

## Overview of Royal Academy of Engineering Investments into world class research and other activities in FY 2009/10

### How were the funds invested?

1. The Royal Academy of Engineering received £12.1m funding from government, via BIS, to invest in supporting research, researchers, policy work, public engagement, education, skills and other activities across all the disciplines of engineering. This overview covers all significant areas of activity.
2. Based on the foundation of core funding from government, the Academy attracted £39.1 millions of additional support from third parties (industry and other sources). These funds were in respect of the following:

#### **Research:**

Research Chairs – £15.7m  
Post Doctoral Research Fellowships – £6.6m  
Chair in Emerging Technologies – £2.8m  
Global Research Awards – £497K

#### **Other activities:**

Industrial Secondment Scheme – £153K  
Visiting Professorships – £1.8m  
Engineering Professional Development Awards – £4.4m  
International Travel Grants – £782K  
Distinguished Visiting Fellowships – £98K  
Public Engagement Awards – £293K  
Public Engagement Activities – £91K  
Engineering Education Programme – £5.8m  
Engineering Leadership Scheme – £95K  
Programme for Science Teachers – £60K

3. Funds available to the Royal Academy of Engineering from BIS were invested in the following main areas:

**3.1 Innovation in a competitive global environment:  
research programmes:**

Post Doctoral Research Fellowships – £2.7m

Research Chairs – £1.6m

Newton Fellowships – £1.4m

Global Research Awards – £497K

Chair in Emerging Technologies – £150K

**Industry/international linkages:**

International Travel Grants – £373K

Industrial Secondment Scheme – £350K

Distinguished Visiting Fellowships – £161K

Research Exchanges with China and India – £184K

**3.2 Skills for the future:**

Visiting Professorships – £564K

Engineering Leadership Scheme – £307K

Engineering Education Programme – £606K

Engineering Professional Development Awards – £228K

Programme for Science Teachers – £218K

**3.3 Engaging with the public and the public policy process**

Policy activities – £355K

International activities – £468K

Public Engagement Awards – £515K

Public Engagement and Public Relations activities – £487K

Publications – £196K

4. In 2008-09 there were 4,153 applications to Royal Academy of Engineering funding schemes, as follows:

**Research**

Post Doctoral Research Fellowships – 65\*

Research Chairs – 7\*

Research Exchanges with China and India – 150

Newton Fellowships – 120

Global Research Awards – 16\*

*(Note: applications marked \* followed extensive pre-selection)*

**Other activities**

Industrial Secondment Scheme – 23\*

Visiting Professorships – 12

Engineering Professional Development Awards – 64

International Travel Grants – 1,402

Distinguished Visiting Fellowships – 147

Public Engagement Awards – 51

Engineering Leadership Scheme – 896

Programme for Science Teachers – 1,200

5. In the same period 2,566 number of awards were made, giving support to 4,012 individuals across all Academy programmes

6. In total, 63.4 % of all applications were rated outstanding

*(Note: 'Outstanding' refers to those in the top bracket of each programme's rating system.)*

7. The Royal Academy of Engineering employed 64 members of staff as at 31 March 2010. Of these, 31 were supported by BIS funding. The remaining 33 staff members were engaged on activities funded from other sources.

8. Fellows of the Royal Academy of Engineering gave 11,345 hours of voluntary time in support of Academy activities

## Who was supported?

9. The Academy made over 2,000 grants and awards to organisations and individuals in 2009/10 totalling £11.7 million. The funds paid to the 50 organisations which received the largest amount of funding, were distributed as follows:

Oxbridge	10.1%
Pre 1992 universities	71.0%
Post 1992 universities	5.3%
Other	13.6%

10. This funding was split between the nations' universities as follows:

England	83.4%
Northern Ireland	1.3%
Scotland	13.0%
Wales	2.3%

11. The Academy allocated 39.5% of its awards to female applicants and 60.5% to male applicants.

12. Ethnicity/Nationality

Those who responded to forms sent to all applicants provided the following information on their ethnic backgrounds:

