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Select Committee examines the state of engineering

In February, the House of Commons Innovation, Universities, Science and Skills Select Committee announced an inquiry into engineering. It called for evidence on the state of engineering in the UK and, more specifically, on two case studies – Nuclear Engineering and Plastic Electronics Engineering. This is the first time any Select Committee has held such an inquiry into engineering and it gave the Academy the opportunity to provide both written and oral evidence on the significant issues.

Along with the two case studies, the inquiry is focused on the role of engineering and engineers in UK society, in innovation and in R&D. It is also looking at the roles of industry, universities, professional bodies, Government, unions and others in promoting engineering skills and the formation of careers in engineering. The Academy's written response to the inquiry emphasised the crucial role of the engineer in society as well as the importance of engineering in providing the products, services and infrastructure that we all rely on. It also described the problems encountered by engineering companies in recruiting suitably qualified engineers, and the perceptions of engineering that may account for the decline in the number of young people applying to study engineering.

The Academy's input to the Nuclear Engineering case study argued that the UK can no longer be self-sufficient in the nuclear technologies required to fulfil the new-build programme currently being mooted. This is an area that is particularly sensitive to the impact of falling numbers of students choosing engineering. However, the time involved in gaining planning consents and licensing mean that some of the required expertise could be home-grown; providing that the correct incentives are in place.

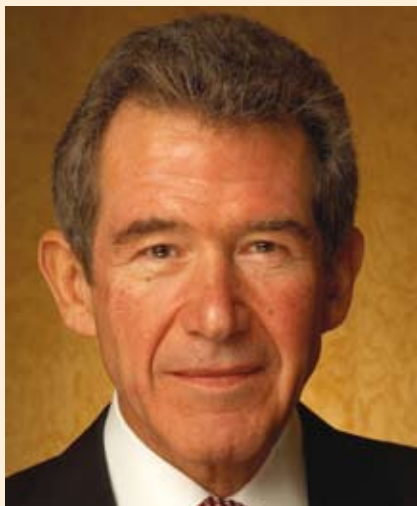
The Academy also made the case that Plastic Electronics Engineering has the potential to revolutionise the electronics industry and the UK could be a clear leader in this field if the opportunity is taken. There are already UK companies developing plastic electronics that are being manufactured elsewhere. There are also manufacturing plants in the UK producing devices developed overseas demonstrating that the UK has the relevant expertise in many aspects of this growing industry.

The Academy has twice given oral evidence to the Committee. On 30 April the President, along with Norman Haste OBE FREng and Professor Mike Kelly FREng FRS, gave their personal views on engineering and discussed their motivations for pursuing an engineering career. On 8 May, Philip Greenish CBE, along with Keith Read (Chairman of the Engineering Institutions Chief Executives' Committee), Andrew Ramsay (Chief Executive, ECuk) and Sir Anthony Cleaver (Chairman, ETB), spoke on the relationships between the 36 engineering institutions, the ETB, ECuk and the Academy; discussing ways in which they could work more closely together.

The committee will continue to hear evidence on the main inquiry and case studies, and will publish its findings within the next year.

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The President's Column



Lord Browne

The first inquiry into engineering by the Innovation, Universities, Science and Skills (IUSS) select committee of the House of Commons is now well underway. We applaud the committee for considering it important to investigate the role, status and structure of the engineering profession. One of the messages that The Royal Academy of Engineering has consistently sought to convey is that engineers can and should make much more of a contribution to public policy and should have a higher profile in Parliament and government. By its very existence this inquiry should achieve that result.

The inquiry has given the Academy a great opportunity to underline the fundamental role of engineers and engineering in shaping and supporting modern society and the fabric of our daily lives. Engineers design and build the future; it is engineering that has created and maintains our modern lifestyles. Engineers are needed to tackle the big issues facing the world today: climate change, poverty, hunger and preventable disease.

A key message is the pressing need to educate, train and employ enough engineers of the right calibre to meet these challenges. It concerns us that the proportion of students reading engineering degrees who go on to pursue engineering careers is falling. As the

current cohort of professional engineers reaches retirement, there will be great pressure to find the young engineers to fill the roles that are left open, not to mention the new roles coming onstream. This is due in part to the fact that too few students now continue with science and mathematics post-16. The Academy is playing an active role in the introduction of the engineering diploma in schools, which will encourage school students to consider engineering as a career by setting the essential mathematics and science learning in a practical context.

One reason why many young people do not consider engineering as a career is the profession's visibility to the public. Much of the work of engineers in maintaining society's infrastructure is behind-the-scenes – until things go wrong. So people take engineering for granted and have little awareness of its inherent creativity as a discipline that can change the world. The select committee is interested in the role of engineering in innovation and in R&D and the fact is that engineering is directly and indirectly supportive of both. Engineers are, by the very derivation of their name, innovators, supporting research at every conceptual and practical level. Engineers design and develop instruments and processes that make research possible – for example, in genomics, think of the sequencers on which the whole discipline is dependent. Engineers turn science into useful products – genomic medicine will require the input of engineers, as described later in this newsletter. Importantly, engineering innovation supports developments across many sectors of the economy – just think of how the internet has led to an explosion of new business models in the retail sector.

A significant concern of the committee appears to be the multiplicity of engineering institutions and how this affects perceptions of engineering by policy-makers and the public. It is true that the current arrangement of professional institutions owes much to the accidents of history. But in seeking to meet the needs of today, our engineering institutions have recognised the need for significant joint effort and have shown that they can work together at all organisational levels and on a range

of projects. The bodies that represent engineering need to work together so that their force is amplified rather than cancelled out by interference. My belief is that developing our joint working is necessary for giving engineering and engineers a stronger voice and a higher profile in society.

I hope that the select committee takes to heart the views of the Academy and its colleagues in the engineering profession and delivers a strong message. It is time that the true value and importance of engineering was recognised, represented better and articulated more frequently by all of society, including Government.



