineering and Physical Sciences  
Research Council

No deadline



Science & Technology  
Facilities Council

Deadline 27<sup>th</sup> September

<http://www.stfc.ac.uk/Grants/Fells/Contents.aspx>



NATURAL  
ENVIRONMENT  
RESEARCH COUNCIL

Deadline 1<sup>st</sup> November

<http://www.nerc.ac.uk/funding/available/fellowships>



Arts & Humanities  
Research Council

No deadline



Various deadlines

**MRC**

Medical  
Research  
Council

Various deadlines

- For future or established researchers leaders
- Covers salary and research costs at host organisation in UK
- Many are open to any nationality

# Current Research Council schemes: Networking

**EPSRC**

Engineering and Physical Sciences  
Research Council

Overseas Travel Grant  
(no deadline)

- To allow UK researchers to visit overseas research institutes to develop international collaborations
- UK researchers can visit academic or industrial organisations
- Flexible timing and funds available
- <http://www.epsrc.ac.uk/funding/grants/int/Pages/otgs.aspx>

**EPSRC**

Engineering and Physical Sciences  
Research Council

Bilateral Research  
Workshops (no deadline)

- For UK-International workshops and networking to explore the possibility of more substantial future collaboration
- Covers the travel costs for UK attendees
- Also covers meeting costs if the meeting is in the UK
- <http://www.epsrc.ac.uk/funding/grants/network/Pages/bilateralworkshops.aspx>

**EPSRC**

Engineering and Physical Sciences  
Research Council

Visiting Researchers  
(no deadline)

- Allows overseas researcher to visit a UK research organisation
- Up to 12 months duration
- Covers salary costs, travel and subsistence
- Awarded to UK host organisation
- <http://www.epsrc.ac.uk/funding/grants/network/Pages/visitingresearchers.aspx>

# Current Research Council schemes: Networking



International Scientific  
Interchange Scheme  
(no deadline)

- For UK researchers to travel and establish new international contacts
- Up to £5k for travel costs
- For r
- <http://www.bbsrc.ac.uk/funding/internationalfunding/isis.aspx>  
[searchers or students](http://www.bbsrc.ac.uk/funding/internationalfunding/isis.aspx)



India Partnering Awards  
(deadline 14<sup>th</sup>  
November)

- For partnership activities, exchange of scientists, workshops and access to facilities
- Up to £25k over 4 years
- Mutual funding from India encouraged
- <http://www.bbsrc.ac.uk/funding/internationalfunding/india.aspx>



Research Networking  
(no deadline)

- To enable international discussions and exchange of ideas
- Workshops, seminars, lectures
- Up to £45k (inc. £15k for overseas attendees)
- <http://www.ahrc.ac.uk/Funding-Opportunities/International-research/Pages/International-research.aspx>

# Current Research Council schemes: Collaborative Research



International Co-  
investigators (no deadline)

- MRC grants can include overseas co-applicants where the nature of the research makes this necessary
- Money awarded to UK partner who then pay overseas research partners.
- <http://www.mrc.ac.uk/Fundingopportunities/Internationalopportunities/Collaborations/index.htm>



International co-investigator  
Scheme (no deadline)

- International researchers can be investigators on ESRC grants, alongside a UK Lead Investigator.
- Major intellectual input from international researcher
- Up to 30% of the total cost of the grant
- Can include overseas research assistants also
- <http://www.esrc.ac.uk/funding-and-guidance/guidance/applicants/international-co-investigators.aspx>

- All schemes require a UK host or collaborator to apply for the award.
- In most cases the money is awarded to the UK partner.

Further information on all schemes can be found on the individual Research Council websites. Simply Google 'AHRC' and look for 'Funding Opportunities'

# Additional information

**UK-India Education and Research Initiative**

<http://www.ukieri.org/>

**Technology Strategy Board**

<http://www.innovateuk.org/>

**Catapult Centres**

[https://catapult.innovateuk.org/en\\_GB/home](https://catapult.innovateuk.org/en_GB/home)

**NESTA**

<http://www.nesta.org.uk/>

**Wellcome Trust**

[www.wellcome.ac.uk/India](http://www.wellcome.ac.uk/India) and [www.wellcomedbt.org](http://www.wellcomedbt.org)

**Royal Society**

<http://royalsociety.org/grants/schemes/india-uk-seminars/>



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# Thank you for listening!

## Contact us:

### Email:

[scienceandinnovation.india@fco.gov.uk](mailto:scienceandinnovation.india@fco.gov.uk)

[rcuk.india@rcuk.ac.uk](mailto:rcuk.india@rcuk.ac.uk)

[UKIERI@in.britishcouncil.org](mailto:UKIERI@in.britishcouncil.org)

### Web:

<http://bit.ly/sinindia>

<http://www.rcuk.ac.uk/international/Offices/OfficeinIndia/Pages/home.aspx>

<http://www.ukieri.org/>

### Latest news:

<http://bit.ly/sinindiablog>



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