<b>Ethnicity</b>	<b>Number</b>	<b>%</b>
British - White	224	39
Irish - White	8	1
Other - White	130	22
White and Black Caribbean - Mixed	1	0
White and Black African - Mixed	3	1
White and Asian - Mixed	4	1
Other - Mixed	6	1
Indian - Asian or Asian British	27	5
Pakistani - Asian or Asian British	3	1

Bangladeshi - Asian or Asian British	3	1
Other - Asian or Asian British	18	3
African - Black or Black British	8	1
Chinese - Chinese or other ethnic group	136	24
Other - Chinese or other ethnic group	7	1
<b>Total</b>	<b>578</b>	

## Outputs and Outcomes Indicators

### Output 1 – A healthy UK science and engineering base

	Knowledge Generation - Stock of Publicly Available Knowledge		Comments
1.1	Scale	Publications per annum	<p><b>1,481</b></p> <p><b>Research appointments:</b>            Post Doctoral Research Fellowships – 329            Research Chairs – 178            Chair in Emerging Technologies – 10            Research Exchanges with China and India – 60            Newton Fellowships – 40</p> <p><b>Other publications:</b>            Visiting Professorships – 18 (books, reports, studies)            International Travel Grant holders – 846</p>
1.2		Number of conference presentations per annum	<p><b>1,368</b></p> <p><b>Research appointments:</b>            Post Doctoral Research Fellowships – 384            Research Chairs – 132            Chair in Emerging Technologies – 13            Research Exchanges with China and India – 80            Newton Fellowships – 12</p> <p><b>Others:</b>            Visiting Professors – 15            Engineering Professional Development Awards – 4            International Travel Grant holders – 728</p>
1.3		Number of electronic products or by-products of research	Data not available. <i>(Note: it would be unusual for the fruits of research in engineering not to become widely available on-line. In areas such as IT research, publication is always on-line.)</i>

1.4	<b>Quality</b>	Number of publications in peer review journals	<b>625</b>	<p><b>Research appointees:</b>  Post Doctoral Research Fellowships – 130  Research Chairs – 80  Chair in Emerging Technologies – 5</p> <p><b>Others:</b> <i>(where peer review is for a wider range of publications than is covered by the ISI citation database):</i>  Visiting Professorships – 6  International Travel Grant holders – 404</p>
1.5		Number of keynote conference presentations	<b>185</b>	<p><b>Research appointees:</b>  Post Doctoral Research Fellowships – 26  Research Chairs – 30  Chair in Emerging Technologies – 13  Research Exchanges with China and India – 20  Newton Fellowships – 2</p> <p><b>Others:</b>  Visiting Professors – 4  Engineering Professional Development Awards – 1  International Travel Grants – 89</p>
1.6		£ /publication		<p><b>Research appointees:</b>  Post Doctoral Research Fellowships – £8K  Research Chairs – £9K  Chair in Emerging Technologies – £15K  Research Exchanges with China and India – £3K  Newton Fellowships – £35K</p> <p><b>Others:</b>  Visiting Professorships – £31K</p>

			International Travel Grants – £0.4K
1.7		£ /conference presentation	<b>Research appointees:</b> Post Doctoral Research Fellowships – £6K Research Chairs – £12K Chair in Emerging Technologies – £11K Research Exchanges with China and India – £2K Newton Fellowships – £116K  <b>Others:</b> Visiting Professorships – £38K Engineering Professional Development Awards – £57K International Travel Grants – £0.5K

Knowledge Generation - Human Capital			Comments
1.8	Scale	Number of new research appointments	<b>Research appointments:</b> Post Doctoral Research Fellowships – 10 Research Chairs – 4 Global Research Awards – 11 Research Exchanges with China and India – 20 Newton Fellowships – 12 <b>Non-research (but knowledge generation) appointments under other Academy schemes:</b> Industrial Secondment Scheme – 16 Visiting Professorships – 12 Engineering Professional Development Awards – 53 International Travel Grants – 752 Distinguished Visiting Fellowships – 29 Public Engagement Awards – 16 Engineering Leadership Scheme – 431