Meetings and Visitors

The President has recently met:

HRH The Duke of Edinburgh KG KT
Senior Fellow

HRH The Duke of Kent KG GCMG GCVO
Royal Fellow

HRH The Princess Royal

Dr APJ Abdul Kalam
President of India 2002 – 2007

HE Bjarne Lindstrøm
Norwegian Ambassador

Dr Robin Niblett
Director General, Chatham House

Ian Ritchie CBE
Principal, Ian Ritchie Architects

Lord Snowdon GCVO

Professor Xu Kuangdi FEng
President, Chinese Academy of Engineering

Lloyd's Register Educational Trust Lecture 2008

Dr Richard Spinrad, Assistant Administrator at the Office of Oceanic and Atmospheric Research National Oceanic and Atmospheric Administration, delivered the annual lecture, *Risk-Informed Investments in Oceanic and Atmospheric Research*, in April.

In it, Dr Spinrad emphasised the importance of understanding the interactions of the ocean with the atmosphere and land to predict climate change and severe storms. Sustainably managing ecosystems shows the risk associated with decision making increases when scientific research is lacking. He concluded with the suggestion that oceanic and atmospheric research are excellent examples of how risk-informed decision-making can make a difference at every level of society.

A transcript of the lecture is available on the Academy website, www.raeng.org.uk

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HM The Queen's Birthday Honours 2008

Members of the Order of the British Empire (CH)

Lord Richard George Rogers of Riverside – for public service and services to architecture

Commanders of the Order of the British Empire (CBE)

Archibald Anderson Bethel OBE – lately Chair, Scottish Enterprise Lanarkshire. For services to business and to economic development in Lanarkshire.

Officers of the Order of the British Empire (OBE)

Professor Frederick Michael Burdekin – Emeritus Professor, University of Manchester. For services to nuclear safety.

Gordon Grier Thomson Masterton – Vice President, Environmental Business centre, Jacobs Engineering Group Inc. For services to Civil Engineering in Scotland.

Professor John Spence – Research Professor, Department of Mechanical Engineering, Strathclyde University. For services to engineering.

Going for Gold – Academy Awards 2008



HRH The Prince Philip, Duke of Edinburgh with the Touch Bionics team and quadruple amputee Ray Edwards (centre) at the Academy Awards evening.

The annual Academy Awards dinner was held in the glamorous setting of the Merchant Taylors' Hall in London on 9 June. Compered by ITN newsreader Alastair Stewart OBE, the top awards were presented by the Senior Fellow, HRH The Prince Philip Duke of Edinburgh.

Touch Bionics, the Livingston-based inventors of the world's first commercially available bionic hand, the i-LIMB Hand, won the 2008 MacRobert Award. The Senior Fellow presented the team with a £50,000 prize and the solid gold MacRobert Award medal.

Many years in development, the i-LIMB Hand is a prosthetic device that looks and acts like a real human hand with five individually powered digits, heralding a new generation in bionics and patient care. Joining the Touch Bionics team at the dinner was patient Ray Edwards, a quadruple amputee who had the i-LIMB hand fitted a month ago and says it has changed his life. Ray survived Hodgkins Disease only to have all four limbs amputated in 1987 after he developed septicaemia. He now runs a construction company customising houses for disabled people and is acting Chair of the UK Limbless Association.

The Senior Fellow also presented the Prince Philip Medal to Ron Dennis, Chairman and Chief Executive of the McLaren Group and Team Principal of McLaren Racing. Ron Dennis took over the McLaren Formula 1 team just 16 years after entering the sport as a teenager and has led the team to nine Drivers' World Championships. Competing at this level calls for cutting-edge technology

which his group of companies, including McLaren Automotive and McLaren Electronic Systems, have been at the forefront of delivering.

The President presented the International Medal to one of China's leading figures in politics and engineering, Professor Xu Kuangdi. Currently President of the Chinese Academy of Engineering, Professor Xu turned to public life after an accomplished academic career in which he developed a reputation as an international expert in the manufacture of iron and steel. A rapid rise through the ranks of Shanghai Municipality culminated in his appointment as Mayor in 1995. Shanghai's current position as a thriving cultural and commercial centre owes

Further information on all winners: www.raeng.org.uk/prizes/awards/default.ht



Dr Barbara Lane, Associate Director of Arup, was one of four engineers to receive the Silver Medal in recognition of their contribution to British engineering. Ingénia magazine will feature profiles of all the Silver Medal winners in its September edition.

International News

Millennium Technology Prize

An Academy Fellow was among two British researchers shortlisted for the prestigious Millennium Technology Prize at an event hosted by the Academy on 8 April 2008.

Professor David Payne CBE FREng FRS of the University of Southampton was nominated, together with team partners Professor Emmanuel Desurvire of Thales Corporate Research and Technology and Dr Randy Giles of Bell Laboratories, for the invention of the erbium-doped fibre amplifier, which helped usher in the information age by allowing information to be carried over optical fibre cables for hundreds of miles. Professor Sir Alec Jeffreys FRS of the University of Leicester was also nominated for his invention of DNA fingerprinting, a development which has revolutionised the field of forensic science.

The list of finalists was announced via webfeed from Helsinki at simultaneous press conferences held in London, New York, Paris and Berlin. The Academy hosted the London conference, which was chaired by Dr Scott Steedman FREng, Vice President of The Royal Academy of Engineering, and attended by the Finnish Ambassador and both British finalists.



Millennium Technology Prize nominee Professor David Payne CBE FREng FRS

The Millennium Technology Prize, which has been called a Nobel Prize for Technology, is awarded by the Technology Academy of Finland every two years to the originator of a technological innovation that has significantly improved the quality of human life. The Prize was first awarded in 2004 to Professor Sir Tim Berners Lee OM KBE FREng FRS for the invention of the World Wide Web.

The eventual winner of the prize, Professor Robert Langer, was announced at a ceremony in Helsinki on 11 June. He was recognised for his work in developing innovative biomaterials for controlled drug release and received €800,000. The three other shortlisted innovations each received €115,000.

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Euro-CASE Conference

If we want Europe's engineers to help deliver ambitious renewable energy targets, we will need to bring them to the heart of the energy policy debate. That will be the core message of an important European conference on the EU's 2020 renewable energy targets, to be hosted by the Academy this winter.

On 3 November 2008 the Academy will host the first annual conference of the European Council of Applied Sciences, Technologies and Engineering (Euro-CASE), the representative organisation for 21 European national academies of engineering. Delegates will be asked to examine the practical engineering challenges arising from the European Commission's target of meeting 20% of Europe's total energy needs from renewable energy sources by 2020.

Academy President Lord Browne will open the conference, while invited speakers include Andris Piebalgs, European Energy Commissioner, and Malcolm Wicks MP, Minister for Energy at the Department for Business, Enterprise and Regulatory Reform.

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A Small Business Act for Europe

In March 2008, the Academy submitted a response to the European Commission's consultation on the development of

a 'Small Business Act' for Europe. The legislative package, which is expected to be launched in late 2008, is intended to help unlock the jobs and growth potential of small and medium sized enterprises (SMEs) across the EU. The Academy called for a greater emphasis on SMEs and innovation in the public procurement process, and drew the Commission's attention to issues regarding standards, access to international markets and industry-academia co-operation which could usefully be addressed at an EU level.

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Entrepreneurship for researchers from developing countries

In recognition of the importance of entrepreneurship for wealth creation in developing countries, the Academy co-sponsored a five day workshop in March 2008 organised by the Institute of Physics, the International Union of Pure and Applied Physics and the European Physical Society to enable developing country physicists and engineers to learn practical skills for the commercialisation of research. The initiative was heavily over-subscribed and around 60 researchers from countries as diverse as Cuba, Azerbaijan, Iran, Zimbabwe and Pakistan were ultimately selected to participate in the workshop in Trieste.

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Newton International Fellowship Scheme

The new flagship Newton International Fellowship scheme being jointly delivered by the British Academy, The Royal Academy of Engineering and the Royal Society was launched at an event on 4 June in Whitehall. The event was addressed by Science Minister Ian Pearson MP, along with senior figures from each of the academies and RCUK, the strategic partnership of the UK Research Councils. Peter Saraga OBE FREng, the Academy's Honorary International Secretary, welcomed the launch of this scheme as an important new initiative for UK research and spoke of the value of working together in partnership with our sister academies, RCUK and the UK Government.

Ingenia

Dr Scott Steedman, Editor-in-Chief of *Ingenia* magazine would like to invite Fellows to submit ideas and authors for future articles. The Academy magazine continues to go from strength to strength and now mails out to 10,500 individuals and institutions. If you have a synopsis that you would like to put forward please contact Dr Steedman at editor@ingenia.org.uk or phone Dominic Joyeux, the Managing Editor, on 020 7766 0679.

All the speakers emphasised the need for the UK to promote collaboration with leading researchers worldwide in order for the UK to remain internationally competitive in research.

The scheme aims to attract the world's most promising postdoctoral early-career researchers to the UK for a period of two years. The Fellowships cover the broad range of the natural and social sciences, engineering and the humanities and include £24,000 per annum to cover subsistence, £8,000 per annum to cover research expenses and a one-off relocation allowance of £2,000.

Importantly, follow-on funding worth £6,000 per year is provided for a further 10 years after the Fellowship ends, to support alumni activities and enable Newton Fellows to maintain long-term links with the UK. Newton Fellows will also become members of the RCUK-administered international alumni scheme.

More details about the Newton International Fellowship scheme are available at: www.newtonfellowships.org

The deadline for the first call is **Monday 4 August 2008** and applications are welcomed.

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Research Exchanges with China and India

The Research Exchanges with China and India scheme promotes academic collaboration between high quality engineering researchers in the UK and China/India and supports the expansion of international networks of excellence.

The scheme funds two types of Awards: Short and Major Awards. Short Awards support visits of up to one month and are primarily for exploratory or networking visits. Major Awards support visits of 3-12 months and should be part of longer-term efforts to build UK-China/India partnerships.

The first round of awards was made in February this year. There were five awards for exchanges with India and 13 awards for exchanges with China. The current Major award holders are:

Prof Tughrul Arslan (University of Edinburgh) together with **Dr Mohammad Hasan** (Aligarh Muslim University): *Low power techniques and architecture of field programmable gate arrays*

Dr Yang Gao (University of Surrey) together with **Prof Hehua Ju** (Beijing University of Technology): *Autonomous guidance, navigation and control design for lunar rovers*

Dr Sai Gu (University of Southampton) together with **Dr Jasvinder Singh** (Indian Institute of Petroleum): *Development of computational models for biomass fast pyrolysis*

Prof Huosheng Hu (University of Essex) together with **Prof Kui Yaun** (Institution of Automation, Chinese Academy of Sciences): *Multi-modal human-machine interfaces for hands-free control of intelligent wheelchairs*

Dr Thomas Joyce (Newcastle University) together with **Dr A Harsha** (Banaras Hindu University): *Development and validation of novel lubricants to be used in the testing of biomaterials employed in total joint replacements*

Prof Shengcai Li (University of Warwick) together with **Prof Shu-Hong Liu** (Tsinghua University): *Joint research for clarifying the proposed mechanism of a new type of cavitation (damage) identified from the Three Gorges turbines*

The full list of award holders is available at www.raeng.org.uk/research/researcher/reci/current.htm. Application forms and notes for guidance are also available to download from the Academy's website.

The deadline for the next round of applications is 12pm on **Friday 17 October 2008**.

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Engaging Engineers

Ingenious provides funding for projects that enable engineers to enhance their engagement and communication skills, consider the societal implications of their work and take part in public debate. The aim is to increase society's access to contemporary engineering, by encouraging today's engineers to be proactive in raising awareness and taking part in public dialogue on engineering and its impact on society.

Fourteen *Ingenious* awards totalling £353,257 were made in the second round (March 2008) of the Academy's public engagement awards scheme *Ingenious – engaging engineers; engaging citizens*.