			Programme for Science Teachers – 1,200
1.9		Total number of research appointees supported	<p><b>Research appointments:</b>  Post Doctoral Research Fellowships – 59  Research Chairs – 35  Global Research Awards – 19  Chair in Emerging Technologies – 1  Research Exchanges with China and India – 20  Newton Fellowships – 24</p> <p><b>Supported under other (non-research) Academy schemes:</b>  Industrial Secondment Scheme – 16  Visiting Professorships – 145  Engineering Professional Development Awards – 1,253  International Travel Grants – 752  Distinguished Visiting Fellowships – 29  Public Engagement Awards – 28  Engineering Leadership Scheme – 431  Programme for Science Teachers – 1,200</p>
1.10		Number of researchers attracted to UK	Research Exchanges with China and India – 10 Newton Fellowships – 12
1.11	<b>Quality</b>	Average peer-review rating for new research appointees	<p><b>Research appointees:</b>  Post Doctoral Research Fellowships – 9.2 out of 10  Research Chairs – Outstanding  Global Research Awards – Excellent  Research Exchanges with China and India – Excellent  Newton Fellowships – Excellent</p>
1.12		Number of research appointees with distinctions	1 Nobel Prize for physics and 2 laureates in the Millennium Technology Prize were achieved by Fellows of the Academy.
1.13		Number of grant holders who become Academicians	<p><b>Research appointees:</b>  Research Chairs – 9</p>

				<p>Global Research Awards – 4 Chair in Emerging Technologies – 1</p> <p><b>Others</b> Visiting Professorships – 3 International Travel Grants – 6</p>																												
1.14		Institutional spread of awards		<p>Over 2500 awards were made during the year to many institutions throughout the UK, encompassing the majority of universities pursuing engineering teaching and research.</p> <p>The recipients of the larger awards in- year for all research programmes were as follows:</p> <p>Cranfield University, Edinburgh University, Heriot-Watt University, HR Wallingford Ltd, Imperial College London, Queen Mary University of London, Queens University Belfast, University of Bath, University of Birmingham, University of Cambridge, University of Durham, University of Glasgow, University of Lancaster, University of Liverpool, University of Nottingham, University of Oxford, University of Sheffield, University of Southampton, University of Sussex, University of Strathclyde, University of Warwick, University of West of England, University of Ulster, Royal Holloway University of London, Swansea University</p>																												
1.15		Diversity		<table border="1"> <tr> <td>Applications to Academy Grants</td> <td>Male</td> <td>445</td> <td>77%</td> </tr> <tr> <td></td> <td>Female</td> <td>133</td> <td>23%</td> </tr> <tr> <td>Recipients of Academy Grants</td> <td>Male</td> <td>1565</td> <td>60.5%</td> </tr> <tr> <td></td> <td>Female</td> <td>1020</td> <td>39.5%</td> </tr> <tr> <td>Engineering Education Programme</td> <td>Male</td> <td>23,539</td> <td>72.4%</td> </tr> <tr> <td></td> <td>Female</td> <td>8,992</td> <td>27.6%</td> </tr> <tr> <td colspan="4" style="text-align: center;">London Engineering Project*</td> </tr> </table>	Applications to Academy Grants	Male	445	77%		Female	133	23%	Recipients of Academy Grants	Male	1565	60.5%		Female	1020	39.5%	Engineering Education Programme	Male	23,539	72.4%		Female	8,992	27.6%	London Engineering Project*			
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				Young Engineers – Primary School Clubs	Male	44%
					Female	56%
					BME	75%
				Young Engineers – Secondary School Clubs	Male	52%
					Female	48%
					BME	75%
				<p><b>* London Engineering Project</b> – This range of programmes was specifically targeted at encouraging girls and black and minority ethnicities (BME) into Engineering. There were multiple programmes including residential courses and mentor schemes, two examples are given.</p> <p><b>Ethnicity</b> – Details supplied by applicants to Academy Programmes are shown in the ‘Overview’ section above, question 12.</p>		
1.16		Number of people supported by schemes per annum per £m		<p>Across the range of Academy schemes the following numbers could be supported per £million:</p> <p><b>Research schemes:</b>  Post Doctoral Research Fellowships – 22  Research Chairs – 22 (Note: each chair leads a team with an average size of ten.)  Global Research Awards – 38  Chair in Emerging Technologies –7  Research Exchanges with China and India – 109  Newton Fellowships – 34</p> <p><b>Other schemes:</b>  Industrial Secondment Scheme – 46  Visiting Professorships – 257  Engineering Professional Development Awards – 5,496  International Travel Grants – 2,016  Distinguished Visiting Fellowships – 180</p>		