One of the awarded projects will train a number of early-career engineers in the techniques of 'digital storytelling' and the art of personal narrative. This public engagement tool is a disciplined form of film making, capturing stories and combining audio and still images using new technology. "By giving the storytellers both the skills and editorial control over production", says the project leader Trevor Cox, Professor of Acoustics Engineering at the University of Salford, "the participants gain insight into a different approach to communication and learn about the use of narrative structures different from that traditionally used in engineering."

A full list of the Awardees is available from www.raeng.org.uk/engagement

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Ingenious awardee, Professor Trevor Cox

Research News

New Senior Research Fellow at Edinburgh

Dr Luke Bisby has been appointed the Arup/RAEng Senior Research Fellow in Structures in Fire at the University of Edinburgh, where he will join the University's Building Research Establishment (BRE) Centre for Fire Safety Engineering. Dr Bisby, previously assistant professor in civil engineering at Queen's University, Canada is an expert in structural uses of fibre reinforced polymers (FRP) in civil engineering applications, as well as the effects of fire and thermal cycling on structures and materials.

Dr Bisby's research seeks to find novel engineering solutions to fire safety concerns which currently prevent widespread application of emerging structural materials and systems; as well as to identify, develop, test, optimise, implement, and monitor new fire-safe materials and structural systems for infrastructure repair and renewal. His research is concerned with finding a more complete understanding of materials' thermal and mechanical response to elevated temperature, and using this knowledge to develop more rational means to predict structural performance in fire and to suggest more holistic structural design methods.



A full-scale structural fire test on a reinforced concrete column, strengthened with a fibre reinforced polymer wrap

Under the umbrella of the BRE Centre, Dr Bisby will work with the existing Professor of Fire Safety Engineering (Professor Jose Torero) and others to: establish a new concept for building safety, where fire safety is fully integrated in the design process; develop a research and educational programme that will serve as a vehicle to transfer this new concept into practice; and generate and educate a core of leaders who will guarantee that this new concept becomes fundamental in the future development of the built environment.

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Research Fellowships

The Academy is pleased to announce the award of 10 new Research Fellowships. These Fellowships are designed to promote excellence in engineering. They provide support for the highest-quality engineers, to encourage them to develop their interests in academic research as a stepping stone to a successful research career. This year's Research Fellows are:

- **Dr Daniel Clark** (Heriot-Watt University), Random-Set Filtering Techniques for Multi-Sensor Multi-Object Tracking and Data Fusion
- **Dr Christopher Gourlay** (Imperial College London), The Granular Rheology of Partially Solidified Alloys and Defect Formation in Advanced Metal Casting Processes

- **Dr Daniel Graf von der Schulenburg** (University of Cambridge), MRI and LB Studies of Biosystems and their use for Bioengineering
- **Dr Timothy Jones** (University of Edinburgh), Power-Aware Compilation in a Multi-Core Era
- **Dr Ioannis Lestas** (University of Cambridge), Analysis of Complex Heterogeneous Networks: Scalability, Robustness and Fundamental Limitations
- **Dr John Murphy** (University of Oxford), Improved Multi-Crystalline Silicon for Solar Cell Applications
- **Dr Valeria Nicolosi** (University of Oxford), Processing and Electron Probing Inorganic Nanostructures for Emerging Nanotechnologies
- **Dr Silvia Schievano** (University College London), FEM before FEM – Finite Element Modelling Prior to First-In-Man in Heart Valve Technology
- **Dr Samuel Somasundaram** (Kings College London), Detection of Explosives Using Nuclear Quadrupole Resonance
- **Dr Kosmas Tsakmakidis** (University of Surrey), Ultraslow and Stopped Light in Metamaterials

Each Fellowship is fully funded for five years, jointly by The Royal Academy of Engineering and the Engineering and Physical Sciences Research Council (EPSRC). This is the sixth year in which we have successfully run the scheme in partnership with EPSRC.

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Council News

Council held its second meeting of the year on 14 April. Council approved a new *modus operandi* to allow more time to be spent on discussing strategic issues and less time on routine matters. The relationships that the Academy has with external bodies such as Government departments, institutional and corporate stakeholders are very important. Council indicated its wish to formulate a relationship strategy so that key relationships are properly managed through Fellows as the lead contacts.

Council received a progress report on the *Engineering for Society* programme and its component themes of climate change and energy, poverty reduction, health and

Places to stay...

We have negotiated a special corporate rate at Citadines studios and hotels for Fellows of the Academy wishing to spend a night in London, around Europe or in the Asia-Pacific region. The group has four branches in London with the Trafalgar Square site being the most conveniently situated to the Academy. Prices for this start at £108 per night for a two-bed studio.

For information on where the Citadines hotels and apartments are available, visit www.citadines.com. To take advantage of the corporate rate you must register and book online via the 'corporate area' of the website – quote the code 1017485.

For help with any queries, contact Citadines direct on 020 7269 1680.

wellbeing, education and infrastructure. The strategy for taking the programme forward was debated. Among the issues considered was the means to establish closer relationships with bodies such as the engineering institutions to work on policy aspects of the programme.

The design team which has been working on proposals for an exhibition of Engineering in the 21st Century presented its vision. Council is warm to the concept and the design team will be asked to formulate a detailed business plan to identify all aspects of the proposal including financial requirements and any areas of risk.

A number of recommendations from the Awards Committee were discussed and Council approved the 2008 awards of the Sustained Achievement Award and the International Medal. Council also approved the theme for the Sir Frank Whittle Medal to be awarded in 2011. The theme will be *Engineering Innovations in Energy Efficient Transportation*.

In regard to the Annual General Meeting to be held on 7 July 2008, Council approved the names of candidates to be put forward for election as Fellows, International Fellows and Honorary Fellows. The names of Fellows to go forward for election as Council Officers were approved. Council also approved two special resolutions to be placed before the AGM, the first to increase the number of International Fellows from 100 to 10 percent of the number of UK Fellows, and the second to increase the Fellows' subscription rates in line with inflation.

Dr Ian Nussey, Chair of the Proactive Membership Committee, gave a progress report on the establishment of the new standing committee. Council approved the list of Fellows to constitute the Committee and Dr Nussey reported that about 60 Fellows have volunteered to become involved with the work of the Committee.

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Development News

The Academy's Development team helped facilitate an event for 400 young children and teachers at the American School, London, which showed how science teaching could be relevant and exciting.



Dr Maggie Aderin-Pocock speaking at the American School, London.

The Development team secured the expert services of Dr Maggie Aderin-Pocock to deliver a presentation entitled *Engineering is not for geeks*. She spoke enthusiastically about what had led her to complete a PhD in Mechanical Engineering, despite battling with dyslexia as a child. Dr Aderin-Pocock took her audience on a 'Tour of a Universe' via a computer package that she devised herself. She talked of her work in the construction of satellites that are being used to monitor climate change.

The talk was very well received by both teachers and children, generating feedback that affirms the Academy's work in education is making a positive impact.

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Education News

In June 2008, Panasonic Trust awardee Victoria Hickman travelled to the Panasonic headquarters in Bracknell to receive her medal from the trustees of the Academy programme. Victoria is one of many students to have benefitted from the scheme, the aim of which is to encourage and support the professional development and retraining of engineers in the UK by providing funding to update skills and knowledge.

Victoria completed a Masters in Architecture and Environmental Design in 2004, after which she worked both within the Sustainability department of her local county council and on a slum rehabilitation NGO programme in India. From this she developed an interest in sustainability and international development – an area which led her to undertake, with the help of the Panasonic

Trust Fellowship, an MPhil in Engineering and Sustainable Development at Cambridge University in 2007.

After a spell working as an intern at the UN, she is now conducting PhD research into sustainable human settlements, urban infrastructure and housing for developing communities.

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Proactive Membership

The new Proactive Membership Committee (PMC) has been set up to ensure that, as the scope of engineering grows, we take our membership from those in the vanguard of developments. The Fellowship does an excellent job of recognising excellent engineering contributions by individuals. However, our membership is patchy in some sectors and this has the potential to reflect badly on us. Council has set a five year target of ensuring that the candidate list going to the Membership Committee better reflects the society in which the Academy operates. As well as considering ethnicity, we are looking for nominations for candidates who are younger, from women and from under represented industry sectors including SMEs.

We have launched a hub-and-spoke approach which involves more than 80 volunteers who will help identify and nominate potential candidates. Most of these came forward from a call to Fellows elected between 2002 and 2007. This alone is a major engagement with the Fellowship. We need more. We need the entire Fellowship to be talent spotters. If you want to help and if you know of someone who you think should be a Fellow please let the newly appointed Fellowship Manager, Chris Coulter or the PMC chair, Ian Nussey know. No work is involved – all we need is the name, affiliation and a sentence or two on why you think the person should be nominated and we will take it from there, involving you as little or as much as you would like.

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Policy News

Severn Barrage Briefing

On 22 May, the Academy welcomed over 200 guests to a particularly successful briefing on the Severn Barrage in London

The briefing opened with a keynote speech by Malcolm Wicks MP, Secretary of State for Energy. He placed the potential generation from the Severn Barrage into context with the UK's targets for renewable electricity and energy. The Minister talked about the Department for Business, Enterprise and Regulatory Reform (BERR)-sponsored Feasibility Study into tidal power on the Severn Estuary. The Minister and appreciated the help the Academy, along with the major engineering institutions, is providing in terms of expert advice and peer review.

Professor Roger Falconer FREng of Cardiff University concentrated on the potential environmental impacts of the barrage and how they could be mitigated from an engineering viewpoint. He pointed out how changes in the flow of the Severn's currents caused by a barrage would have beneficial effects, such as lowering the bacterial load in the water and providing a degree of flood protection.

Dr Doug Parr of Greenpeace explained that Greenpeace had not developed a firm position on a Severn Barrage, as the trade-offs between renewable energy and its environmental impact were quite evenly balanced. However, the capital cost of the barrage was very high and suggested that greater benefit might be derived from directing that money elsewhere.

Bob Taylor from E.ON put forward the electricity market's point of view. A Severn Barrage would be the largest electricity-generating asset on the UK system and would have implications for how the electricity market functioned and on future investment decisions. Although the output of such a barrage is predictable, the generating profile would dictate investing in more flexible plant in the future. Implications for an overall increase in the cost of generating electricity abound.

Yaver Abidi of Halcrow gave a sobering talk on the engineering scale of the Severn Barrage. At the height of construction, the Barrage could require 44,600 workers, but would face competition from the potential new nuclear build programme and other major infrastructure programmes. The resources required and the number of companies capable of running the project suggests that it would be better run as a true Public Private Partnership rather than a Private Finance Initiative.

A transcript of the meeting is available on the Academy website.

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Scottish Climate Change Bill

A response was submitted to the Scottish Government on proposals for a Scottish Climate Change Bill. This would closely mirror the equivalent Climate Change Bill currently proceeding through Westminster. The intention of the Scottish Government is to push for stringent 80% reductions in greenhouse gas emissions. Given that this is to be achieved without any new nuclear power plants, this represents a significant

engineering challenge, although Scotland does have significant resources of wind and marine energy which it is hoped would lead to a sizeable renewables industry in the future.

The Academy was supportive of the proposals and, in particular, Scotland's desire to be at the forefront of tackling climate change. It did, however, express concern over the scale of the challenge and the specific policies and technologies that would achieve the targets.

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Genomic Medicine

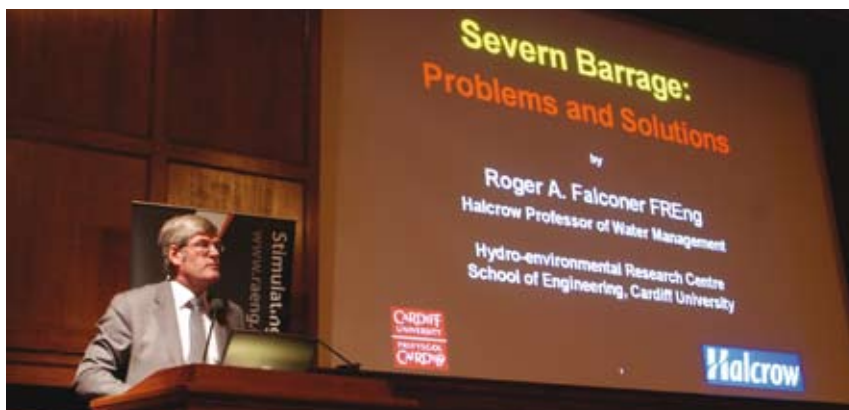
In April the Academy submitted a response to the House of Lords Science and Technology sub-committee II inquiry on genomic medicine. The inquiry will provide an assessment of genome technologies and their impact on clinical practice in the post-genomic era. The committee is expected to publish its report at the end of 2008.