				Public Engagement Awards – 738 Engineering Leadership Scheme – 1,404 Programme for Science Teachers – 5,505
1.17		Percentage retained in research at end of appointment		<b>Research appointments:</b> Post Doctoral Research Fellowships – 97.5% Research Chairs – 100% Global Research Awards – 100% Research Exchanges with China and India – 100% Newton Fellowships – N/A . <i>(No awards have yet finished)</i>
1.18	<b>Value</b>	Contribution of Fellows – Hours of effort	11,345	<b>All research appointments/ activities:</b> Post Doctoral Research Fellowships – 1,486 Research Chairs – 1214 Global Research Awards – 297 Chair in Emerging Technologies – 22 Research Events – 145 Leverhulme Fellowships - 212 Research Exchanges with China and India – 109 Newton Fellowships – 145  <b>Other schemes and activities:</b> Industrial Secondment Scheme – 199 Visiting Professorships – 36.25 Engineering Professional Development Awards – 14.5 International Travel Grants – 217.5 Distinguished Visiting Fellowships – 245 Public Engagement Awards – 609 Public Engagement Activities - 145 Engineering Education Programme – 290 Engineering Leadership Scheme – 362.5 Programme for Science Teachers – 14.5 Events – 1,600 Proactive Membership Group – 555 Membership – 892

				Policy - 1,943 Public Engagement – 104 Publications – 308 Public Relations - 180
1.19		Contribution of Fellows – Estimated financial value		£1.6 millions

Framework Conditions - (Financial Sustainability)			Comments	
1.20	<b>Scale</b>	Number of awards made for research equipment, research institutes/societies/collections	<b>20</b>	Equipment Grants for Research Chairs and Senior Research Fellows
1.21		Total value (£'000) of awards made for research above	<b>£162,000</b>	
1.22	<b>Quality</b>	Level of importance of equipment funded by Academy for conducting research work	<b>High</b>	
1.23		Review/evaluations conducted and key findings		<b>Research appointees:</b> Every research appointee submitted a personal annual report which was considered at a personal meeting with his/her Academy mentor, departmental head and with the co-sponsoring company in the case of research chairs. Citation analysis was also conducted by Evidence Ltd. No untoward reports were passed to the Academy's supervising Research and Secondments Committee during the year.