Genomic research is increasingly moving towards quantitative methods and analysis. To make the most of post-genomic developments in a clinical setting, it is vital that quantitative system-wide approaches are developed to help diagnosis and treatment. The Academy recommended a greater involvement of engineering and engineering-based ideas to help drive the quantitative revolution necessary to make full use of genomic developments in medicine. The Academy also suggested that any genetic information database should be subject to stringent data security, and genetic information should be treated as sensitive personal data even if anonymised.

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UK ICT industry – a call for evidence

Information and Communications Technology (ICT) is undergoing profound changes which, unless acknowledged, analysed and addressed, present significant risks to the future competitiveness of UK business and the national economy. Factors include globalisation, off-shoring, protectionism, impatient capital, changing skill requirements and growing business dependency.



Professor Roger Falconer FREng speaking at the Severn Barrage briefing.

Accordingly, the Academy is undertaking a study with the following terms of reference: consider the importance of the ICT base for the UK economy; examine the present and projected state of UK ICT-related business activity in a global context; identify potential ways and means for improvement; and make policy and other recommendations.

The study group, chaired by John Trewby CBE FREng, comprises Fellows and non-Fellows from business, government, institutions and

universities. It is seeking evidence-informed views, using conventional information-gathering methods and ways of reaching younger people, such as through YouTube. Topics include the UK's strength and level of exploitation of ICT, user and academic attention to sustaining the skill base, and the urgency and nature of responses to possible threats.

The study group will especially welcome input from Fellows, preferably based on the core questions posted on the Academy's website (follow the link on the current Policy Activities page in the Policy section of the Academy website). Written responses and offers to give oral evidence should be sent to responses@raeng.org.uk. The study group will also welcome suggestions for other sources of opinion and reference material.

Concurrent with this call for evidence, there will be a series of interviews with leaders from across and beyond the UK, drawn from business users, ICT suppliers, relevant professional societies, economic policy and other agencies, academia and Government.

Subject to approval by the Engineering Policy Committee, the outcome of the study will be published in Spring 2009.

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RCUK Physics Review

The Academy has been strongly involved with the RCUK Review of UK Physics, led by Professor Bill Wakeham FREng. In May

the Academy submitted evidence to the review panel.

Physics provides the underpinning knowledge for most engineering disciplines. The Academy believes that the UK has an historical reputation for excellence in physics. However there are many weaknesses with physics in the UK. It is felt that the quality of teaching could be improved by ensuring that teachers have physics backgrounds or appropriate training and knowledge of the subject. This is essential for inspiring young people to continue studying the subject. At universities, physics teaching should incorporate a strong practical/applied element and train students well for careers in industry as well as academia. There are also problems with recruitment and retention of good physicists into science and engineering sectors; the Academy suggests diversifying entry routes into physics and providing better pay and financial incentives.

The Academy is also concerned about the Government's attitude towards funding and commitment to international programmes. The Government should have a clear, consistent and maintainable strategy for funding and better management of contracts concerning international programmes.

The RCUK Physics Review Panel held witness meetings in June, and will publish their report in September.

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Cheltenham Science Festival

Three Academy Fellows appeared at the 2008 Cheltenham Science Festival in June. This five-day public engagement with science event is one of the UK's finest with high profile speakers, topical debates and a range of interactive activities to excite the younger visitors.

At a well-attended *Climate Engineering* presentation, Professor Roland Clift CBE FREng debated the pros and cons of large scale geoengineering projects to mitigate climate change, alongside environmental scientist Professor Andrew Watson FRS (University of East Anglia) and Defra's Chief Scientific Advisor, Professor Robert Watson. The event was chaired by Forum for the Future Director, Jonathan Porritt CBE, and raised issues including the unknown consequences of climate engineering, huge costs, the challenges of achieving global policy agreement, and the effect on the perceived need of a carbon-neutral future. The panel concluded that geoengineering research should however go ahead and that only those technologies that can be revoked should be implemented, if the need does arise.

For a presentation entitled *From Blueprint to Building* Academy Fellows Professor Chris Wise and Patrick Bellew were joined on stage by architect Keith Bradley. In this, the trio were united about the level of teamwork and agreement needed on multi-million pound revolutionary projects where the architect's ideas push engineering innovation to the limit.

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News of Fellows

Dr Martin Barnes has been appointed Chairman, and Dr Richard Harris and Professor Tony Ridley CBE members, of the Independent Dispute Avoidance Panel for the London 2012 Olympics.

Professor Polina Bayvel has been named a Fellow of the Optical Society.

Professor János Beér has been awarded the Knight's Cross of the Order of Merit of the Hungarian Republic by the President of Hungary.

Professor Wendy Hall CBE has been appointed President of the Association for Computer Machinery. She has also been awarded a Guest Professorship at Tsinghua University in China.

Sir Peter Gershon CBE is to lead a review of the Australian Government's Use of Information and Communication Technology.

Anthony Roche has been appointed Master of the Worshipful Company of Engineers.

Dr Tony Storey has won the 2008 Lovelace Medal from the British Computer Society.

Professor John Wood CBE has been appointed to the European Research Area Board.

Newcastle University has appointed **Professor Paul Younger** as the new Pro-Vice Chancellor of Engagement.

Education Programmes

An overview of activity

The Academy's Education Programmes have grown over recent times as we have sought to increase our influence on the STEM subjects (science, technology, engineering, and maths) taught in schools and colleges. The Academy now has five major programmes and progress with each one is reported here. In time that number will reduce as programmes reach their planned completion. We need to concentrate on areas where we can sustain high impact.

DCSF/DIUS STEM Programme

Since the last newsletter, the Academy has been appointed as the Lead Organisation for Engineering and Technology within the Government's STEM Programme. This provides us with the status required to be truly effective providers of STEM education advice to Ministers and officials within the two Government departments responsible for education the Department for Children, Schools and Families (DCSF) and the Department for Innovation, Universities and Skills (DIUS). At the recent National STEM Conference, the Academy's work in this area was described as 'pioneering' by the National STEM Director, John Holman.

Government is currently looking to the Academy for help in two areas. Firstly to help it produce directories of science and maths extra-curricular activities for schools based on the Academy's *Shape the Future* Directory which is now in its second edition. Secondly, to develop teaching approaches which will help teachers link maths and science with engineering and technology. This will be quite a challenge. However a start has been made thanks to generous support obtained from the Dulverton Trust which is funding the

creation of a teacher CPD course at the National Science Learning Centre in York.

14-19 Diploma in engineering

More than 4,000 school and college students will begin studying the 14-19 Diploma in Engineering in September. The Academy's role in ensuring the maths content of this qualification draws to a close as we prepare for the commencement of teaching. The work on the maths in the Advanced Diploma, undertaken with a number of partners including the Engineering Professors Council and ECuk, has received particular praise from both Government Ministers and the education and engineering press.

London Engineering Project

The London Engineering project has been underway for 30 months now and is delivering a plan that will run for at least a further 12 months. One recent success was the introduction of an engineering recruitment fair for engineering graduates from LEP universities in London. This put over 100 young Londoners, with the engineering skills gained from their recent degree studies, in front of recruiters from 15 engineering companies based in the capital. Careful matchmaking was involved in this event; placing a set of graduates who represent the cultural diversity of London in front of London firms who recognise the benefits of employing a local workforce that is as diverse as the city itself.

Barrow Engineering Project

The Barrow Engineering Project (BEP) is the newest of the Academy's education programmes. It is based in Barrow-in-Furness – although that could easily have been Hull, Swansea, Glasgow or Belfast. The BEP is a long term case study to see how the Academy can have a positive and measurable impact on the promotion of engineering education a long way from its base in London. In Barrow, the Academy has co-funded work in Barrow schools and colleges aimed at inspiring young people to take up engineering as a subject and is a career. We work with local agencies – as funders and as local project champions. That way, local solutions to local problems are found, with the Academy providing national perspective, funding and coordination. BP and BAE Systems are important strategic partners in the BEP.

Best Programme

Under the Academy's Engineering Leadership Awards (ELAs), the most

outstanding engineering undergraduates are sought out and given the support they need to accelerate their early careers and to help them act as inspirational role models for the next generation of engineers. Thanks to funding secured from DIUS through grant-in-aid, 29 new ELA holders were selected by Academy Fellows and by Sainsbury Management Fellows during a weekend selection event in April. These exceptional young people, more than a third of whom are women, will be given a mentor for the next three years and access to their own personal development fund worth up to £5,000. Already this cohort of aspiring engineers has received training in the creation of their Personal Development Plan so that they can take full advantage of what an ELA award from the Academy can bring them. They have also met with more than 50 ELA alumni at an event hosted by the Academy which will provide them with examples of how earlier ELA holders have used their awards and with a chance to network.

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'STEMIT' set to enhance UK Science Teaching

Science teachers can now access a brand new, interactive teaching resource to enhance their classroom offering in science and technology subjects.

Recently launched, STEMIT (www.stemit.org.uk) is the brainchild of long-time science educator Roy Bromley. It is an interactive website that provides teachers with a source for inspiring and creative learning tools for science (technology, engineering, mathematics and information technology will follow shortly).

Recognising the crippling demands on teachers' time, STEMIT's website is easy to access and navigate, is packed with quality-controlled teaching resources and also encourages teachers to collaborate by contributing their own material.

With the site aimed at both teachers and students, STEMIT will soon provide students with their own interactive web-based service, enabling them to search for STEM activities locally, access more advanced subject material, log

Fellowship Nominations

The deadline for new nominations for Fellowship is 31 July 2008. Nominations can be made online at: <http://private.raeng.org.uk> or through the Membership Manager, Jo Ryley at jo.ryley@raeng.org.uk

competences and receive impartial careers advice. The website will also provide links between students and companies, thereby facilitating mentoring relationships and career progression routes.

Supported by The Royal Academy of Engineering and the Royal Society, STEMIT aims to reverse the decline in the number of students choosing to study STEM subjects at school and afterwards.

Minister for Schools, Jim Knight said recently, "Britain has a great tradition for producing world class scientists and engineers and I want to not only maintain that but enhance that... I want more science in action in the classroom, more flash bang to enthuse budding scientists."

Roy Bromley plans to enable this to happen: "My vision is to reignite a passion and enthusiasm for STEM, enabling accessibility for all. We want teachers and students to be turned on to STEM and not to give up because they don't know where to start. I want to make learning fun and exciting; providing an intuitive, interactive and evolutionary, electronic portal developed by teachers for teachers."

Further information: www.stemit.org.uk

Barrow Engineering Project launches

In April, Barrow-in-Furness MP, John Hutton, launched the Barrow

Engineering Project – a unique schools and colleges initiative.

Barrow has one of the largest shipyards in Britain which is currently owned and operated by BAE Systems. Housed in Devonshire Dock Hall, it is the largest shipbuilding construction complex of its kind in Europe, the tallest building in Cumbria, and has dominated the Barrow skyline for over 20 years. BAE Systems has plans for a new building which will be the centre for manufacture of a large section of the new Queen Elizabeth class aircraft carriers, providing over 700 new jobs for local people.

The Project will get local youngsters involved in engineering activities while they are still at school or sixth-form college. Many of the Academy's Best Programme schemes and also BP's Enterprising Science Programme will be involved in delivering the activities, which will include school science clubs and short residential courses. College-based students will even have the chance to taste engineering courses at university. All this will give Barrow students the chance to experience and understand engineering and consider it as a career.