1.24		Periodic survey of award holders on timeliness/design of funding schemes		Not done in this financial year.
1.25		Institutional spread of awards	11 HEIs	<b>Equipment awards were made to the following institutions:</b> Aberystwyth – 1 Cranfield – 1 Edinburgh – 4 Imperial College – 5 Manchester – 1 Oxford – 2 Queens. Belfast – 1 Sheffield – 1 Southampton – 2 University College London – 1 York – 1

	<b>Framework Conditions - (Public Engagement)</b>		<b>Comments</b>	
2.1	<b>Scale</b>	Number of events sponsored by the Academy	41	All Academy events relating to policy, research, public engagement, . There were, in addition, 39 events in support of education activities.
2.2		Number attending events sponsored by the Academy	2,898	All Academy events listed in 2.1 except education. <i>Note: An additional 12,060 attended Public Engagement Activities involving the Academy.</i>
2.3		Audiences reached via above events		Members of the general public, engineers from across the profession, industry, academics/universities, schools (where appropriate), Members of Parliament, press/media, Academy Fellows and other interested parties.  Public Engagement Awards - school pupils, families, adult public audiences, and teachers.

2.4		Number of communication activities conducted by award holders with audiences outside academia (eg primary and secondary education, charities, policy makers, industry)	<b>234</b>	Public Engagement Awards – 227 Research Exchanges with China and India – 5 Newton Fellowships – 2
2.5		Number of contributions published in print or online media or via broadcast	<b>671</b>	Public Engagement Awards – 124 Public Engagement Activities – 15 Publications and Public Relations in general – 532
2.6	<b>Quality</b>	Audience Assessment of events sponsored by the Academies		<b>Academy run events.</b> From feedback forms returned: 86% rated 'subject matter' excellent, 84% rated 'quality of presentation' excellent, 66% rated 'venue' excellent.  <b>Events run by recipients of the Public Engagement Awards scheme:</b> Mean scores: Enjoyable: 86% Interesting: 85% Informative: 82% Interactive: 82% Well-organised: 87%

## Output 2 – Better Exploitation

Knowledge Exchange Efficiency			Comments
2.7	<b>Scale</b>	Number of international/interdisciplinary or cross-sectoral collaborations maintained by award holders	Engineering by its very nature is generally interdisciplinary, cross-sectoral and/or international; this aspect is not therefore monitored.
2.8		Number of international meeting attendances sponsored by the Academy	<b>Research appointees:</b> Post Doctoral Research Fellowships – 280 Research Chairs – 151 <b>Others:</b> International Travel Grants – 752 International relations with other academies – 15
2.9		Number of formal partnerships maintained by the Academies	<b>Research appointments:</b> Post Doctoral Research Fellowships – 1 ( <i>Scheme jointly funded and administered with EPSRC</i> )  Research Chairs – 25 ( <i>Note: Every chair is jointly funded with an industrial company. Some support more than one chair.</i> ) Industrial Secondment Scheme – 16 per year, various industries  <b>Other activities:</b> Distinguished Visiting Fellowships – 29 International relations – 2 Public Engagement Activities – 3 Programme for Science Teachers – >1,000 <i>Note: In addition, the Academy's education programmes have multiple partnerships.</i>
2.10		Number of policy reports and responses to	<b>31</b>

		consultations carried out by the Academy		
2.11		Number of businesses directly involved with Award holders	670	<p><b>Research appointees:</b>  Post Doctoral Research Fellowships – 33 industries and charities  Research Chairs – 65 industries and charities  Chair in Emerging Technologies – 8 industries</p> <p><b>Others:</b>  Visiting Professorships – 264  Engineering Professional Development Awards – 228  Distinguished Visiting Fellowships –16  Engineering Leadership Scheme – 56</p>
2.12	<b>Quality</b>	Assessment of quality/relevance of collaboration between the academies and key users/partners		<p><b>Research appointments:</b>  Post Doctoral Research Fellowships – Collaborating industrial and charitable partners provided £1M funding in 2009/10  Research Chairs – Collaborating industrial and charitable partners provided £6.8M in 2009/10  Chair in Emerging Technologies – Industrial and Charitable partners provided £605K funding in 2009/10</p> <p><b>Others:</b>  Industrial Secondment Scheme – 83% of end-of-secondment assessments by Host company rated outstanding or successful. Distinguished Visiting Fellowships – 92% of end-of-Fellowship assessments by Host university rated outstanding or successful.</p>