Local Barrow Engineering Project Coordinator, Ed Elvish, 14-19 curriculum strategic consultant for Furness said, "This is a unique opportunity for the young people of the schools and colleges of Barrow. The Academy and our local partners have made this happen through their joint commitment."

Local supporters include Barrow Borough Council, Cumbria County Council, Furness Education Consortium and Cumbria Aimhigher along with employers BAE Systems and BP. The project is planned to run for five years.

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Academy supports Transition to Teaching

This summer sees the Academy supporting the Transition to Teaching Programme.

The Programme has been inaugurated to address the shortage of people with skills in STEM areas; a shortage which to some extent can be attributed to an inability to recruit teachers of STEM subjects.

Developed with employers from both the private and public sectors to promote teaching as a second career and aimed at employees considering a mid to late career change, it is funded by the Training and Development Agency, and targets those with STEM qualifications and who can engage young people and their new teaching peers.

To make a real impact it needs to recruit about 300 additional STEM teachers every year for the next seven years. The first cohort of trainee teachers from the programme will begin their courses in September 2008, with a rolling programme thereafter.

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Pupils from Parkview school in Barrow working with a BAE graduate at a BAE Systems Roadshow on 18 April 2008 – the day the Project was launched.

Obituaries

Professor Thomas Bell FREng died on 17 April. At the time of his death he was Hanson Professor of Metallurgy, School of Metallurgy and Materials, University of Birmingham.

Dr Keith Best OBE FREng died on 1 June. Before his retirement he was a Senior Partner, Bullen & Partners.

Mr Bevan Braithwaite OBE FREng died on 25 April. Prior to his retirement he was Chief Executive, TWI Ltd.

Professor Peter Rolfe Vaughan FREng died in June. At the time of his death he was Emeritus Professor of Ground Engineering, Imperial College London.

Academy Fellow appointed MoD Chief Scientific Advisor

Professor Mark Welland, Academy Fellow and Cambridge Academic, was appointed to the position of Chief Scientific Advisor (CSA) for the Ministry of Defence in April. This position requires Professor Welland to handle a £500 million budget and manage 250 Defence scientific staff to provide the MoD with the best possible access to, as he said himself, "ensure science contributes fully in supporting the role of the Armed Forces by delivering world-beating technology."

The Secretary for Defence, Des Browne MP, welcomed Professor Welland's appointment and said, "His extensive experience and his wide ranging scientific interest, together with his strong links to academia will prove invaluable to his successful tenure in this role."

While working as CSA, Professor Welland will continue his innovative research at the University of Cambridge where he is Professor of Nanotechnology at the Department of Engineering and Head of the Nanoscience Group at the Nanoscience Centre.

Re-organising the Academy

Some important changes to the staff structure were made in April aimed at positioning us better for our increasingly ambitious agenda. The first places a stronger emphasis on creating impact from the Academy's policy work by bringing together the policy team with those who deliver PR, public affairs and public engagement. This new group is led by Beverley Parkin who joined the Academy in April as Director of Policy and Public Affairs. We are currently recruiting a public affairs manager to strengthen the team.

The second change addresses our need to improve our strategy and planning processes, which has become increasingly important as the volume and complexity of our work has grown. Keith Davis, as the Director of Strategy and Planning, will also have responsibility for our membership support, events and awards, research and secondments, and our growing international activities.

Chris Coulter will move internally to the new role of Fellowship Manager and part of his time will be dedicated to supporting the new Proactive Membership Committee, set up following Sir Peter Gershon's review of our membership processes last year.

Staff News

Beverley Parkin has joined the Academy as the first Director of Policy and Public Affairs. Her previous role was as Director of Public Affairs and Communications for the Royal Pharmaceutical Society of Great Britain, the regulatory and professional development body for pharmacists. In

APEG update

In March, the Associate Parliamentary Engineering Group (APEG) was addressed by the Executive Director of Powertrain Engineering at Ford. Graham Hoare spoke about carbon dioxide and the engineering challenges posed by climate change. He gave an overview of the different technologies available to power motor vehicles and highlighted the difficulty his company had experienced in recruiting engineers in the UK with the range of skills needed to address these issues.

The annual APEG dinner in April was very well-attended. Gareth Thomas MP, Parliamentary Under-Secretary in both the Departments for International Development and Business, Enterprise and Regulatory Reform was the

keynote speaker. Highlighting the role of Government in supporting the engineering, the Minister paid tribute to the contribution of the engineering industry to the UK economy in terms of jobs, skills and wealth-creation.

that post, which she held for eight years, she established the organisation's public affairs programme in the UK and EU and developed its media presence. She was responsible for award-winning public information campaigns and directed several areas of policy.

Her earlier career has included roles in journalism and public relations with engineering trade unions and a public affairs role with the Gas Consumers' Council.

Cuong Dang has joined the Academy as Team Administrator for the Strategy and Planning and the Policy and Public Affairs Departments. Prior to this he was a Production Coordinator in the film industry..

James Lucey and **Nigel Palmer** have changed job titles at the Academy. They are now Conference Manager and Facilities Manager respectively.

Kate Phillips has left after two years of service as the IT Officer at the Academy. She has contributed to the development of all aspects of the Academy's IT systems. We wish her the best of luck for the future.

In May, Robin McGill, the Chief Executive of The Institution of Engineering and Technology addressed APEG. Robin McGill explained the role of the IET and how it interacted with other engineering organisations. He highlighted the range of engineering skills that the UK engineering industry will need for the future. There was, he said, a challenge in encouraging women to take up science and engineering degree courses and to keep them in the industry once they are qualified.

Further information: www.apeg.org.uk

News Summer 2008 – printed on Cyclus 100% recycling concept paper

Published by The Royal Academy of Engineering
3 Carlton House Terrace, London SW1Y 5DG
Tel: 020 7766 0600 Fax: 020 7930 1549 www.raeng.org.uk
Edited and designed by Angus Dawson



The Royal Academy of Engineering promotes excellence in the science, art and practice of engineering.
Registered charity number 293074